lower elevations of the Sierra foothills and in the Coast Range. As a result, the natural hydrology historically reflected a mixed runoff regime dominated by winter-spring rainfall runoff and spring-summer snowmelt runoff. Most flow is derived from snowmelt from the Sierra Nevada, with relatively little runoff contributed from the western side of the drainage basin in the rain shadow of the Coast Range. The unimpaired average annual water yield (WY1906-2002) of the San Joaquin River, as measured immediately above Millerton Reservoir, is 1,801,000 acre-feet (USBR, 2002); the post-Friant Dam average annual water yield (WY 1950-2000) to the lower San Joaquin River is 695,500 acre-feet (USGS, 2000). As average precipitation decreases from north to south, the San Joaquin River basin (including the Stanislaus, Tuolumne, and Merced Rivers) contributes about 22% of the total runoff to the Delta (DWR, 1998).

Current Conditions

Historically, most of the San Joaquin River, which forms the great majority of the Delta-Mendota Subbasin's eastern border, was a gaining reach. Snowmelt runoff during the spring and early summer resulted in these conditions through a good portion of the year. However, significant decreases in groundwater elevations due to a myriad of factors, including pumping, tile drains, the channelizing of flood flows, and upstream diversions on the river, have reversed this condition so most reaches are now losing reaches. Some localized gaining reaches still remain on the lower river, such as between the Stanislaus and Merced Rivers; however, many reaches along these rivers (and along localized streams) may transition from gaining to losing depending on hydrology.

Estimates of Timing and Quantity of Depletions

Using available data and where feasible, each Delta-Mendota Subbasin GSP Group quantified the gains and/or losses from the groundwater at each interconnected reach of the San Joaquin River adjoining the Delta-Mendota Subbasin. **Table CC-6** summarizes these estimates. For more information about the sources or methods used to estimate the timing and quantity of depletions, refer to the individual GSPs.

Table CC-6: Estimated Quantity of Gains/Depletions for Interconnected Stream Reaches, San Joaquin River

	Landmark	River Mile	GSP Group	Interconnected?	Gaining or Losing?	Quantity Gained/Loss (cfs)	Notes
REACH 1		*267.5 to 229.0*	Located outside the Delta-Mendota Subbasin				
A	Friant Dam	267.5					
	North Fork Road Bridge	266.8					
	Cobb Island Bridge	259.0					
	State Route 41 (Lanes Bridge)	255.2					
	Scout Island Bend	250.0					
	ATSF Railroad Bridge	245.0					
B	State Route 99	243.2					
	Southern Pacific Railroad	243.2					
	State Route 145 Bridge (Skaggs Bridge)	234.1					
	Gravelly Ford	229.0					
REACH 2		*229.0 to 204.8*					
A	Gravelly Ford	229.0		Yes	Losing when flowing		
	Upstream Limit of Right Bank Levee	227.0					
	Upstream Limit of Left Bank Levee	225.0					
B	Chowchilla Bypass Control Structure	216.1	Farmers Water District	Yes	Losing when flowing	-4	2003 to 2013 average. High in 2010 (-8 cfs), low in 2004 and 2009 (-1 cfs)
	Mendota Dam	204.8					
	Mendota Pool			Yes	Losing	-40	-29,000 AFY
REACH 3		*204.8 to 182.0*		Yes	Losing	-25	-18.000 AFY
	Mendota Dam	204.8					
	Avenue 7.5 Bridge (Firebaugh)	195.2					
	Sack Dam	182.0					
REACH 4		*182.0 to 135.8*				–-0 - 0	Losses when wet; gaining in some areas (but unquantifiable)
A	Sack Dam	182.0		Y–s - first 2 miles –o - next 1.5 miles Y–s - remaining miles	Losing		
	State Route 152 Bridge	173.9		Yes	Gaining		
B	Sand Slough Control Structure	168.5					
	Mariposa Slough Control Structure	168.4					
	Turner Island Road Bridge	157.2					
	Mariposa Bypass confluence	147.2					

Landmark	River Mile	GSP Group	Interconnected?	Gaining or Losing?	Quantity Gained/Loss (cfs)	Notes
Bear Creek/Eastside Bypass confluence	135.8					
REACH 5	*135.8 to 118.0*		Yes	Gaining	unquantifiable	Likely gaining from ag/refuge draining but unquantifiable
Bear Creek/Eastside Bypass confluence	135.8					
State Route 165 Bridge (Lander Avenue)	132.9					
Salt Slough con fluence	127.7					
State Route 140 Bridge (Fremont Ford)	125.1					
Mud Slough confluence	121.2					
Merced River confluence (Hills Ferry Bridge)	118.0					
Newman to Crows Landing		Northern & Central Delta-Mendota	Yes	Gaining	50	50
Crows Landing to Patterson		Northern & Central Delta-Mendota Region	Yes	Gaining	-50 to 200	-50 to 200
Patterson to Vernalis		Northern & Central Delta-Mendota Region	Yes	Gaining	190	6.1 cfs/mi for 30.8 miles. Based on Cooley, W. 2001. *Groundwater flow net analysis for lower San Joaquin River Basin.* Memo to CRWQCB, August 8, 2001

Groundwater Dependent Ecosystems

A groundwater dependent ecosystem (GDE) is defined under the GSP Emergency Regulations as referring "to ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" (§351(m)). Under §354.16(g) of the GSP Emergency Regulations, each Plan is required to identify GDEs within the subbasin utilizing data provided by DWR or the best available information. The following section describes the process for verifying GDEs within the Delta-Mendota Subbasin and the location of verified and potential GDEs.

The Natural Communities Commonly Associated with Groundwater (NCCAG) dataset (2018c) provided by DWR was used in conjunction with information provided by The Nature Conservancy (TNC) to identify GDEs within the Delta-Mendota Subbasin. To further screen available information regarding GDEs, each GSP Group developed individualized criteria. Additional details regarding the screening process implemented by each GSP can be found in the individual GSPs.

Based on the screening process implemented by each individual GSP Group, GDE polygons determined not to be GDEs were removed from the mapping. **Figure CC-62** and **Figure CC-63** summarize the results of the GDE analysis for the Subbasin. Results are compiled into two habitat classes: wetlands (**Figure CC-62**) and vegetation (**Figure CC-63**). Wetland features are commonly associated with surface expression of groundwater under natural, unmodified conditions. Vegetation feature types are commonly associated with the sub-surface presence of groundwater (phreatophytes – deep rooted plants). Confirmed GDEs have been grouped into larger polygons based on proximity and aquifer connection.

In general, identified Possible GDEs are primarily located along the San Joaquin River corridor, within the northern portion of the Northern & Central Delta-Mendota Region GSP, the SJREC GSP, the Grassland GSP, and the Fresno GSP Plan Areas, where some possible GDEs have been identified along ephemeral streams that originate from the Coast Range. Table CC-7 includes all freshwater species within the Delta-Mendota Subbasin as identified by TNC (2018). Per TNC data, these species (listed in Table CC-7) have either been observed or have the potential to exist within the Delta-Mendota Subbasin; however, the actual presence of these species have not been verified. As a result of the identification of Possible GDEs for the purpose of SGMA, no land use protections for GDEs are conveyed unless otherwise required. Additionally, the Delta Mendota Subbasin recognizes the opportunity to present further-refined GDE delineations in the subsequent GSP Updates.

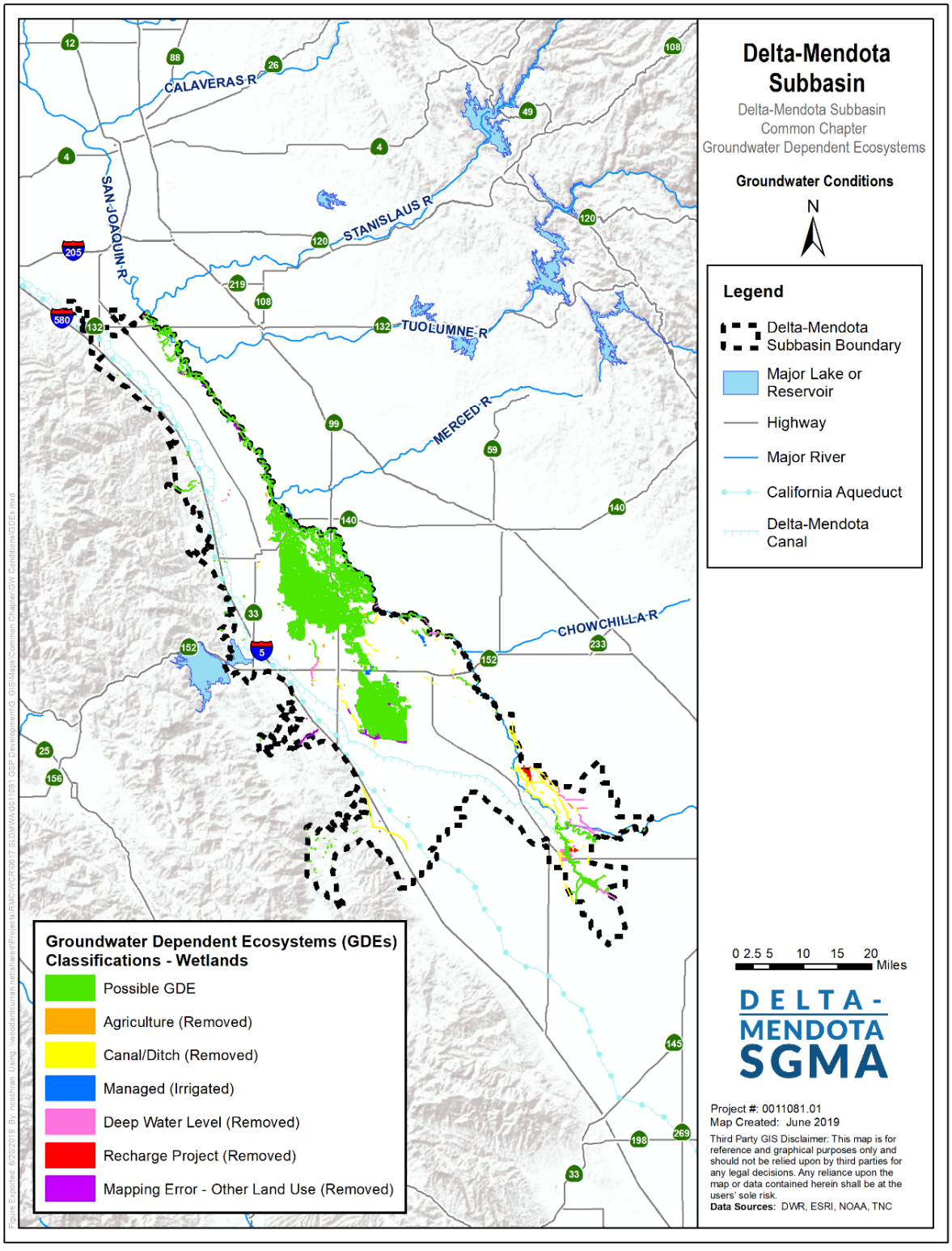


Figure CC-62: Groundwater Dependent Ecosystems, Wetlands

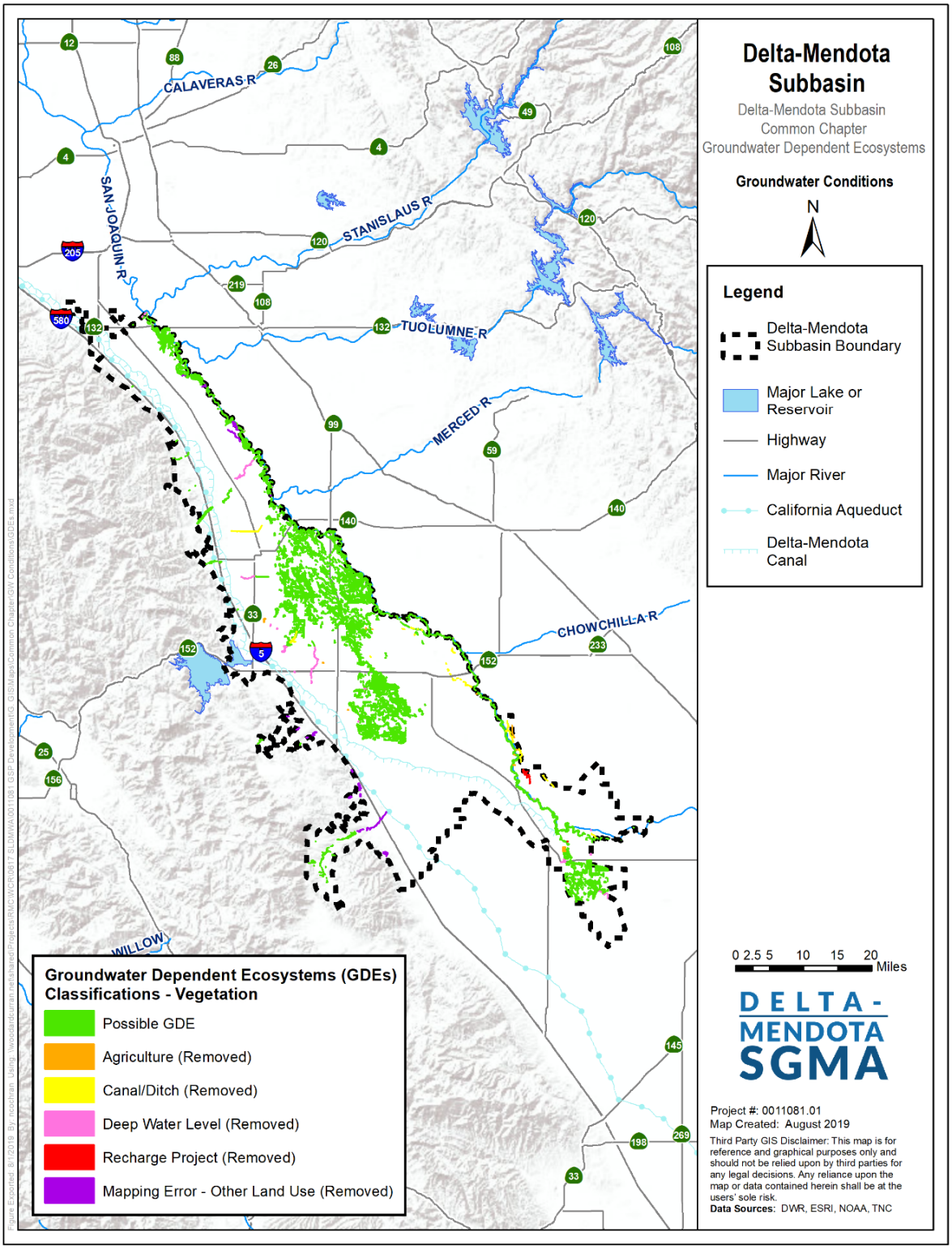


Figure CC-63: Groundwater Dependent Ecosystems, Vegetation

Table CC-7: List of Potential Freshwater Species

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Actitis macularius	Spotted Sandpiper	Birds		
Aechmophorus clarkii	Clark's Grebe	Birds		
Aechmophorus occidentalis	Western Grebe	Birds		
Agelaius tricolor	Tricolored Blackbird	Birds	Bird of Conservation Concern	Special Concern
Aix sponsa	Wood Duck	Birds		
Anas acuta	Northern Pintail	Birds		
Anas americana	American Wigeon	Birds		
Anas clypeata	Northern Shoveler	Birds		
Anas crecca	Green-winged Teal	Birds		
Anas cyanoptera	Cinnamon Teal	Birds		
Anas discors	Blue-winged Teal	Birds		
Anas platyrhynchos	Mallard	Birds		
Ariescriser albifrons	Greater White-fronted Goose	Birds		
Ardea alba	Great Egret	Birds		
Ardea herodias	Great Blue Heron	Birds		
Aythya affinis	Lesser Scaup	Birds		
Aythya americana	Redhead	Birds		Special Concern
Aythya collaris	Ring-necked Duck	Birds		
Aythya marila	Greater Scaup	Birds		
Aythya valisineria	Canvasback	Birds		Special
Botaurus lentiginosus	American Bittern	Birds		
Bucephala albeola	Bufflehead	Birds		
Bucephala clangula	Common Goldeneye	Birds		
Butorides virescens	Green Heron	Birds		
Calidris alpina	Dunlin	Birds		
Calidris mauri	Western Sandpiper	Birds		
Calidris minutilla	Least Sandpiper	Birds		
Chen caerulescens	Snow Goose	Birds		

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Chen rossii	Ross's Goose	Birds		
Chlidonias niger	Black Tern	Birds		Special Concern
Chroicocephalus philadelphia	Bonaparte's Gull	Birds		
Cistothorus palustris	Marsh Wren	Birds		
Cygnus columbianus	Tundra Swan	Birds		
Cypseloides niger	Black Swift	Birds	Bird of Conservation Concern	Special Concern
Dendrocygna bicolor	Fulvous Whistling-Duck	Birds		Special Concern
Egretta thula	Snowy Egret	Birds		
Empidonax traillii	Willow Flycatcher	Birds	Bird of Conservation Concern	Endangered
Fulica americana	American Coot	Birds		
Gallinago delicata	Wilson's Snipe	Birds		
Gallinula chloropus	Common Moorhen	Birds		
Geothlypis trichas	Common Yellowthroat	Birds		
Grus canadensis	Sandhill Crane	Birds		
Haliaeetus leucocephalus	Bald Eagle	Birds	Bird of Conservation Concern	Endangered
Himantopus mexicanus	Black-necked Stilt	Birds		
Icteria virens	Yellow-breasted Chat	Birds		Special Concern
Limnodromus scolopaceus	Long-billed Dowitcher	Birds		
Lophodytes cucullatus	Hooded Merganser	Birds		
Megaceryle alcyon	Belted Kingfisher	Birds		
Mergus merganser	Common Merganser	Birds		
Mergus serrator	Red-breasted Merganser	Birds		
Numenius americanus	Long-billed Curlew	Birds		
Numenius phaeopus	Whimbrel	Birds		
Nycticorax	Black-crowned Night-Heron	Birds		
Oxyura jamaicensis	Ruddy Duck	Birds		
Pandion haliaetus	Osprey	Birds		Watch list
Pelecanus erythrorhynchos	American White Pelican	Birds		Special Concern

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Phalacrocorax auritus	Double-crested Cormorant	Birds		
Phalaropus tricolor	Wilson's Phalarope	Birds		
Plegadis chihi	White-faced Ibis	Birds		Watch list
Pluvialis squatarola	Black-bellied Plover	Birds		
Podiceps nigricollis	Eared Grebe	Birds		
Podilymbus podiceps	Pied-billed Grebe	Birds		
Porzana carolina	Sora	Birds		
Rallus limicola	Virginia Rail	Birds		
Recurvirostra americana	American Avocet	Birds		
Riparia	Bank Swallow	Birds		Threatened
Setophaga petechia	Yellow Warbler	Birds		
Tachycineta bicolor	Tree Swallow	Birds		
Tringa melanoleuca	Greater Yellowlegs	Birds		
Tringa semipalmata	Willet	Birds		
Tringa solitaria	Solitary Sandpiper	Birds		
Vireo bellii	Bell's Vireo	Birds		
Vireo bellii pusillus	Least Bell's Vireo	Birds	Endangered	Endangered
Xanthocephalus	Yellow-headed Blackbird	Birds		Special Concern
Artemia franciscana	San Francisco Brine Shrimp	Crustaceans		
Branchinecta conservatio	Conservancy Fairy Shrimp	Crustaceans	Endangered	Special
Branchinecta lindahli	Versatile Fairy Shrimp	Crustaceans		
Branchinecta longiantenna	Longhorn Fairy Shrimp	Crustaceans	Endangered	Special
Branchinecta lynchi	Vernal Pool Fairy Shrimp	Crustaceans	Threatened	Special
Lepidurus packardi	Vernal Pool Tadpole Shrimp	Crustaceans	Endangered	Special
Linderiella occidentalis	California Fairy Shrimp	Crustaceans		Special
Oncorhynchus myki–s - CV	Central Valley steelhead	Fishes	Threatened	Special
Oncorhynchus mykiss irideus	Coastal rainbow trout	Fishes		

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Pogonichthys macrolepidotus	Sacramento splittail	Fishes		Special Concern
Actinemys marmorata	Western Pond Turtle	Herps		Special Concern
Ambystoma californiense	California Tiger Salamander	Herps	Threatened	Threatened
Anaxyrus boreas	Boreal Toad	Herps		
Pseudacris regilla	Northern Pacific Chorus Frog	Herps		
Rana boylii	Foothill Yellow-legged Frog	Herps	Under Review in the Candidate or Petition Process	Special Concern
Rana draytonii	California Red-legged Frog	Herps	Threatened	Special Concern
Spea hammondii	Western Spadefoot	Herps	Under Review in the Candidate or Petition Process	Special Concern
Thamnophis atratus	Santa Cruz Gartersnake	Herps		
Thamnophis elegans	Mountain Gartersnake	Herps		
Thamnophis gigas	Giant Gartersnake	Herps	Threatened	Threatened
Thamnophis hammondii	Two-striped Gartersnake	Herps		Special Concern
Thamnophis sirtalis	Common Gartersnake	Herps		
Aeshnidae fam.	Aeshnidae fam.	Insects & other inverts		
Anax junius	Common Green Darner	Insects & other inverts		
Brillia spp.	Brillia spp.	Insects & other inverts		
Callicorixa spp.	Callicorixa spp.	Insects & other inverts		
Capnia hitchcocki	Arroyo Snowfly	Insects & other inverts		
Chironomus spp.	Chironomus spp.	Insects & other inverts		
Coenagrionidae fam.	Coenagrionidae fam.	Insects & other inverts		
Corisella spp.	Corisella spp.	Insects & other inverts		
Cricotopus spp.	Cricotopus spp.	Insects & other inverts		
Ischnura cervula	Pacific Forktail	Insects & other inverts		
Ischnura denticollis	Black-fronted Forktail	Insects & other inverts		
Mesocapnia bulbosa	Bulbous Snowfly	Insects & other inverts		

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Paraleptophlebia associata	A Mayfly	Insects & other inverts		
Paratanytarsus spp.	Paratanytarsus spp.	Insects & other inverts		
Phaenopsectra spp.	Phaenopsectra spp.	Insects & other inverts		
Procladius spp.	Procladius spp.	Insects & other inverts		
Psectrocladius spp.	Psectrocladius spp.	Insects & other inverts		
Tanypus spp.	Tanypus spp.	Insects & other inverts		
Tipulidae fam.	Tipulidae fam.	Insects & other inverts		
Trichocorixa spp.	Trichocorixa spp.	Insects & other inverts		
Castor canadensis	American Beaver	Mammals		
Lontra canadensis	North American River Otter	Mammals		
Neovison vison	American Mink	Mammals		
Ondatra zibethicus	Common Muskrat	Mammals		
Anodonta californiensis	California Floater	Mollusks		Special
Margaritifera falcata	Western Pearlshell	Mollusks		Special
Pyrgulopsis diablensis	Diablo Range Pyrg	Mollusks		Special
Alopecurus saccatus	Pacific Foxtail	Plants		
Ammannia coccinea	Scarlet Ammannia	Plants		
Anemopsis californica	Yerba Mansa	Plants		
Arundo donax	NA	Plants		
Azolla filiculoides	NA	Plants		
Azolla microphylla	Mexican mosquito fern	Plants		Special
Baccharis salicina		Plants		
Bacopa eisenii	Gila River Water-hyssop	Plants		
Bidens laevis	Smooth Bur-marigold	Plants		
Bolboschoenus glaucus	NA	Plants		
Bolboschoenus maritimus paludosus	NA	Plants		
Callitriche marginata	Winged Water-starwort	Plants		
Ceratophyllum demersum	Common Hornwort	Plants		
Chloropyronmoesclle hispidum		Plants		Special
Chloropyron palmatum	NA	Plants	Endangered	Special

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Cotula coronopifolia	NA	Plants		
Crassula aquatica	Water Pygmyweed	Plants		
Crypsis vaginiflora	NA	Plants		
Cyperus erythrorhizos	Red-root Flatsedge	Plants		
Cyperus squarrosus	Awned Cyperus	Plants		
Downingia bella	Hoover's Downingia	Plants		
Downingia pulchella	Flat-face Downingia	Plants		
Echinodorus berteroi	Upright Burhead	Plants		
Elatine brachysperma	Shortseed Waterwort	Plants		
Elatine californica	California Waterwort	Plants		
Eleocharis acicularis	Least Spikerush	Plants		
Eleocharis atropurpurea	Purple Spikerush	Plants		
Eleocharis coloradoensis		Plants		
Eleocharis macrostachya	Creeping Spikerush	Plants		
Eleocharis montevidensis	Sand Spikerush	Plants		
Eleocharis quadrangulata	NA	Plants		
Elodea canadensis	Broad Waterweed	Plants		
Epilobium cleistogamum	Cleistogamous Spike-primrose	Plants		
Eragrostis hypnoides	Teal Lovegrass	Plants		
Eryngium castrense	Great Valley Eryngo	Plants		
Eryngium racemosum	Delta Coyote-thistle	Plants		Endangered
Eryngium spinosepalum	Spiny Sepaled Coyote-thistle	Plants		Special
Eryngium vaseyi vallicola		Plants		
Eryngium vaseyi	Vasey's Coyote-thistle	Plants		
Euthamia occidentalis	Western Fragrant Goldenrod	Plants		
Hydrocotyle verticillata	Whorled Marsh-pennywort	Plants		
Juncus acuminatus	Sharp-fruit Rush	Plants		
Juncus xiphioides	Iris-leaf Rush	Plants		

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Lasthenia ferrisiae	Ferris' Goldfields	Plants		Special
Lasthenia fremontii	Fremont's Goldfields	Plants		
Lemna aequinoctialis	Lesser Duckweed	Plants		
Lemna gibba	Inflated Duckweed	Plants		
Lemna minor	Lesser Duckweed	Plants		
Lepidium jaredii	Jared's Peppergrass	Plants		Special
Lepidium oxycarpum	Sharp-pod Peppergrass	Plants		
Limnanthes douglasii	Douglas' Meadowfoam	Plants		
Limosella acaulis	Southern Mudwort	Plants		
Lipocarpha micrantha	Dwarf Bulrush	Plants		
Ludwigia peploides	NA	Plants		
Ludwigia repens	Creeping Seedbox	Plants		
Lythrum californicum	California Loosestrife	Plants		
Marsilea vestita	NA	Plants		
Mimulus cardinalis	Scarlet Monkeyflower	Plants		
Mimulus guttatus	Common Large Monkeyflower	Plants		
Montia fontana	Fountain Miner's-lettuce	Plants		
Myosurus minimus	NA	Plants		
Myosurus sessilis	Sessile Mousetail	Plants		
Myriophyllum aquaticum	NA	Plants		
Najas guadalupensis	Southern Naiad	Plants		
Navarretia heterandra	Tehama Navarretia	Plants		
Navarretia leucocephala	White-flower Navarretia	Plants		
Navarretia prostrata	Prostrate Navarretia	Plants		Special
Neostapfia colusana	Colusa Grass	Plants	Threatened	Endangered
Panicum dichotomiflorum	NA	Plants		
Paspalum distichum	Joint Paspalum	Plants		
Persicaria hydropiperoides		Plants		
Persicaria lapathifolia		Plants		
Persicaria maculosa	NA	Plants		
Persicaria pensylvanica	NA	Plants		

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Phacelia distans	NA	Plants		
Phyla lanceolata	Fog-fruit	Plants		
Phyla nodiflora	Common Frog-fruit	Plants		
Pilularia americana	NA	Plants		
Plagiobothrys acanthocarpus	Adobe Popcorn-flower	Plants		
Plagiobothrys greenei	Greene's Popcorn-flower	Plants		
Plagiobothrys humistratus	Dwarf Popcorn-flower	Plants		
Plagiobothrys leptocladus	Alkali Popcorn-flower	Plants		
Plantago elongata	Slender Plantain	Plants		
Pluchea odorata	Scented Conyza	Plants		
Pogogyne douglasii	NA	Plants		
Pogogyne zizyphoroides		Plants		
Potamogeton diversifolius	Water-thread Pondweed	Plants		
Potamogeton foliosus	Leafy Pondweed	Plants		
Potamogeton nodosus	Longleaf Pondweed	Plants		
Potamogeton pusillus	Slender Pondweed	Plants		
Psilocarphus brevissimus	Dwarf Woolly-heads	Plants		
Psilocarphus oregonus	Oregon Woolly-heads	Plants		
Psilocarphus tenellus	NA	Plants		
Puccinellia simplex	Little Alkali Grass	Plants		
Ranunculus sceleratus	NA	Plants		
Rorippa curvisiliqua	Curve-pod Yellowcress	Plants		
Rorippa palustris	Bog Yellowcress	Plants		
Rotala ramosior	Toothcup	Plants		
Ruppia cirrhosa	Widgeon-grass	Plants		
Ruppia maritima	Ditch-grass	Plants		
Sagittaria longiloba	Longbarb Arrowhead	Plants		
Sagittaria montevidensis calycina		Plants		
Salix exigua	Narrowleaf Willow	Plants		
Salix gooddingii	Goodding's Willow	Plants		

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Schoenoplectus acutus occidentalis	Hardstem Bulrush	Plants		
Schoenoplectus americanus	Three-square Bulrush	Plants		
Sinapis alba	NA	Plants		
Sparganium eurycarpum		Plants		
Stuckenia pectinata		Plants		
Typha domingensis	Southern Cattail	Plants		
Typha latifolia	Broadleaf Cattail	Plants		
Veronica americana	American Speedwell	Plants		
Wolffiella lingulata	Tongue Bogmat	Plants		
Zannichellia palustris	Horned Pondweed	Plants		

Source: The Nature Conservancy (TNC). 2018. Identifying Environmental Surface Water Use–s - Freshwater Species List for Each Groundwater Basin dataset. https://groundwaterresourcehub.org/gde-tools/environmental-surface-water-beneficiaries/

4.2.8 Data Gaps

The Delta-Mendota Subbasin is an extensive subbasin covering a large area extending along the northwestern end of the San Joaquin Valley. While there is a significant amount of data available regarding various groundwater-related aspects of the Subbasin, much is still not known in multiple locations around the Subbasin. To this end, the following data gaps have been identified and will be addressed as part of the interim period between adoption of this GSP and its first 5-year update.

- Information regarding subsidence varies in extent around the region. While there is a large amount of land elevation survey data available in association with the DMC and the San Joaquin River Restoration Program, other areas in the Delta-Mendota Subbasin require additional data collection to both further establish and monitor future land subsidence rates.

- Only three shallow groundwater wells exist proximate to the northern end of the San Joaquin River (outside of the area being addressed by the San Joaquin River Restoration Program). Additional nested or clustered monitoring wells are required adjacent to the river on the northern end of the Subbasin to evaluate horizontal and vertical groundwater gradients, and in connection with river stage monitoring, to assess the interconnection between the San Joaquin River and the northeastern end of the Delta-Mendota Subbasin.

- There are a large number of wells in the Delta-Mendota Subbasin where no well construction information exists or is readily available. Video surveys and other surveys should be conducted on selected wells that may potentially be added to the Subbasin monitoring network to (1) identify where the wells are screened, and (2) determine if the well(s) are appropriate as additions to the GSP Groups' groundwater monitoring programs.

- Mapping of GDEs in the Delta-Mendota Subbasin, as contained in this Common Chapter, is an initial assessment of their location. This mapping may be refined using most recent groundwater elevation/depth to water contour mapping.

- Monitoring networks contained herein are preliminary and were formulated based on existing well information. As additional wells are installed in the Subbasin and additional well construction information is obtained for existing wells, these networks may need to be refined to improve on the spatial (areal and vertical) distribution of monitoring points and the data collected for evaluation of conditions of the groundwater basin.

- The sustainable yield estimates and water budgets contained in this Common Chapter for both the Upper and Lower Aquifers were developed using limited data. As additional data are collected over the first five years, improved sustainable yield estimates and estimates of water in storage in both principal aquifers should be prepared utilizing the new data.

In addition to these Subbasin-level data gaps, additional data gaps have been identified for each GSP Plan Area. Please see the individual GSPs for additional identified data gaps.

4.3 Delta-Mendota Subbasin Water Budgets

This section describes the common coordinated assumptions agreed upon and utilized by each GSP Group in the Delta-Mendota Subbasin in developing the historical, current, and projected water budgets for their respective GSP Plan Areas. These coordinated historical, current, and projected water budgets were then compiled to prepare the subbasin-level water budgets required under the GSP Regulations §

357.4(b)(3)(B), presented below. The sustainable yield for the Upper Aquifer and Lower Aquifer developed at the Subbasin-level and agreed upon by all GSP Groups in the Delta-Mendota Subbasin is also presented along with a description as to how the sustainable yield for each primary aquifer was calculated.

4.3.1 Coordinated Assumptions

All common coordinated assumptions agreed upon and utilized by each GSP Group in preparing their respective historical, current, and projected water budgets are presented in Technical Memoranda 3 (*Assumptions for the Historical, Current, and Projected Water Budgets of the Delta-Mendota Subbasin*), which is included in **Appendix B** of this Common Chapter.

The data and methodologies used to develop the water budgets in the six individual GSPs (and compiled herein as the Subbasin Water Budgets) were coordinated with the express objective to "rely on the best available information and best available science to quantify the water budget for the basin" (Title 23 of the California Code of Regulations [23 CCR] § 354.18(e)). Given the complex nature of the Subbasin, different data sets and methodologies were appropriate for and/or available in different portions of the Subbasin. As such, a significant effort was made by the Subbasin GSAs to: (1) identify the different sources and accuracy of the available data; (2) consolidate these data and associated methodologies into a general hierarchy for use by the GSAs to honor the local conditions, while maintaining consistency with the intent of 23 CCR § 354.18(e); and (3) standardize the terminology for purposes of the Common Chapter presentation of the Subbasin Water Budget. These standardized water budget components and data sources are presented in **Table CC-8** and **Table CC-9** for the historic and current, and projected water budgets, respectively, and are further described below, while acknowledging that significant additional detail is presented in the six underlying GSPs. In some cases, data were not available or applicable, as acknowledged below and in the tables. Additionally, in some cases the specific terminology and/or the details of the calculations included in each underlying GSP remains unique relative to the standardized terminology and descriptions presented below; a full reconciliation of water budget nomenclature will be conducted as part of the 2025 GSP updates, as well as updates to the datasets and methodologies employed. Water use in the Subbasin is largely for agricultural purposes, with local municipal and industrial (M&I) uses. As appropriate, these M&I uses were quantified and incorporated in the individual GSP water budgets.

LAND SURFACE WATER BUDGET

The data sources/methodologies used to estimate the six major components of the Historical and Current Land Surface Water Budgets are summarized in **Table CC-8** and for the Projected Land Surface Water Budgets in **Table CC-9**. A general description of each component and the data hierarchy that was applied by the GSAs is provided below, with further detail provided in the Water Budget sections of the six underlying GSPs. For purposes of the Subbasin GSPs, the Historical and Current Water Budgets represent Water Year (WY) 2003-2013, where the historical period is WY 2003-2012 and the current year is WY 2013. The Projected Water Budgets reflect projected conditions through 2070[1] and consider the impacts

[1] The Subbasin GSAs agreed to use actual data from WYs 2014-2017 and assume a repeat of the historical hydrology for the years WY 2018-2070. The selected period for the projected water budgets meets SGMA requirements by establishing a 50-year period, where the timeframe is continuous between the historic, current, and projected water budgets. The historic hydrologic period for simulating the projected water budget hydrologic

of climate change and projects and management actions (PMAs). To the extent possible the data sources and methodology used were consistent with those identified by the California Department of Water Resources (DWR) in *Table 2 – Potential Data Sources to Support Water Budget Development* and other sections of the Best Management Practices (BMP) –4 - Water Budget.[1] As applicable and available, models and tools (e.g., the Central Valley Hydrologic Model 2 [CVHM2]) were used to support the local sources and assumptions incorporated into the development of the Subbasin Groundwater Water Budget.

(1) **Precipitation (Inflow).** For the Historical and Current Land Surface Water Budgets, total precipitation across the Subbasin was estimated using either: (1) PRISM: the Precipitation-Elevation Regressions on Independent Slopes Model (PRISM); (2) CIMIS: area-weighted data from the California Irrigation Management Information System (CIMIS) stations located in the Subbasin; California Data Exchange Center (CDEC) and/or (3) data from the National Water Service Station located in Los Banos, CA. Total precipitation was further parsed into effective and non-effective precipitation, as applicable to each GSP area, based on assumptions regarding deep percolation percentages and other losses.

For the Projected Land Surface Water Budgets, for WY 2014-2017, actual data were provided consistent with the process described above for the Historical and Current Water Budgets. For the projected WY 2018-2070 period, the 2030 Central Tendency and 2070 Central Tendency climate change factors and guidance provided by DWR were applied to the historical precipitation record to project the impact of climate change on precipitation across the Subbasin. For example, either (1) the Gridded Statewide Precipitation and Change Factors developed for the Water Storage Investment Program (WSIP) using the Variable Infiltration Capacity (VIC) Macroscale Hydrology Model (DWR, 2018) were applied to the available precipitation data sets for the Subbasin, or (2) recommendations from the *Perspectives and Guidance for Climate Change Analysis* document prepared by the DWR Climate Change Technical Advisory Group (CCTAG) were incorporated (DWR CCTAG, 2015).

(2) **Applied Water – Groundwater (Inflow).** To estimate the volume of applied groundwater for the Historical and Current Land Surface Water Budgets (including both agricultural and M&I pumping, as applicable to each GSP area), the total pumping within the Subbasin was estimated using the following hierarchy of sources, depending upon existing records: (1) Flow meters: volumetric flow meter records from pumping wells; (2) Power bills: electricity bills from pumping wells (wherein information related to the number of kilowatt-hours used was converted to a pumping volume based on assumptions related to pumping lift and efficiency); and/or (3) Consumptive use: reported crop acreages and consumptive use data based on either Irrigation Training and Research Center (ITRC)[2] Mapping of Evapotranspiration with Internal Calibration (METRIC) procedure or crop coefficient methodologies (e.g., those provided in the Food and Agricultural Organization of the United States (FAO) Irrigation and Drainage Paper No. 56

schema was chosen as WY 1979-2017, then wrapping around to include WY 1965-1978 hydrology. Actual data and hydrology were used for WY 2014- 2017 with the representative water years simulating WY 2018 and beyond (e.g., WY2018 is represented by the hydrology from WY1979; WY2019 is represented by the hydrology from WY1980, and so forth, with the caveat that 1979 would represent the fifth year of the projection and following sequentially the historical water year 1965 would represent the forty-fourth year of the projection).

[1] https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-4-Water-Budget_ay_19.pdf

[2] California Polytechnic State University, San Luis Obispo

(FAO-56) (Snyder *et. al*., 2000, Snyder and Bali, 2008) or the ITRC Crop Coefficient data for Zone 14), corrected as applicable, for applied local and imported surface water. This volume of applied groundwater is consistent with the volume estimated under Water Budget Component (9) Extraction of the Groundwater Water Budget (see below).

For the Projected Land Surface Water Budgets, for WY 2014-2017, actual data were provided, consistent with the process described above for the Historical and Current Water Budgets. For the projected (WY 2018-2070) period, the volume of applied groundwater was estimated using various, complementary methods, including: (1) as the difference between projected demand and the assumed volumes of precipitation, surface water deliveries, and tile drainage available to meet the demand, or (2) assuming future groundwater production rates would be equivalent to historical extractions for a given year type (e.g., future dry year production rates would be equivalent to average dry year production rates over the historical record). Climate change impacts and the effects of the planned projects and management actions (PMAs) are implicitly, rather than explicitly, accounted for (i.e., to the extent that climate change and PMAs increase or decrease the amount of water otherwise available to meet applied water demands, the volume of applied groundwater will be adjusted accordingly). Total inflow to Shasta Lake dictates the amount of imported surface water available for use in the Subbasin. The WSIP model was used to analyze the impacts of climate change on the Subbasin and anticipate projected inflow to Shasta Lake, and as to whether or not the water year would be classified as Shasta Critical under the Exchange Contract, the Refuge Contract, and by municipal users.

(3) **Surface Water Inflow (Inflow).** Surface water serves as an inflow to Subbasin water budget as both applied surface water and as seepage from streams and rivers. To estimate the volume of applied surface water for the Historical and Current Land Surface Water Budgets, the total diversions within the Subbasin over the historical and current water budget time periods were reported using the best available data for each source. Deliveries from the Central Valley Project (CVP), State Water Project (SWP), the San Joaquin River, and other local streams and rivers were compiled from records from the following sources, including, but not limited to: State Water Resources Control Board (SWRCB) diversion reports; United States Bureau of Reclamation (USBR) Central Valley Operations (CVO); Meyers Water Bank Records; CVP refuge water supply delivery data; and GSA member agency records.

To account for seepage of surface water into the Subbasin from streams and rivers for the Historical and Current Water Budgets, California Data Exchange Center (CDEC) data were used (i.e., by comparing the reductions in measured flow at successive gauging stations after accounting for other diversions) and/or from estimates of seepage losses from certain water bodies from prior water infiltration studies or modeling efforts, as described in the individual GSPs. Seepage from streams and rivers is counted either towards the Groundwater Water Budget directly or towards the Land Surface Water Budget and then, because of the lack of storage capacity in the land surface system and by way of mass balance principles, some or all of this water adds to the Groundwater Water Budget through Water Budget Component (6) Deep Percolation (see below).

For the Projected Land Surface Water Budgets, the volume of applied surface water was estimated as (1) the records of actual delivery data as available for the respective service areas for WY 2014-2017; and (2) estimates of anticipated future deliveries by WY type for WY 2018-2070, inclusive of climate change considerations to the extent they could be reasonably estimated (i.e., directly modeled based on data provided by DWR and the USBR), or using water year types as a proxy (i.e., future dry year deliveries would reflect historical average dry year deliveries over

the historical record). The impacts of planned PMAs on the availability of applied surface water volumes were also incorporated, as applicable.

For the Projected Land Surface Water Budgets, the volume of surface water seepage was adjusted, as applicable and available, based on climate change factors provided by DWR. Changes to surface water seepage were directly estimated as a result of PMAs or other program implementation (e.g., the impact on seepage resulting from the San Joaquin River Restoration Program [SJRRP] implemented by the USBR).

(4) **Surface Water Outflow (Outflow).** As described above, total precipitation was parsed into effective and non-effective precipitation (i.e., the latter being that portion of the total precipitation that cannot be used by the plants because it either runs off or percolates beyond the root zone). Similarly, a portion of the applied water can run off or deep percolate (typically termed "irrigation inefficiency"). Other surface water outflows (losses) from the Subbasin Land Surface Water Budget include agency-measured or estimated "spills" (i.e., outflow from tile drained fields, canal spills, field runoff, and precipitation runoff) and stream gauge readings, flow meter readings, and transfer pumping data. These collective data sets, sources, and methodologies were used to estimate the historical and current outflows from this component of the Subbasin Land Surface Water Budget.

For the Projected Land Surface Water Budgets, for WY 2014-2017, the data were provided consistent with the process described above for the Historical and Current Water Budgets. For the projected (WY 2018-2070) period, the volume of surface water outflows was estimated based on estimates provided by the GSA member agencies (using water year types as a proxy), while those components that may be impacted by climate change (e.g., runoff) were adjusted to reflect changes to precipitation and reference evapotranspiration (ETo). Changes to surface water outflows were directly estimated as a result of PMAs or other program implementation (e.g., water conservation programs to reduce spills) as information was available.

(5) **Evapotranspiration (Outflow).** The largest outflow for the Historical and Current Land Surface Water Budget is evapotranspiration (consumptive use) by crops. As such, a combination of CIMIs ETo data, crop acreage, and crop coefficient data and methodologies (e.g., ITRC data and methodologies) were utilized to estimate the consumptive use, including municipal uses, of water in the Subbasin. In addition, direct evaporation from surface water bodies and phreatophytes (i.e., groundwater dependent ecosystems [GDEs]) was estimated based on the surface area and time period it was wetted.

For the Projected Land Surface Water Budgets, for WY 2014-2017, the actual data were provided consistent with the process described above for the Historical and Current Water Budgets. For the projected (WY 2018-2070) period, the 2030 Central Tendency and 2070 Central Tendency climate change factors or guidance provided by DWR were applied to the historical ETo record to project the impact of climate change on ETo across the Subbasin. For example, either the Gridded Statewide Precipitation and Change Factors developed for the WSIP using the VIC Macroscale Hydrology Model (DWR, 2018) were applied to the available ETo data sets for the Subbasin, or (2) recommendations from the *Perspectives and Guidance for Climate Change Analysis* document prepared by the DWR CCTAG (2015) were incorporated.

(6) **Deep Percolation (Outflow).** For the Historical, Current, and Projected Land Surface Water Budgets, this water budget component is estimated as the sum of the other Outflow components (Water Budget Components 4 and 5) of the Land Surface Water Budget subtracted from the sum of the Inflow components (Water Budget Components 1 through 3) and represents the total

volume of water that seeps past the root zone and into the Subbasin aquifer(s). This includes applied water seepage, as well as stream seepage (from the San Joaquin River, Delta-Mendota Canal, and California Aqueduct, and other canals), and delivery losses. To the extent that climate change and PMA implementation affects the volumes of Water Budget Components 1 through 5, these impacts are reflected in the resultant Outflow component, Water Budget Component (6) Deep Percolation, which serves as the inflow component, and Water Budget Component (7) Deep Percolation to the Groundwater Water Budget (see below).

GROUNDWATER WATER BUDGET

The data sources/methodologies used to estimate the Historical and Current Groundwater Water Budgets are summarized in **Table CC-8** and for the Projected Groundwater Water Budgets in **Table CC-9**. A general description of each component and the data hierarchy that was applied by the GSAs is provided below, with further detail provided in the Water Budget sections of the six underlying GSPs. The time periods for the Groundwater Water Budgets are consistent with those used for the Land Surface Water Budgets, and likewise, to the extent possible, the data sources and methodology used were consistent with those identified by DWR in *Table 2 – Potential Data Sources to Support Water Budget Development* and other sections of the BMP –4 - Water Budget.[1] As identified in **Table CC-8** and **Table CC-9**, significant data gaps were identified in several of the GSPs on key aspects of the Groundwater Water Budget; additional efforts are on-going to address those data gaps and refine the water budgets as part of the 2025 GSP update. As applicable and available, models and tools (e.g., CVHM2, Westside Subbasin Groundwater Model, and a numerical flow model for the Farmers Water District and Fresno County areas) were used to validate the local sources and support assumptions used to develop the Subbasin Groundwater Water Budget.

(7) **Deep Percolation (Inflow).** In all instances, this component of the Groundwater Water Budget is directly linked to the Water Budget Component (6) Deep Percolation of the Land Surface Water Budget. To the extent that climate change is factored into the Historical, Current, and Projected Land Surface Water Budgets, those impacts are reflected in the varying volumes of deep percolation that are assumed to recharge the aquifer system(s) via infiltration.

(8) **Lateral Subsurface Flow (Inflow).** For the Historical and Current Groundwater Water Budgets, this component is estimated somewhat differently for the Upper and Lower Aquifer portions of the Subbasin.

8A. Upper Aquifer. For the Upper Aquifer, lateral inflows were generally estimated using Darcy's equation[2] and estimated aquifer characteristics, or a groundwater flow model, as available. Aquifer transmissivity values were compiled from aquifer tests, model parameters and other sources, while observed or simulated water level maps for wet, normal, and dry water year types and hydrographs were prepared to determine the elevation and direction of groundwater flow between GSP areas within the Subbasin and across Subbasin boundaries. Mountain front recharge

[1] https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-4-Water-Budget_ay_19.pdf

[2] Darcy's equation in which groundwater flow velocity is identified as a function of the aquifer hydraulic conductivity and hydraulic gradient based upon measured water levels and aquifer properties. Freeze, R.A. and Cherry, J.A. 1979. Groundwater. Prentice Hall, Inc. Englewood Cliffs, NJ. p 16.

from the Coastal Range was also assumed to provide an additional source of inflow to the Upper Aquifer.

8B. Lower Aquifer. To the extent possible, lateral inflows to the Lower Aquifer were estimated, primarily using Darcy's equation and estimated aquifer characteristics, and coarse assumptions regarding contributions of other sources of inflow, or via a groundwater flow model, as available. However, this portion of the Groundwater Budget was acknowledged as a significant data gap, which the GSAs are working to address through the collection of additional data, etc.

In instances where there was significant downward flow between the Upper and Lower Aquifers, vertical flow was estimated using Darcy's equation, estimated aquifer characteristics, and groundwater gradients. Aquifer transmissivity values were compiled from aquifer tests, model parameters and other sources, while water level maps for wet, normal, and dry water year types were prepared to determine the elevation and groundwater gradient. Furthermore, flow to the Lower Aquifer from the Upper Aquifer is acknowledged as a data gap.

Projected Groundwater Water Budget. For the Projected Groundwater Water Budgets, for WY 2014-2017, the data were provided consistent with the process described above for the Historical and Current Water Budgets. For the projected (WY 2018-2070) period, this component is generally estimated using historical inflows by water year type as a proxy (i.e., the underflows used in the Historical and Current Water Budgets were averaged by WY type and used throughout the Projected Water Budget period). Impacts of climate change are implicitly incorporated, and expected increases in inflows as a result of PMAs (including projected groundwater banking activities) are directly incorporated to the extent the information was provided by the GSAs. As additional data are obtained during implementation of the GSPs, the inputs will be updated and improved to revise the Projected Groundwater Water Budget.

(9) **Extraction (Outflow).** Consistent with the methodology used to estimate Water Budget Component (2), Applied Groundwater, of the Historical and Current Land Surface Water Budgets, the total pumping from the Subbasin aquifers was estimated using the following hierarchy of sources depending upon available records: (1) Flow meters: Volumetric flow meter records from pumping wells; (2) Power bills: Electricity bills from pumping wells (wherein information related to the number of kilowatt-hours used was converted to a pumping volume based on assumptions related to pumping lift and efficiency and duration of operation); and/or (3) Consumptive use: crop acreages and consumptive use data based on either ITRC-METRIC or crop coefficient methodologies. While the exact distribution of pumping from the Upper and Lower Aquifers is acknowledged as a data gap, total extractions were assumed to be partitioned between the aquifers, with the majority of extractions (80-90%) occurring in the Upper Aquifer. Information regarding well construction obtained and compiled from the local and Subbasin Well Census and Inventory projects completed by the GSAs in 2022 will be used to further improve the estimated allocation of groundwater extraction between the aquifers in the 2025 GSP update.

For the Projected Groundwater Water Budgets, for WY 2014-2017, the data were provided, consistent with the process described above for the Historical and Current Water Budgets. For the projected (WY 2018-2070) period, the volume of pumped groundwater was estimated using various, complimentary methods, including (1) as the difference between projected demand and the assumed volumes of precipitation, surface water deliveries, and tile drainage available to meet the demand, or (2) assuming future groundwater production would be equivalent to historical extractions for a given year type (e.g., future dry year production rates would be equivalent to average dry year production rates over the historical record, with the exception of M&I pumping which was projected based on information provided in various source documents such as Urban

Water Management Plans). Climate change impacts and the effect of the planned PMAs are implicitly, rather than explicitly, accounted for.

(10) **Lateral Subsurface Flow (Outflow).** For the Historical and Current Groundwater Water Budgets, this component was estimated somewhat differently for the Upper and Lower Aquifer portions of the Subbasin, but similarly to Water Budget Component (8) of the Groundwater Water Budget.

10A. Upper Aquifer. Lateral outflows were generally estimated using Darcy's equation and estimated aquifer characteristics, and validated by a groundwater flow model, as available. Aquifer transmissivity values were compiled from aquifer tests, model parameters and other sources, while observed or simulated water level maps for wet, normal, and dry water year types and hydrographs were prepared to determine the elevation and direction of groundwater flow between GSP areas within the Subbasin and across Subbasin boundaries.

10B. Lower Aquifer. To the extent possible, lateral outflows from the Lower Aquifer were estimated, primarily using Darcy's equation and estimated aquifer characteristics, and validated by a groundwater flow model, as available. However, this portion of the Groundwater Water Budget was acknowledged as a significant data gap which the GSAs are working to address through the collection and evaluation of additional data, etc.

Projected Groundwater Water Budget. For the Projected Groundwater Water Budgets, for WY 2014-2017, the data were provided, consistent with the process described above for the Historical and Current Water Budgets. For the projected (WY 2018-2070) period, this component is generally estimated using historical outflows by water year type as a proxy (i.e., the underflows used in the Historical and Current Water Budgets were averaged by WY type and used throughout the Projected Water Budget period). Impacts of climate change are implicitly incorporated, and expected increases in outflows as a result of PMAs (including projected groundwater banking activities) are directly incorporated to the extent the information was provided by the GSAs.

(11) **Change in Storage.** For the Historical and Current Groundwater Water Budgets, this component was estimated somewhat differently for the Upper and Lower Aquifer portions of the Subbasin.

11A. Upper Aquifer. A sum of the Outflow components (Water Budget Components 9 through 10) of the Groundwater Water Budget was subtracted from the Inflow components (Water Budget Components 7 and 8) to assess the change in storage. These estimates were also compared in some of the GSPs to the available hydrographs, water level contour maps, and assumed aquifer storativity values from local data sets and models to assess and confirm change in storage, and assumed consumptive use data.

11B. Lower Aquifer. Approaches varied among the GSPs given the limited available data, which the GSAs are working to address through the collection of additional data, etc. Change in storage was estimated using measured subsidence as a proxy (i.e., due to compaction caused by inelastic land subsidence), as the difference between inflows and outflows based on modeled results, or as an assumed proportion of overall groundwater change in storage. These estimates were also compared in some of the GSPs to the available hydrographs, water level contour maps, and assumed aquifer storativity values from local data sets and models to assess and confirm change in storage, and assumed consumptive use data.

Projected Groundwater Water Budgets. For the Projected Groundwater Water Budgets, for WY 2014-2017, the data were provided, consistent with the process described above for the Historical and Current Water Budgets. For the projected (WY 2018-2070) period, the change in storage volumes used in the Historical and Current Water Budgets were averaged by water year type and used throughout the projected water budget period, or were calculated as the difference between inflows and outflows.

Table CC-8: Historical and Current Water Budgets Data Sources

Water Budget	Flow Direction	Flow Budget Category	Aliso Water District	Farmers Water District	Fresno County	Grassland	Northern & Central Delta-Mendota	San Joaquin River Exchange Contractors
Land Surface	Inflow	Precipitation	Precipitation-Elevation Regressions on Independent Slopes Model (PRISM) and California Irrigation Management Information System (CIMIS)	PRISM		PRISM and CIMIS	PRISM and CIMIS	CIMIS and National Weather Service (NWS)
Land Surface	Inflow	Applied Wat–r - Groundwater	Consumptive use	Flow meters	Flow meters, power bills, and consumptive use	Flow meters and consumptive use		Flow meters
Land Surface	Inflow	Surface Water Inflow	State Water Resources Control Board (SWRCB) diversion reports; landowner records	San Joaquin River inflows	United States Bureau of Reclamation (USBR) Central Valley Operations (CVO); Meyers Water Bank Records	Central Valley Project (CVP) refuge water supply delivery data	USBR CVO and SWRCB diversion reports	USBR CVO; California Data Exchange Center (CDEC) where available, water infiltration study used otherwise
Land Surface	Outflow	Surface Water Outflow	Non-effective precipitation	Transfer pumping and San Joaquin River outflows	Transfer pumping that exceeds applied groundwater	Non-effective precipitation and agency measured spills	Evapotranspiration and non-effective precipitation)	Non-effective precipitation and flow meter readings
Land Surface	Outflow	Evapotranspiration	Vegetation coefficients and CIMIS					
Land Surface	Outflow	Deep Percolation	Land Surface Budget Inflow - Outflow					
Groundwater	Inflow	Infiltration	Land Surface Budget Inflow - Outflow					
Groundwater	Inflow	Lateral subsurface flow - Upper Aquifer	Darcy's equation (groundwater levels and transmissivities)					
Groundwater	Inflow	Lateral subsurface flow - Lower Aquifer	Unused - Data Gap	Darcy's equation (groundwater levels and transmissivities)			Data G–p - Assumed 20% of total inflows.	Darcy's equation (groundwater levels and transmissivities)
Groundwater	Outflow	Extraction - Upper Aquifer	Consumptive use and irrigation efficiency	Flow meters	Flow meters, power bills and consumptive use	Flow meters and consumptive use		Flow meters
Groundwater	Outflow	Extraction - Lower Aquifer	Unused - Data Gap	Flow meters	Flow meters, power bills and consumptive use	Flow meters and consumptive use		Assumed 10% of total pumping
Groundwater	Outflow	Lateral subsurface flow - Upper Aquifer	Darcy's equation (groundwater levels and transmissivities)					
Groundwater	Outflow	Lateral subsurface flow - Lower Aquifer	Unused - Data Gap	Darcy's equation (groundwater levels and transmissivities)				
Groundwater	Change in Storage	Upper Aquifer	Inflow - Outflow					
Groundwater	Change in Storage	Lower Aquifer	Land subsidence as proxy	Inflow - Outflow		Land subsidence as proxy		

Table CC-9: Projected Water Budgets Data Sources

Water Budget	Flow Direction	Flow Budget Category	Aliso Water District	Farmers Water District	Fresno County	Grassland	Northern & Central Delta-Mendota	San Joaquin River Exchange Contractors
Land Surface	Inflow	Precipitation	Precipitation-Elevation Regressions on Independent Slopes Model (PRISM), applying climate change factors (CCF)			PRISM and California Irrigation Management Information System (CIMIS), applying CCF		CIMIS and National Weather Service (NWS), applying CCF
Land Surface	Inflow	Applied Wat–r - Groundwater	Consumptive use			Flow meters and consumptive use		Flow meters
Land Surface	Inflow	Surface Water Inflow	State Water Resources Control Board (SWRCB) diversion reports, using water year (WY) types as a proxy	San Joaquin River inflows (CDEC and United States Geological Survey [USGS])	Mendota Pool inflows - USBR CVO	USBR CVO and SWRCB diversion reports, using WY types as a proxy		USBR CVO; California Data Exchange Center (CDEC) where available, using WY types as a proxy; Water infiltration study used otherwise
Land Surface	Outflow	Surface Water Outflow	Non-effective precipitation calculated with CCF and WY types as a proxy for quantity	San Joaquin River outflows (CDEC and USGS)	Mendota Pool outflows (USBR CVO)	Non-effective precipitation and agency measured spills calculated with CCF and WY types as a proxy for quantity	Non-effective precipitation calculated with CCF and WY types as a proxy for quantity	Non-effective precipitation and agency measured spills calculated with CCF and WY types as a proxy for quantity
Land Surface	Outflow	Evapotranspiration	Vegetation coefficients and CIMIS (calculated with CCFs and WY types as a proxy)					
Land Surface	Outflow	Deep Percolation	Land Surface Inflow - Outflow					
Groundwater	Inflow	Infiltration	Land Surface Budget Inflow - Outflow					
Groundwater	Inflow	Lateral subsurface flow - Upper Aquifer	Darcy's equation (groundwater levels and transmissivities) using WY types as a proxy					
Groundwater	Inflow	Lateral subsurface flow - Lower Aquifer	Unused - Data Gap	Darcy's equation (groundwater levels and transmissivities) using WY types as a proxy			Data Gap - Assumed 20% of total inflows.	Darcy's equation (groundwater levels and transmissivities) using WY types as a proxy
Groundwater	Outflow	Extraction - Upper Aquifer	Consumptive use and irrigation efficiency using WY type as a proxy with CCFs and PMAs	Adjusted historic metered data using WY type as a proxy with CCFs and PMAs		Adjusted historic metered data and consumptive use using WY type as a proxy with CCFs and PMAs		
Groundwater	Outflow	Extraction - Lower Aquifer	Unused - Data Gap	Not Applicable		Unused - Data Gap	Adjusted historic metered data and consumptive use using WY type as a proxy with CCFs and PMAs	
Groundwater	Outflow	Lateral subsurface flow - Upper Aquifer	Darcy's equation (groundwater levels and transmissivities) using WY types as a proxy with CCFs					
Groundwater	Outflow	Lateral subsurface flow - Lower Aquifer	Unused – Data Gap	Darcy's equation (groundwater levels and transmissivities) using WY types as a proxy with CCFs			Data Gap - Assumed 20% of total inflows.	Darcy's equation (groundwater levels and transmissivities) with CCFs
Groundwater	Change in Storage	Upper Aquifer	Inflow - Outflow					
Groundwater	Change in Storage	Lower Aquifer	Unused – Data Gap	Inflow - Outflow		Projected land subsidence and WY types used as a proxy with CCFs and PMAs	Inflow - Outflow	Projected land subsidence and WY types used as proxy with CCFs and PMAs

4.3.2 GSP-Level Water Budgets

Individual historical, current, and projected water budgets were developed by each GSP Group for their respective Plan Area. For more information on the development of those water budgets, as well as tabular and graphical representation of the results, refer to the respective sections of the individual GSPs.

All historical, current, and projected water budgets developed within the Delta-Mendota Subbasin are consistent with GSP Regulations §354.18 Water Budget, and DWR's *Best Management Practices for the Sustainable Management of Groundwater Water Budget BMP* (2016c) document was used when and where applicable at the discretion of each GSP Group.

4.3.3 Coordinated Water Budgets

The land surface budget, groundwater budget, and annual change in storage for the historical water budget, current water budget, and projected water budget with climate change factors (CCFs) and projects and management actions for the Delta-Mendota Subbasin were developed by compiling the water budgets prepared by each of GSP Group. The land surface budget is an accounting of water flows into and out of the land surface above an aquifer within with Delta-Mendota Subbasin, where inflows and outflows include flow between GSP Groups and neighboring subbasins, the atmosphere, and the groundwater aquifer below. The groundwater budget is an accounting of groundwater flows into and out of the two principal groundwater aquifers (Upper Aquifer and Lower Aquifer) within the Delta-Mendota Subbasin, where inflows and outflows include flow between GSP Groups and neighboring subbasins as well as the above land surface.

Subsequent to the submittal of the Delta-Mendota GSP in January 2022, and in response to the Consultation Initiation Letter (CIL) received from DWR on January 21, 2022 in which DWR stated that, while the same data may have been used in developing the water budgets, the terminology used to describe those data sets were not consistent across the basin, the Delta-Mendota Subbasin GSAs acknowledge additional detail was needed to demonstrate that all water budget components across the six Subbasin GSPs utilize the same data and methodologies. As such, subsequent to receipt of the CIL, the Technical Working Group and Coordination Committee met to identify the specific data used and to develop a consistent terminology for the various water budget components. Additionally, the Technical Working Group attempted to simplify the presentation of the Subbasin water budgets through a reduction in the number of water budget components. The mapping of the original GSP water budget components into the revised simplified coordinated water budget component terminology is discussed in the prior section (Section 4.3.1 of this revised Common Chapter).

After agreeing to the set of common simplified definitions for water budget components, the six Delta-Mendota GSP groups mapped their prior water budget components to the new common definitions. The revised land surface budget and groundwater budget are presented respectively for the historical water budget in **Table CC-10** and **Table CC-11,** for the current water budget in **Table CC-12** and **Table CC-13**, and for the projected water budget with climate change factors and projects and management actions in **Table CC-14** and **Table CC-15**. All categories presented in the land surface budget and groundwater budget tables were agreed upon by all Delta-Mendota GSP Groups, with representatives from each GSP group tasked with filling out these budget tables as appropriate to account for the unique hydrology, land use, and water use within their respective GSP regions. The tables below are simply compilations of the individual GSP water budget data as provided by their respective plan preparers, and no water budget data were modified during the mapping process.

Individual GSAs and agencies in the Delta-Mendota Subbasin understand that the historical, current, and projected water budgets were completed using best available science and data, and efforts were made to use the same data sources throughout the Subbasin where available, though due to variability in data availability throughout the Subbasin, the best available data were used and characterized appropriately. Where data gaps exist, the individual GSAs and agencies intend to conduct the work necessary to substantiate or improve the estimates and assumptions developed for determining their water budgets. Nothing in this part, or in any groundwater sustainability plan adopted pursuant to this part, determines, or alters surface water rights or groundwater rights under common law or any provision of law that determines or grants surface water rights.

Figure CC-64 shows the revised average annual and cumulative change in storage in both principal aquifers under the Subbasin projected water budget (including application of climate change factors and the addition of projects and management actions).

Table CC-10: Delta-Mendota Subbasin Historical Water Budget, Land Surface Budget

Land Surface Budget									
Water Year	Water Year Type	Inflows				Outflows			
		Precipitation	Applied Water - Groundwater	Surface Water Inflows	**Total Inflows**	Surface Water Outflows	Evapotranspiration	Deep Percolation	**Total Outflows**
2003	N	450,000	395,000	2,501,000	**3,346,000**	1,306,000	1,772,000	293,000	**3,371,000**
2004	D	412,000	417,000	2,433,000	**3,262,000**	1,206,000	1,760,000	315,000	**3,281,000**
2005	W	739,000	303,000	2,764,000	**3,806,000**	1,614,000	1,810,000	352,000	**3,776,000**
2006	W	571,000	293,000	3,311,000	**4,175,000**	2,111,000	1,804,000	296,000	**4,211,000**
2007	D	258,000	474,000	2,485,000	**3,217,000**	1,230,000	1,701,000	310,000	**3,241,000**
2008	D	328,000	527,000	2,295,000	**3,150,000**	1,140,000	1,769,000	331,000	**3,240,000**
2009	N	304,000	511,000	2,191,000	**3,006,000**	1,017,000	1,813,000	327,000	**3,157,000**
2010	N	539,000	380,000	2,637,000	**3,556,000**	1,515,000	1,655,000	406,000	**3,576,000**
2011	W	626,000	279,000	3,283,000	**4,188,000**	2,013,000	1,799,000	414,000	**4,226,000**
2012	D	275,000	470,000	2,582,000	**3,327,000**	1,301,000	1,679,000	355,000	**3,335,000**

Table CC-11: Delta-Mendota Subbasin Historical Water Budget, Groundwater Budget

Groundwater Budget												
Water Year	Water Year Type	Inflows				Outflows					Change in Storage		
		Infiltration	Lateral Subsurface Flow		**Total Inflows**	Groundwater Extraction		Lateral Subsurface Flow		**Total Outflows**	Estimated Annual Change in Groundwater Storage		
			Upper Aquifer	*Lower Aquifer*		*Upper Aquifer*	*Lower Aquifer*	*Upper Aquifer*	*Lower Aquifer*		*Upper Aquifer*	*Lower Aquifer*	*Total*
2003	N	324,000	196,000	117,000	**637,000**	357,000	39,000	260,000	106,000	**762,000**	17,000	5,000	22,000
2004	D	345,000	180,000	114,000	**639,000**	376,000	42,000	286,000	132,000	**836,000**	(180,000)	(48,000)	(228,000)
2005	W	424,000	223,000	128,000	**775,000**	268,000	36,000	269,000	78,000	**651,000**	223,000	14,000	237,000
2006	W	394,000	203,000	120,000	**717,000**	260,000	34,000	264,000	75,000	**633,000**	18,000	(23,000)	(5,000)
2007	D	358,000	161,000	99,000	**618,000**	431,000	48,000	280,000	130,000	**889,000**	(282,000)	(67,000)	(349,000)
2008	D	371,000	169,000	106,000	**646,000**	481,000	55,000	293,000	141,000	**970,000**	(341,000)	(80,000)	(421,000)
2009	N	361,000	195,000	112,000	**668,000**	466,000	53,000	273,000	117,000	**909,000**	(134,000)	(28,000)	(162,000)
2010	N	470,000	211,000	124,000	**805,000**	350,000	39,000	264,000	116,000	**769,000**	180,000	(4,000)	176,000
2011	W	515,000	205,000	124,000	**844,000**	248,000	32,000	277,000	83,000	**640,000**	125,000	(23,000)	102,000
2012	D	417,000	168,000	107,000	**692,000**	432,000	45,000	288,000	141,000	**906,000**	(171,000)	(62,000)	(233,000)

Table CC-12: Delta-Mendota Subbasin Current Water Budget, Land Surface Budget

Land Surface Budget									
Water Year	Water Year Type	Inflows				Outflows			
		Precipitation	Applied Water - Groundwater	Surface Water Inflows	**Total Inflows**	Surface Water Outflows	Evapotranspiration	Deep Percolation	**Total Outflows**
2013	D	318,000	521,000	2,597,000	**3,436,000**	1,386,000	1,671,000	402,000	**3,459,000**

Table CC-13: Delta-Mendota Subbasin Current Water Budget, Groundwater System

Groundwater Budget												
Water Year	Water Year Type	Inflows				Outflows					Change in Storage		
		Infiltration	Lateral Subsurface Flow		**Total Inflows**	Groundwater Extraction		Lateral Subsurface Flow		**Total Outflows**	Estimated Annual Change in Groundwater Storage		
			Upper Aquifer	*Lower Aquifer*		*Upper Aquifer*	*Lower Aquifer*	*Upper Aquifer*	*Lower Aquifer*		*Upper Aquifer*	*Lower Aquifer*	*Total*
2013	D	467,000	173,000	112,000	**752,000**	477,000	51,000	278,000	136,000	**942,000**	(128,000)	(55,000)	(183,000)

Table CC-14: Delta-Mendota Subbasin Projected Water Budget, Land Surface Budget (containing climate change factors and projects and management actions)

Land Surface Budget																
		Inflows							Outflows							
		Precipitation	Applied Water - Groundwater	Surface Water Inflow	Applied Water - Groundwater (Project Effect–) - NCDM Only	Applied Water - Imported Surface Water (Project Effect–) - NCDM Only	Project Effects - All GSP Groups	**Total Inflows**	Surface Water Outflow	Evapotranspiration	Crop Evapotranspiration - Aliso Only	Canal/Reservoir Evaporation - Aliso Only	Deep Percolation	Runoff (Project Effect–) - NCDM Only	Project Effects - All GSP Groups	**Total Outflows**
2014	SC	283,000	601,000	1,725,000	0	0	1,000	**2,610,000**	852,000	1,616,000	0	0	230,000	0	0	**2,698,000**
2015	SC	363,000	650,000	1,247,000	0	0	0	**2,260,000**	479,000	1,528,000	0	0	287,000	0	0	**2,294,000**
2016	D	712,000	392,000	1,605,000	0	0	0	**2,709,000**	631,000	1,618,000	0	0	403,000	0	0	**2,652,000**
2017	W	686,000	303,000	3,651,000	0	0	6,000	**4,646,000**	2,423,000	1,773,000	0	0	445,000	0	0	**4,641,000**
2018	N	527,000	389,000	2,628,000	(6,000)	0	7,000	**3,545,000**	1,506,000	1,660,000	0	0	403,000	0	0	**3,569,000**
2019	W	712,000	266,000	3,162,000	(7,000)	2,000	6,000	**4,141,000**	1,975,000	1,810,000	0	0	368,000	0	0	**4,153,000**
2020	D	434,000	394,000	2,187,000	(6,000)	9,000	7,000	**3,025,000**	939,000	1,726,000	0	0	343,000	0	0	**3,008,000**
2021	W	808,000	261,000	3,261,000	(7,000)	7,000	6,000	**4,336,000**	2,025,000	1,821,000	0	0	403,000	0	0	**4,249,000**
2022	W	1,021,000	249,000	3,266,000	(7,000)	7,000	6,000	**4,542,000**	2,190,000	1,834,000	0	0	449,000	0	0	**4,473,000**
2023	N	580,000	389,000	2,658,000	(8,000)	6,000	7,000	**3,632,000**	1,470,000	1,711,000	0	0	403,000	0	0	**3,584,000**
2024	D	573,000	387,000	2,176,000	(3,000)	6,000	6,000	**3,145,000**	963,000	1,726,000	0	0	374,000	0	0	**3,063,000**
2025	W	884,000	261,000	3,256,000	(7,000)	7,000	6,000	**4,407,000**	1,993,000	1,847,000	0	0	424,000	0	0	**4,264,000**
2026	D	575,000	483,000	2,098,000	(43,000)	52,000	9,000	**3,174,000**	914,000	1,785,000	0	0	412,000	0	0	**3,111,000**
2027	D	653,000	481,000	2,078,000	(41,000)	49,000	9,000	**3,229,000**	914,000	1,766,000	0	0	419,000	0	0	**3,099,000**
2028	D	534,000	484,000	2,115,000	(42,000)	50,000	9,000	**3,150,000**	934,000	1,789,000	0	0	353,000	0	0	**3,076,000**
2029	D	462,000	484,000	2,099,000	(46,000)	55,000	9,000	**3,063,000**	910,000	1,744,000	0	0	356,000	0	0	**3,010,000**
2030	SC	417,000	575,000	1,800,000	(47,000)	49,000	3,000	**2,797,000**	833,000	1,624,000	0	0	363,000	0	0	**2,820,000**
2031	SC	492,000	573,000	1,780,000	(48,000)	51,000	2,000	**2,850,000**	815,000	1,633,000	0	0	406,000	0	0	**2,854,000**
2032	W	832,000	269,000	3,250,000	(31,000)	46,000	6,000	**4,372,000**	1,963,000	1,830,000	0	0	490,000	1,000	0	**4,284,000**
2033	D	466,000	490,000	2,001,000	(46,000)	60,000	10,000	**2,981,000**	869,000	1,741,000	0	0	364,000	1,000	0	**2,975,000**
2034	W	851,000	252,000	3,258,000	(29,000)	47,000	7,000	**4,386,000**	2,003,000	1,791,000	0	0	465,000	1,000	0	**4,260,000**
2035	W	731,000	280,000	3,163,000	(32,000)	48,000	7,000	**4,197,000**	1,969,000	1,849,000	0	0	422,000	1,000	0	**4,241,000**
2036	W	774,000	316,000	3,268,000	(31,000)	50,000	7,000	**4,384,000**	2,052,000	1,867,000	0	0	494,000	1,000	0	**4,414,000**
2037	W	1,194,000	252,000	3,274,000	(28,000)	49,000	7,000	**4,748,000**	2,254,000	1,780,000	0	0	607,000	1,000	0	**4,642,000**
2038	N	448,000	431,000	2,689,000	(47,000)	53,000	10,000	**3,584,000**	1,529,000	1,660,000	0	0	381,000	0	0	**3,570,000**
2039	N	488,000	446,000	2,655,000	(46,000)	52,000	10,000	**3,605,000**	1,487,000	1,698,000	0	0	411,000	0	0	**3,596,000**
2040	D	534,000	423,000	2,200,000	(46,000)	66,000	9,000	**3,186,000**	1,001,000	1,712,000	0	0	411,000	1,000	0	**3,125,000**
2041	D	384,000	437,000	2,139,000	(52,000)	62,000	9,000	**2,979,000**	879,000	1,704,000	0	0	374,000	1,000	0	**2,958,000**
2042	N	530,000	469,000	2,730,000	(46,000)	51,000	10,000	**3,744,000**	1,532,000	1,795,000	0	0	400,000	0	0	**3,727,000**

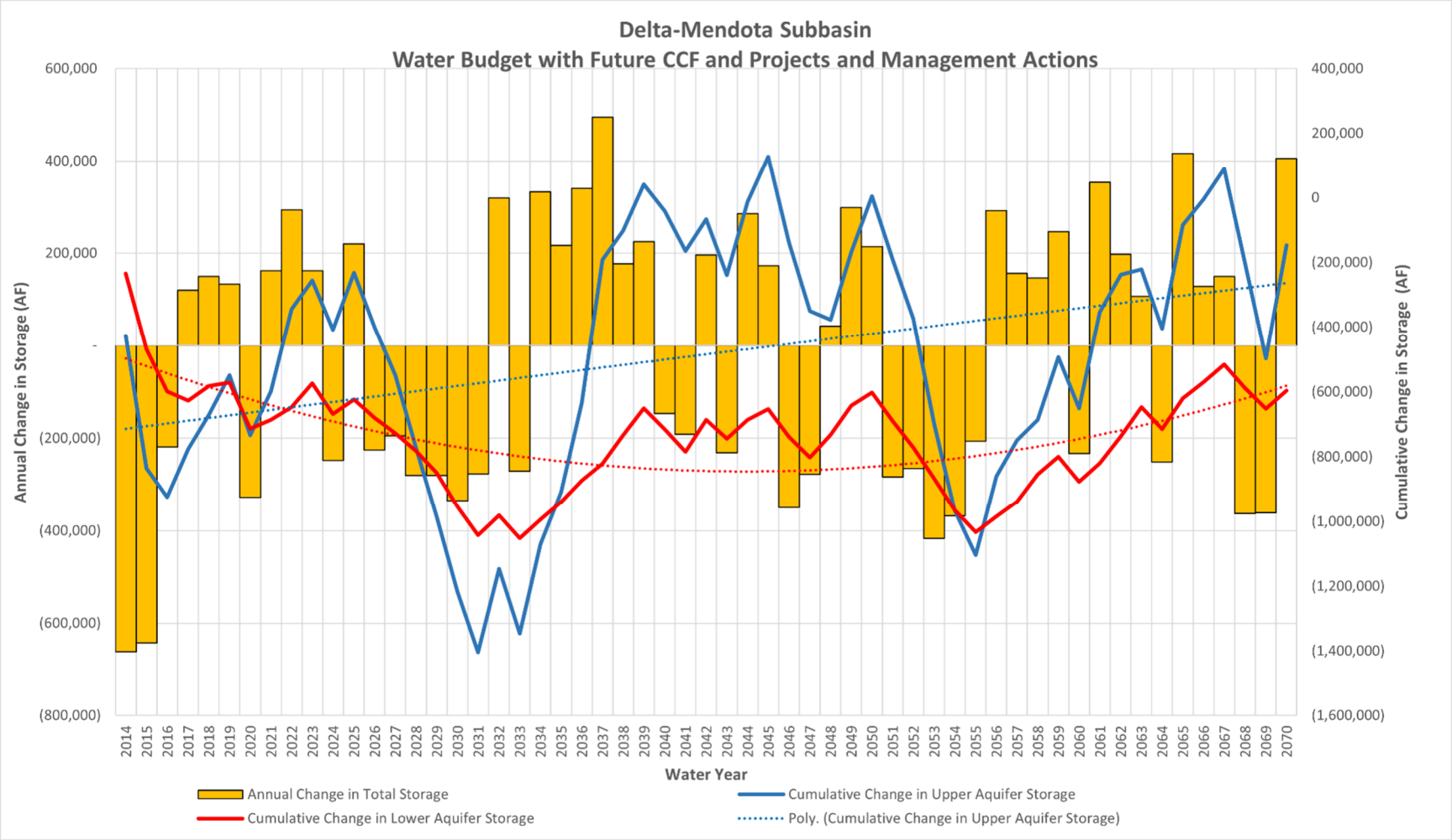
Land Surface Budget																
		Inflows							Outflows							
		Precipitation	Applied Water - Groundwater	Surface Water Inflow	Applied Water - Groundwater (Project Effect–) - NCDM Only	Applied Water - Imported Surface Water (Project Effect–) - NCDM Only	Project Effects - All GSP Groups	**Total Inflows**	Surface Water Outflow	Evapotranspiration	Crop Evapotranspiration - Aliso Only	Canal/Reservoir Evaporation - Aliso Only	Deep Percolation	Runoff (Project Effect–) - NCDM Only	Project Effects - All GSP Groups	**Total Outflows**
2043	D	488,000	437,000	2,101,000	(48,000)	68,000	11,000	**3,057,000**	884,000	1,797,000	0	0	331,000	1,000	0	**3,013,000**
2044	W	875,000	286,000	3,231,000	(37,000)	53,000	11,000	**4,419,000**	2,141,000	1,831,000	0	0	419,000	1,000	0	**4,392,000**
2045	W	622,000	313,000	3,263,000	(45,000)	53,000	12,000	**4,218,000**	1,971,000	1,847,000	0	0	355,000	1,000	0	**4,174,000**
2046	D	268,000	571,000	2,149,000	(57,000)	68,000	12,000	**3,011,000**	893,000	1,794,000	0	0	346,000	1,000	0	**3,034,000**
2047	D	402,000	575,000	2,067,000	(55,000)	64,000	12,000	**3,065,000**	834,000	1,820,000	0	0	383,000	0	0	**3,037,000**
2048	N	331,000	593,000	2,696,000	(49,000)	49,000	12,000	**3,632,000**	1,457,000	1,893,000	0	0	358,000	0	0	**3,708,000**
2049	N	658,000	407,000	2,683,000	(29,000)	62,000	12,000	**3,793,000**	1,525,000	1,706,000	0	0	474,000	2,000	0	**3,707,000**
2050	W	708,000	316,000	3,145,000	(40,000)	54,000	13,000	**4,196,000**	1,974,000	1,878,000	0	0	376,000	1,000	0	**4,229,000**
2051	D	350,000	447,000	2,110,000	(51,000)	69,000	13,000	**2,938,000**	858,000	1,738,000	0	0	302,000	1,000	0	**2,899,000**
2052	D	390,000	553,000	2,103,000	(46,000)	67,000	14,000	**3,081,000**	873,000	1,727,000	0	0	416,000	1,000	0	**3,017,000**
2053	SC	306,000	634,000	1,765,000	(44,000)	47,000	8,000	**2,716,000**	801,000	1,699,000	0	0	304,000	0	0	**2,804,000**
2054	SC	340,000	632,000	1,678,000	(29,000)	34,000	7,000	**2,662,000**	750,000	1,657,000	0	0	354,000	0	0	**2,761,000**
2055	D	630,000	453,000	1,831,000	(39,000)	49,000	14,000	**2,938,000**	855,000	1,742,000	0	0	385,000	1,000	0	**2,983,000**
2056	W	745,000	351,000	3,073,000	(44,000)	46,000	12,000	**4,183,000**	1,935,000	1,894,000	0	0	450,000	0	0	**4,279,000**
2057	W	693,000	313,000	3,150,000	(34,000)	55,000	12,000	**4,189,000**	1,932,000	1,893,000	0	0	401,000	1,000	0	**4,227,000**
2058	N	478,000	547,000	2,688,000	(49,000)	54,000	15,000	**3,733,000**	1,417,000	1,871,000	0	0	446,000	0	0	**3,734,000**
2059	W	739,000	309,000	3,154,000	(33,000)	55,000	13,000	**4,237,000**	1,941,000	1,888,000	0	0	425,000	1,000	0	**4,255,000**
2060	D	405,000	441,000	2,111,000	(52,000)	69,000	15,000	**2,989,000**	847,000	1,786,000	0	0	360,000	1,000	0	**2,994,000**
2061	W	910,000	300,000	3,276,000	(33,000)	55,000	13,000	**4,521,000**	2,106,000	1,896,000	0	0	512,000	1,000	0	**4,515,000**
2062	N	466,000	459,000	2,687,000	(50,000)	58,000	16,000	**3,636,000**	1,482,000	1,757,000	0	0	420,000	0	0	**3,659,000**
2063	N	477,000	544,000	2,674,000	(49,000)	54,000	16,000	**3,716,000**	1,454,000	1,861,000	0	0	397,000	0	0	**3,712,000**
2064	D	338,000	447,000	2,123,000	(49,000)	70,000	16,000	**2,945,000**	818,000	1,780,000	0	0	341,000	1,000	0	**2,940,000**
2065	N	725,000	443,000	2,688,000	(47,000)	58,000	17,000	**3,884,000**	1,502,000	1,739,000	0	0	573,000	1,000	0	**3,815,000**
2066	W	668,000	323,000	3,153,000	(34,000)	55,000	15,000	**4,180,000**	1,929,000	1,897,000	0	0	383,000	1,000	0	**4,210,000**
2067	W	690,000	321,000	3,262,000	(33,000)	55,000	15,000	**4,310,000**	1,942,000	1,898,000	0	0	394,000	1,000	0	**4,235,000**
2068	D	448,000	558,000	1,859,000	(52,000)	69,000	12,000	**2,894,000**	872,000	1,695,000	0	0	327,000	1,000	0	**2,895,000**
2069	D	382,000	561,000	1,824,000	(50,000)	66,000	12,000	**2,795,000**	788,000	1,688,000	0	0	328,000	1,000	0	**2,805,000**
2070	W	962,000	302,000	3,388,000	(34,000)	55,000	16,000	**4,689,000**	2,130,000	1,887,000	0	0	557,000	1,000	0	**4,575,000**

Table CC-15: Delta-Mendota Subbasin Projected Water Budget, Groundwater Budget
(containing climate change factors and projects and management actions)

Groundwater Budget																			
		Inflows							Outflows							Change in Storage		
			Lateral Subsurface Flow						Groundwater Extraction		Lateral Subsurface Flow					Estimated Annual Change in Groundwater Storage		
		Infiltration	*Upper Aquifer*	*Lower Aquifer*	Seepage Through Corcoran Clay - SJREC Only	Applied Water Infiltration (Project Effects) - NCDM Only	Deep Percolation (Project Effects) - NCDM Only	Project Effects	**Total Inflows**	*Upper Aquifer*	*Lower Aquifer*	*Upper Aquifer*	*Lower Aquifer*	Flow to Lower Aquifer - Grassland Only	Discharge to Surface Water/Consumptive Use by GDEs/Lateral Flow - Grassland Only	**Total Outflows**	*Upper Aquifer*	*Lower Aquifer*	*Total*
2014	SC	275,000	162,000	115,000	0	0	0	0	**552,000**	513,000	101,000	321,000	191,000	0	0	**1,126,000**	(428,000)	(234,000)	(662,000)
2015	SC	333,000	154,000	113,000	0	0	0	0	**600,000**	558,000	101,000	325,000	202,000	0	0	**1,186,000**	(408,000)	(234,000)	(642,000)
2016	D	487,000	152,000	112,000	0	0	0	0	**751,000**	354,000	60,000	313,000	156,000	0	0	**883,000**	(89,000)	(130,000)	(219,000)
2017	W	525,000	198,000	128,000	0	0	0	10,000	**861,000**	254,000	50,000	307,000	91,000	0	0	**702,000**	148,000	(28,000)	120,000
2018	N	465,000	190,000	115,000	0	0	0	0	**770,000**	347,000	59,000	264,000	101,000	0	0	**771,000**	105,000	44,000	149,000
2019	W	461,000	216,000	124,000	0	0	0	10,000	**811,000**	231,000	38,000	279,000	74,000	0	0	**622,000**	122,000	11,000	133,000
2020	D	385,000	153,000	106,000	0	0	3,000	0	**647,000**	354,000	57,000	298,000	136,000	0	0	**845,000**	(185,000)	(142,000)	(327,000)
2021	W	464,000	218,000	125,000	0	0	10,000	0	**817,000**	224,000	39,000	280,000	72,000	0	0	**615,000**	135,000	27,000	162,000
2022	W	553,000	218,000	125,000	0	0	10,000	10,000	**916,000**	214,000	37,000	276,000	77,000	0	0	**604,000**	254,000	40,000	294,000
2023	N	449,000	186,000	117,000	0	0	3,000	0	**755,000**	348,000	55,000	264,000	111,000	0	0	**778,000**	89,000	74,000	163,000
2024	D	417,000	151,000	108,000	0	0	3,000	0	**679,000**	349,000	58,000	301,000	134,000	0	0	**842,000**	(153,000)	(94,000)	(247,000)
2025	W	493,000	214,000	125,000	0	0	10,000	10,000	**852,000**	227,000	38,000	278,000	73,000	0	0	**616,000**	176,000	44,000	220,000
2026	D	451,000	152,000	107,000	0	0	6,000	0	**716,000**	413,000	51,000	302,000	137,000	0	0	**903,000**	(169,000)	(56,000)	(225,000)
2027	D	470,000	152,000	106,000	0	0	9,000	0	**737,000**	411,000	52,000	303,000	131,000	0	0	**897,000**	(148,000)	(47,000)	(195,000)
2028	D	390,000	153,000	104,000	0	0	9,000	0	**656,000**	414,000	51,000	304,000	130,000	0	0	**899,000**	(225,000)	(55,000)	(280,000)
2029	D	395,000	154,000	103,000	0	0	10,000	0	**662,000**	410,000	51,000	303,000	129,000	0	0	**893,000**	(213,000)	(67,000)	(280,000)
2030	SC	400,000	159,000	97,000	0	0	9,000	0	**665,000**	454,000	84,000	312,000	127,000	0	0	**977,000**	(230,000)	(104,000)	(334,000)
2031	SC	442,000	158,000	97,000	0	0	9,000	0	**706,000**	453,000	82,000	313,000	118,000	0	0	**966,000**	(188,000)	(89,000)	(277,000)
2032	W	545,000	220,000	115,000	0	0	22,000	0	**902,000**	213,000	35,000	279,000	68,000	0	0	**595,000**	258,000	61,000	319,000
2033	D	400,000	157,000	98,000	0	0	10,000	0	**665,000**	402,000	50,000	308,000	133,000	0	0	**893,000**	(201,000)	(70,000)	(271,000)
2034	W	547,000	220,000	118,000	0	0	22,000	10,000	**917,000**	203,000	29,000	273,000	70,000	0	0	**575,000**	275,000	57,000	332,000
2035	W	459,000	220,000	119,000	0	0	22,000	0	**820,000**	225,000	34,000	276,000	76,000	0	0	**611,000**	162,000	55,000	217,000
2036	W	552,000	221,000	119,000	0	0	22,000	10,000	**924,000**	243,000	51,000	275,000	76,000	0	0	**645,000**	275,000	65,000	340,000
2037	W	719,000	217,000	122,000	0	0	23,000	10,000	**1,091,000**	202,000	31,000	269,000	80,000	0	0	**582,000**	442,000	53,000	495,000
2038	N	415,000	185,000	114,000	0	0	15,000	0	**729,000**	350,000	58,000	258,000	111,000	0	0	**777,000**	90,000	87,000	177,000
2039	N	455,000	197,000	117,000	0	0	15,000	0	**784,000**	360,000	63,000	262,000	108,000	0	0	**793,000**	142,000	82,000	224,000
2040	D	457,000	151,000	104,000	0	0	10,000	0	**722,000**	348,000	53,000	299,000	136,000	0	0	**836,000**	(82,000)	(65,000)	(147,000)
2041	D	410,000	150,000	101,000	0	0	10,000	0	**671,000**	352,000	56,000	299,000	130,000	0	0	**837,000**	(123,000)	(68,000)	(191,000)
2042	N	448,000	197,000	111,000	0	0	15,000	0	**771,000**	385,000	62,000	264,000	100,000	0	0	**811,000**	98,000	98,000	196,000
2043	D	368,000	151,000	100,000	0	0	10,000	0	**629,000**	357,000	55,000	298,000	109,000	0	0	**819,000**	(173,000)	(58,000)	(231,000)

Groundwater Budget																			
		Inflows							Outflows							Change in Storage		
		Infiltration	Lateral Subsurface Flow		Seepage Through Corcoran Clay - SJREC Only	Applied Water Infiltration (Project Effects) - NCDM Only	Deep Percolation (Project Effects) - NCDM Only	Project Effects	**Total Inflows**	Groundwater Extraction		Lateral Subsurface Flow		Flow to Lower Aquifer - Grassland Only	Discharge to Surface Water/Consumptive Use by GDEs/Lateral Flow - Grassland Only	**Total Outflows**	Estimated Annual Change in Groundwater Storage		
			Upper Aquifer	*Lower Aquifer*						*Upper Aquifer*	*Lower Aquifer*	*Upper Aquifer*	*Lower Aquifer*				*Upper Aquifer*	*Lower Aquifer*	*Total*
2044	W	502,000	209,000	119,000	0	0	23,000	28,000	**881,000**	220,000	38,000	282,000	71,000	0	0	**611,000**	227,000	59,000	286,000
2045	W	413,000	215,000	121,000	0	0	22,000	28,000	**799,000**	235,000	43,000	271,000	77,000	0	0	**626,000**	141,000	32,000	173,000
2046	D	382,000	151,000	101,000	0	0	10,000	0	**644,000**	469,000	68,000	296,000	112,000	0	0	**945,000**	(264,000)	(85,000)	(349,000)
2047	D	422,000	150,000	99,000	0	0	10,000	0	**681,000**	471,000	71,000	298,000	105,000	0	0	**945,000**	(214,000)	(64,000)	(278,000)
2048	N	393,000	187,000	109,000	0	0	14,000	0	**703,000**	475,000	92,000	263,000	100,000	0	0	**930,000**	(27,000)	69,000	42,000
2049	N	545,000	188,000	110,000	0	0	16,000	0	**859,000**	345,000	56,000	262,000	103,000	0	0	**766,000**	209,000	90,000	299,000
2050	W	436,000	217,000	120,000	0	0	23,000	28,000	**824,000**	239,000	46,000	274,000	73,000	0	0	**632,000**	173,000	41,000	214,000
2051	D	343,000	152,000	101,000	0	0	10,000	0	**606,000**	361,000	58,000	296,000	136,000	0	0	**851,000**	(195,000)	(88,000)	(283,000)
2052	D	466,000	150,000	98,000	0	0	10,000	0	**724,000**	463,000	66,000	296,000	105,000	0	0	**930,000**	(183,000)	(82,000)	(265,000)
2053	SC	341,000	156,000	97,000	0	0	9,000	0	**603,000**	499,000	99,000	312,000	104,000	0	0	**1,014,000**	(322,000)	(95,000)	(417,000)
2054	SC	392,000	156,000	96,000	0	0	8,000	0	**652,000**	514,000	98,000	312,000	102,000	0	0	**1,026,000**	(270,000)	(98,000)	(368,000)
2055	D	422,000	152,000	96,000	0	0	9,000	0	**679,000**	376,000	62,000	296,000	101,000	0	0	**835,000**	(138,000)	(69,000)	(207,000)
2056	W	511,000	222,000	115,000	0	0	22,000	28,000	**898,000**	258,000	58,000	278,000	67,000	0	0	**661,000**	244,000	48,000	292,000
2057	W	437,000	222,000	116,000	0	0	23,000	0	**798,000**	249,000	41,000	279,000	73,000	0	0	**642,000**	110,000	46,000	156,000
2058	N	479,000	205,000	108,000	0	0	15,000	0	**807,000**	453,000	69,000	266,000	105,000	0	0	**893,000**	63,000	83,000	146,000
2059	W	482,000	221,000	120,000	0	0	23,000	28,000	**874,000**	245,000	40,000	275,000	74,000	0	0	**634,000**	192,000	55,000	247,000
2060	D	395,000	150,000	101,000	0	0	10,000	0	**656,000**	361,000	51,000	293,000	136,000	0	0	**841,000**	(157,000)	(76,000)	(233,000)
2061	W	581,000	218,000	120,000	0	0	23,000	28,000	**970,000**	238,000	40,000	274,000	72,000	0	0	**624,000**	297,000	56,000	353,000
2062	N	454,000	198,000	113,000	0	0	15,000	0	**780,000**	372,000	60,000	262,000	109,000	0	0	**803,000**	115,000	83,000	198,000
2063	N	431,000	200,000	113,000	0	0	15,000	0	**759,000**	448,000	71,000	264,000	107,000	0	0	**890,000**	17,000	90,000	107,000
2064	D	376,000	152,000	101,000	0	0	11,000	0	**640,000**	368,000	52,000	299,000	134,000	0	0	**853,000**	(183,000)	(68,000)	(251,000)
2065	N	657,000	186,000	111,000	0	0	15,000	0	**969,000**	360,000	60,000	263,000	103,000	0	0	**786,000**	321,000	95,000	416,000
2066	W	419,000	218,000	120,000	0	0	23,000	0	**780,000**	258,000	42,000	280,000	74,000	0	0	**654,000**	78,000	50,000	128,000
2067	W	430,000	217,000	121,000	0	0	23,000	0	**791,000**	257,000	42,000	277,000	77,000	0	0	**653,000**	96,000	54,000	150,000
2068	D	362,000	155,000	102,000	0	0	10,000	0	**629,000**	451,000	64,000	311,000	113,000	0	0	**939,000**	(291,000)	(72,000)	(363,000)
2069	D	364,000	154,000	98,000	0	0	10,000	0	**626,000**	457,000	62,000	312,000	105,000	0	0	**936,000**	(297,000)	(64,000)	(361,000)
2070	W	638,000	211,000	118,000	0	0	23,000	28,000	**1,018,000**	237,000	42,000	270,000	70,000	0	0	**619,000**	350,000	55,000	405,000

Figure CC-64: Change in Storage, Delta-Mendota Subbasin Projected Water Budget



4.3.4 Sustainable Yield

Under SGMA, sustainable yield is defined as "the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result." (CWC 10721(w)). Sustainable yield estimates for the Upper Aquifer and Lower Aquifer have been developed in a coordinated fashion for the Delta-Mendota Subbasin by the Delta-Mendota Technical Working Group and approved by the Delta-Mendota Coordination Committee.

Upper Aquifer Sustainable Yield Estimate

Methodologies for calculating Upper Aquifer sustainable yield were discussed by both the Delta-Mendota Coordination Committee and an ad-hoc Technical Working Group of the Coordination Committee. During a workshop dedicated to this effort, several basic concepts and principles were discussed to calculate the Upper Aquifer sustainable yield estimate. Consideration was given to several potential options with increasing detail, including a combination of the following: total Subbasin Upper Aquifer pumping volumes, total Subbasin Upper Aquifer change in storage, and Subbasin Upper Aquifer subsurface inflows and outflows. Inflow from certain neighboring subbasins, based on groundwater flow direction, as well as subsurface inflow from the Coast Range at existing gradients (as part of the inflow to the Northern & Central Delta-Mendota Region GSP area) was considered. Outflow to neighboring subbasins at existing gradients was also considered in certain applicable areas along the Delta-Mendota Subbasin boundary based on groundwater flow characteristics.

An overarching goal of this Subbasin is to maintain a balanced water budget by managing groundwater extractions (pumping). Therefore, the Upper Aquifer sustainable yield was estimated using the change in storage from the historic water budget (WY2003-2012). Based on these considerations, the following formula was selected for estimating Upper Aquifer sustainable yield utilizing the consolidated historic water budget components:

> Upper Aquifer Sustainable Yield = (Pumping + Change in Storage) + (Subsurface Outflow – Subsurface Inflow)

The formula for determining Upper Aquifer sustainable yield was applied to the following compiled Delta-Mendota Subbasin projected water budgets (WY2014-2070):

- Projected Baseline values with Climate Change Factors
- Projected Baseline values with Climate Change Factors and Projects and Management Actions

This analysis resulted in an Upper Aquifer Sustainable Yield estimate of 403,000 acre-feet.

The Upper Aquifer sustainable yield value, derived from calculations using the best available but limited data, is considered to be a preliminary estimation only and will be updated to an anticipated higher level of accuracy in future GSP updates. The intention of the Delta-Mendota Subbasin GSAs, following GSP submission in 2020, is to increase subbasin-wide data collection efforts. Improved data, modeling results, and understanding of subsurface flows will allow the GSAs and each GSP Group to improve estimated sustainable yield values for future GSP updates. The GSP Groups are in the process of developing GSP implementation guidelines that will address future data collection efforts and other GSP implementation activities.

The Upper Aquifer sustainable yield calculated range reflects the principle that the GSAs within the Delta-Mendota Subbasin reserve the right to claim or retain some portion of subbasin outflow generated by the lowering of groundwater levels from neighboring subbasins and the equitable portion of sources of recharge shared between two subbasins, by physical or non-physical means, in the future if the Delta-Mendota Subbasin GSAs determine that doing so will improve Subbasin sustainability or will prevent undesirable results due to the chronic lowering of groundwater levels. Furthermore, intra-basin coordination during GSP development, followed by continuing inter-basin coordination discussions and data collection after GSP adoption, will allow the GSAs to further refine these determinations.

Lower Aquifer Sustainable Yield Estimate

Currently, within the Delta-Mendota Subbasin, the distribution of known Lower Aquifer water level data and extraction volume data are not sufficient to allow for an accurate calculation of Lower Aquifer sustainable yield utilizing the same methodology as for the Upper Aquifer. Following discussions by both the Coordination Committee and the Technical Working Group of the Coordination Committee, a consensus was reached to establish a Lower Aquifer sustainable yield estimate for the Subbasin based on a projection of existing subsidence rates as measured along the DMC with the minimum threshold established for inelastic land subsidence. In the original 2020 submittal, the calculation for the Lower Aquifer sustainable yield was based on the following. The Westlands Water District GSA recently conducted a study using groundwater modeling, in conjunction with the Westside GSP development, to estimate sustainable yield for the Westside Subbasin. Based on an analysis of available data and an initial assumption of Lower Aquifer sustainable yield equivalent to approximately 0.35 acre-feet per acre within the Westside Subbasin (Westlands Water District GSA, Groundwater Management Strategy Concepts presentation to the WWD Board on October 16, 2018), the GSA estimates a sustainable yield of 230,000 to 250,000 acre-feet, with historic conditions suggesting a range from 250,000 to 300,000 acre-feet (Westlands Water District GSA, Westside Subbasin's Groundwater Model Forecast and Augmentation Strategies presentation to the WWD Board on April 3, 2019). Using Westlands Water District GSA's analysis, the Delta-Mendota Coordination Committee recommended a slightly more conservative sustainable yield value of one-third (0.33) an acre-foot per acre for the Delta-Mendota Subbasin. Using this more conservative value, the estimated Lower Aquifer sustainable yield is approximately 250,000 acre-feet per year over the approximately 750,000-acre subbasin. It should be noted that sustainable management of the Lower Aquifer is governed by significant and unreasonable subsidence rather than sustainable yield. The distribution of sustainable yield is not uniform throughout the Subbasin, and it will be the responsibility of each GSA in the Subbasin to manage Lower Aquifer pumping to prevent significant and unreasonable subsidence.

Acknowledging that land subsidence is occurring at localized areas in the Subbasin, the DMCC refined the Lower Aquifer sustainable yield calculation, adjusting the value from 250,000 AF to 101,000 AF, based on observed extractions from the Lower Aquifer during WY2015. This refinement is consistent with the common definitions established across the Subbasin for all SMCs. It is important to note that subsidence will be the primary factor influencing the allowable volume of groundwater that can be extracted from the Lower Aquifer without incurring significant and unreasonable impacts on beneficial uses and users. As such, this number will be updated as data gaps are filled, particularly using the Proposition (Prop) 68 grant-funded well inventory and subsidence study and the results of the Airborne Electromagnetic (AEM) survey recently completed by DWR. Furthermore, the Subbasin will investigate the feasibility to recharge the Lower Aquifer as a means of reducing subsidence and managing future Lower Aquifer sustainable yield.

The Lower Aquifer sustainable yield estimate will be refined in the future based on data collected and compiled for the Subbasin. This current sustainable yield approximation highlights the importance of an

accepted Subbasin-level subsidence monitoring program concurrent with improved estimates of sub-Corcoran Clay groundwater extractions.

5. SUSTAINABLE MANAGEMENT CRITERIA

As required by Subarticle 3. Sustainable Management Criteria of the GSP regulations, the GSPs must include a sustainability goal and definitions of undesirable results, in addition to defining what is considered to be significant and unreasonable and establishing minimum thresholds, measurable objectives and 5-year interim goals. Given the variability of conditions within the Delta-Mendota Subbasin, a subbasin-wide sustainability goal and definitions of undesirable results were developed at the subbasin-level, while the definitions of significant and unreasonable, minimum thresholds, measurable objectives and 5-year interim goals were established at the GSP Plan area-level.

This section describes the coordinated sustainability goal and definition of undesirable results at a subbasin-level and the sustainable management criteria at a GSP-level. Sustainable management criteria developed by each GSP Group were further compared and coordinated between neighboring GSP Groups to avoid conflicts, particularly in setting numeric minimum thresholds, measurable objectives, and interim milestones at boundary locations. The sustainable management criteria for each GSP Group for each applicable sustainability indicator are presented herein.

5.1 Coordinated Assumptions and Data

All common coordinated assumptions and data agreed upon and implemented by each GSP Group in developing their respective sustainable management criteria for each applicable sustainability indicator are presented in Technical Memoranda 4 (*Assumptions for Delta-Mendota Subbasin Management Areas, Sustainability Indicators, and GSP Documentation*), which is included in **Appendix B** of this Common Chapter.

During preparation of the January 2020 GSP, each GSP Group drafted their respective sustainable management criteria for each applicable sustainability indicator and then met with their neighboring GSP Groups to coordinate minimum thresholds and measurable objectives to avoid conflicts and ensure each GSP Group would not negatively impact their neighboring GSP Groups from achieving sustainability. In the CIL received on January 21, 2022, DWR stated that "The GSPs have not established common definitions of undesirable results in the Subbasin." nor did they comply with the Emergency GSP Regulations in establishing common definitions and methodologies for SMC. In response, subsequent to receipt of the CIL, the Technical Working Group and Coordination Committee met to develop, at a subbasin level, singular coordinated definitions and methods for establishing SMC for each applicable sustainability indicator.

5.2 Coordinated Sustainability Goal and Undesirable Results

The sustainability goal for the Delta-Mendota Subbasin was established to succinctly state the objectives and desired conditions of the Subbasin that culminates in the absence of undesirable results by 2040. The sustainability goal for the Delta-Mendota Subbasin is as follows and was approved by the Delta-Mendota Subbasin Coordination Committee during the June 10, 2019 meeting:

> *The Delta-Mendota Subbasin will manage groundwater resources for the benefit of all users of groundwater in a manner that allows for operational flexibility, ensures resource availability under drought conditions, and does not negatively impact surface water diversion and conveyance and delivery capabilities. This goal will be achieved through the implementation of the proposed projects and management actions to reach identified measurable objectives and milestones through the implementation of the GSP(s), and through continued coordination with neighboring subbasins to ensure the absence of undesirable results by 2040.*

The following definitions of "undesirable results" were agreed upon during the 20222 revision of this Common Chapter for the following applicable sustainability indicators:

- **Chronic lowering of groundwater levels** - Chronic changes in groundwater levels that diminish access to groundwater, causing significant and unreasonable impacts to beneficial uses and users of groundwater.

- **Reduction in groundwater storage** - A chronic decrease in groundwater storage that causes a significant and unreasonable impact to the beneficial uses and users of groundwater.

- **Degraded water quality** - Degradation of groundwater quality as a result of groundwater management activities that causes significant and unreasonable impacts to beneficial uses and users of groundwater.

- **Land subsidence** - Changes in ground surface elevation that cause damage to critical infrastructure, including significant and unreasonable reductions of conveyance capacity, impacts to natural resource areas, or conditions that threaten public health and safety.

- **Depletions of interconnected surface wat–r** - Depletions of interconnected surface water as a direct result of groundwater pumping that cause significant and unreasonable impacts on natural resources or downstream beneficial uses and users.

5.3 GSP-Level Sustainable Management Criteria

In the original 2020 GSP submittals for the Delta-Mendota Subbasin, each GSP Group defined what was considered significant and unreasonable in their Plan Area for each applicable sustainability indicator, in addition to establishing minimum thresholds, measurable objectives and 5-year interim goals for their Plan Area, consistent with GSP Regulations Article 5. Plan Contents, Subarticle 3. Sustainable Management Criteria (§ 354.2 through 354.30). DWR's *Draft Best Management Practices for the Sustainable Management of Groundwater Sustainable Management Criteria BMP* (2017) document was also used when and where applicable at the discretion of each GSP Group.

Subsequent to this submittal, the Technical Working Group and Coordination Committee met to develop consistent definitions and methodologies for establishing numeric metrics for each applicable sustainability indicator. These revised SMC are discussed in the next section.

5.4 Delta-Mendota Subbasin Sustainable Management Criteria

The sustainable management criteria for each sustainability indicator contains the following components: the subbasin-wide definitions of an undesirable result and of significant and unreasonable, sustainability goals, minimum thresholds (MTs), measurable objectives (MOs), and five-year interim milestones (IMs). Separate tables show the sustainable management criteria for chronic lowering of groundwater levels, reduction in groundwater storage, degraded water quality, land subsidence, and depletions of interconnected surface water with maps showing representative monitoring sites with corresponding numeric MTs and MOs, and a table summarizing the MTs and MOs by representative monitoring location.

5.4.1 Chronic Lowering of Groundwater Levels

Chronic Lowering of Groundwater Levels is arguably the most fundamental Sustainability Indicator, as it directly and indirectly influences several other Sustainability Indicators, such as Reduction of Groundwater Storage, Land Subsidence, and Degraded Water Quality. The Subbasin GSAs are committed to maintaining groundwater levels above historic low conditions in order to avoid undesirable results to beneficial uses and users of groundwater and to prevent further decrease of groundwater levels due to groundwater management actions performed within the Subbasin.

The GSAs developed SMCs for Chronic Lowering of Groundwater Levels using readily available historic records of groundwater level data for 61 of the 75 Representative Monitoring Sites (RMS). The MTs and MOs were developed for each RMS using common data and coordinated assumptions, as detailed in **Table CC-16**, and are consistent with the requirement of Title 23 of the California Code of Regulations (23 CCR) § 354.28(c) to consider trends in historic groundwater levels, water year type, projected water use in the Basin, and relationship with other sustainability indicators. The equivalent process was used in both the Upper Aquifer and Lower Aquifer within the Subbasin.

The MT is currently established as a fixed elevation at each RMS, equivalent to the historic seasonal low prior to the end of WY2016, based on available groundwater level data. The MO is to maintain water levels at or above the Water Year 2015 seasonal high at more than 50% of RMS in a GSP area. The GSAs will conduct a minimum of bi-annual groundwater level monitoring to track progress towards sustainability at the 75 RMS.

Per the definition of Undesirable Results for Chronic Lowering of Groundwater Levels, the exceedance of a MT at a single RMS is not indicative of an Undesirable Result; rather, the exceedance of MTs at 50% or more RMS within a GSP area is considered to cause significant and unreasonable impacts to locally-specific beneficial uses and users of groundwater, namely the increased costs associated with modifying wells to access groundwater, securing alternative sources, or required mitigation of groundwater dependent ecosystems. To account for future year-to-year variations in hydrology, compliance will be assessed by comparing a four-year rolling average of groundwater level measurements to the fixed MT at each RMS within a GSP area.

In addition to the SMCs developed as part of this GSP, the GSAs will continue to coordinate to develop shorter-term ("acute") groundwater level thresholds in the five-year GSP update that will be submitted in 2025. These thresholds will be set at levels that avoid short-term undesirable results, particularly for domestic water users, groundwater dependent ecosystems, and interconnected surface waters and subsidence when present. Each year, both the historic seasonal low MT value and the acute groundwater elevation thresholds will apply, whichever is more protective.

Table CC-16: Delta-Mendota Subbasin SMC for Chronic Lowering of Groundwater Levels

Definition of Undesirable Results	Chronic changes in groundwater levels that diminish access to groundwater, causing significant and unreasonable impacts to beneficial uses and users of groundwater.
Definition of Significant and Unreasonable	Significant and unreasonable impacts to beneficial uses and users of groundwater are substantially increased costs associated with higher total pumping lift, lowering pumps, drilling deeper wells, or otherwise modifying wells to access groundwater, securing alternative water sources, or required mitigation of groundwater dependent ecosystems. Significant

Table CC-16: Delta-Mendota Subbasin SMC for Chronic Lowering of Groundwater Levels	
	and unreasonable is quantitatively defined as exceeding the MT at more than 50% of representative monitoring sites by aquifer in a GSP area.
Sustainability Goal	Maintain groundwater levels that are comparable to existing conditions (historic low conditions as of Water Year 2016) in order to continue meeting the demand of beneficial uses and users of groundwater and prevent a trend of decreasing groundwater levels. The Delta-Mendota Subbasin will continue successful and ongoing coordination with neighboring Subbasins to address chronic lowering of groundwater levels caused by pumping outside of the Subbasin.
Minimum Threshold	The groundwater elevation indicating a chronic lowering of groundwater levels that may lead to undesirable results is an elevation that is lower than the historical seasonal low. The historic seasonal low is a fixed elevation at each site, based on available groundwater level data prior to the end of Water Year 2016. To account for future year-to-year variations in hydrology, compliance with the fixed historic seasonal low threshold will be compared with a 4-year rolling average of annual groundwater level measurements. Shorter-term ("acute") groundwater elevation thresholds will also be established at each representative monitoring site by 2025 using a coordinated methodology. Acute thresholds will be established at levels that are intended to avoid short-term undesirable results, particularly for domestic water wells, groundwater dependent ecosystems, and interconnected surface waters where present in the Upper Aquifer, and for subsidence in the Lower Aquifer. Each year, both the historic seasonal low and the acute groundwater elevation thresholds will apply, whichever is more protective. Groundwater levels are measured as water surface elevation (WSE). Each GSP area includes multiple representative monitoring sites (RMS) to which the minimum threshold applies. See **Table CC-17**for numeric MTs. For any RMS without data prior to Water Year 2016, MTs and acute thresholds will be established using the aforementioned methodologies and the data resulting from the first five years of monitoring following Water Year 2016 or following construction of the well.
Measurable Objective	Maintain seasonal high groundwater levels at an elevation that is at or above the Water Year 2015 seasonal high at more than 50% of representative monitoring sites in a GSP area. The Water Year 2015 seasonal high is a fixed elevation at each site, based on available groundwater level data. If data are unavailable for Water Year 2015 at a representative monitoring site, either a Water Year 2014 or Water Year 2016 Seasonal High will be used. To account for future year-to-year variations in hydrology, compliance with the fixed seasonal high threshold will be compared with a 4-year rolling average of annual groundwater level measurements. Groundwater levels are measured as water surface elevation (WSE). Each GSP area includes multiple representative monitoring sites (RMS) to which the measurable objective applies. See **Table CC-17** for numeric MOs. For any RMS without data prior to Water Year 2016, Measurable Objectives will be established using the aforementioned methodology and

Table CC-16: Delta-Mendota Subbasin SMC for Chronic Lowering of Groundwater Levels	
	the data resulting from the first five years of monitoring following Water Year 2016 or following the construction of the well.
5-Year Interim Milestones	**Year 5:** Gather data and complete the establishment of seasonal low and seasonal high elevations at representative monitoring sites in the Lower Aquifer for the Grassland GSP area. Develop a coordinated methodology and complete the establishment of acute groundwater elevation thresholds. Identify chronic lowering of groundwater levels caused by pumping outside the Subbasin. **Year 10:** Maintain groundwater levels at MOs. Where chronic lowering of groundwater levels is caused by pumping outside of the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs. **Year 15:** Maintain groundwater levels at MOs. Where chronic lowering of groundwater levels is caused by pumping outside of the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs.

The numeric MTs and MOs by RMS are shown below in **Figure CC-65** for the Upper Aquifer and **Figure CC-66** for the Lower Aquifer, with the numeric SMC tabulated in **Table CC-17**.

Table CC-17: Numeric SMC for the Chronic Lowering of Groundwater Levels

DMS ID	GSP Region	Principal Aquifer	Minimum Threshold (ft above MSL, NAVD88)	Measurable Objective (ft above MSL, NAVD88)
09-001	Aliso Water District	Upper	40.5	114.3
09-002	Aliso Water District	Upper (Composite)	-4.0	17.1
09-003	Aliso Water District	Upper	37.4	52.9
09-004	Aliso Water District	Upper	37.7	51.9
10-001	Farmers Water District	Upper	34.0	102.7
12-001	Fresno County	Upper	98.2	103.2
13-001	Fresno County	Upper	109.4	120.5
13-003	Fresno County	Upper	48.6	116.1
13-004	Fresno County	Lower	-59.0	-27.0
11-001	Grassland	Lower	TBD	TBD
11-002	Grassland	Lower	TBD	TBD
11-003	Grassland	Lower	TBD	TBD
11-004	Grassland	Lower	TBD	TBD

DMS ID	GSP Region	Principal Aquifer	Minimum Threshold (ft above MSL, NAVD88)	Measurable Objective (ft above MSL, NAVD88)
11-005	Grassland	Lower	TBD	TBD
11-006	Grassland	Lower	TBD	TBD
11-007	Grassland	Upper	79.9	91.1
11-008	Grassland	Upper	82.3	93.2
11-009	Grassland	Upper	63.4	77.3
11-013	Grassland	Upper	76.8	80.4
11-014	Grassland	Upper	68.1	80.7
11-015	Grassland	Upper	72.8	75.7
11-016	Grassland	Upper	83.1	92.8
11-017	Grassland	Upper	90.2	116.6
11-019	Grassland	Upper	27.0	27.0
19-003	Grassland	Upper	90.5	91.8
01-001	NCDM	Lower	-44.9	-13.4
01-002	NCDM	Lower	-36.1	-18.9
01-003	NCDM	Lower	-21.8	62.3
01-004	NCDM	Upper	158.9	161.8
01-005	NCDM	Upper	110.6	179.6
01-006	NCDM	Lower	77.1	94.0
01-007	NCDM	Lower	12.3	56.7
01-008	NCDM	Lower	-44.9	2.4
02-002	NCDM	Lower	-18.3	33.7
02-009	NCDM	Upper	-6.2	29.8
03-001	NCDM	Upper	30.7	46.7
03-002	NCDM	Upper	7.7	67.2
03-003	NCDM	Upper	TBD	TBD
04-001	NCDM	Lower	-17.6	-3.6
06-001	NCDM	Lower	-52.3	16.1
06-002	NCDM	Upper	31.5	44.6
06-003	NCDM	Lower	-9.1	18.5
06-004	NCDM	Upper	14.8	30.5
07-002	NCDM	Lower	1.6	10.8
07-003	NCDM	Upper	62.5	89.9
07-005	NCDM	Lower	-84.7	-41.8
07-007	NCDM	Lower	-53.4	-26.6
07-008	NCDM	Lower	-63.0	-47.0
07-009	NCDM	Upper	49.3	73.9
07-010	NCDM	Upper	64.0	96.2
07-012	NCDM	Upper	TBD	TBD
07-014	NCDM	Lower	-133.5	-47.2

DMS ID	GSP Region	Principal Aquifer	Minimum Threshold (ft above MSL, NAVD88)	Measurable Objective (ft above MSL, NAVD88)
07-015	NCDM	Lower	-147.0	-65.0
07-016	NCDM	Lower	-2.4	74.6
07-017	NCDM	Upper	TBD	TBD
07-018	NCDM	Upper	TBD	TBD
07-028	NCDM	Lower	-88.2	-64.8
07-029	NCDM	Upper	TBD	TBD
07-030	NCDM	Lower	TBD	TBD
07-031	NCDM	Lower	TBD	TBD
07-032	NCDM	Lower	TBD	TBD
07-035	NCDM	Upper	-99.8	95.2
08-002	NCDM	Upper	50.7	83.7
14-001	SJREC	Upper	24.0	48.5
14-002	SJREC	Upper	96.5	125.7
14-003	SJREC	Upper	81.3	92.2
14-004	SJREC	Upper	78.7	92.6
14-005	SJREC	Upper	92.2	106.2
14-006	SJREC	Upper	76.7	98.2
14-007	SJREC	Upper	73.5	98.5
14-008	SJREC	Upper	70.5	98.5
14-019	SJREC	Lower	-48.8	35.0
14-020	SJREC	Lower	38.1	57.4
14-021	SJREC	Lower	-33.0	14.8
23-001	SJREC	Upper	102.3	120.2

T–D - Numeric SMC to be determined after five years of data have been collected for this representative monitoring site.

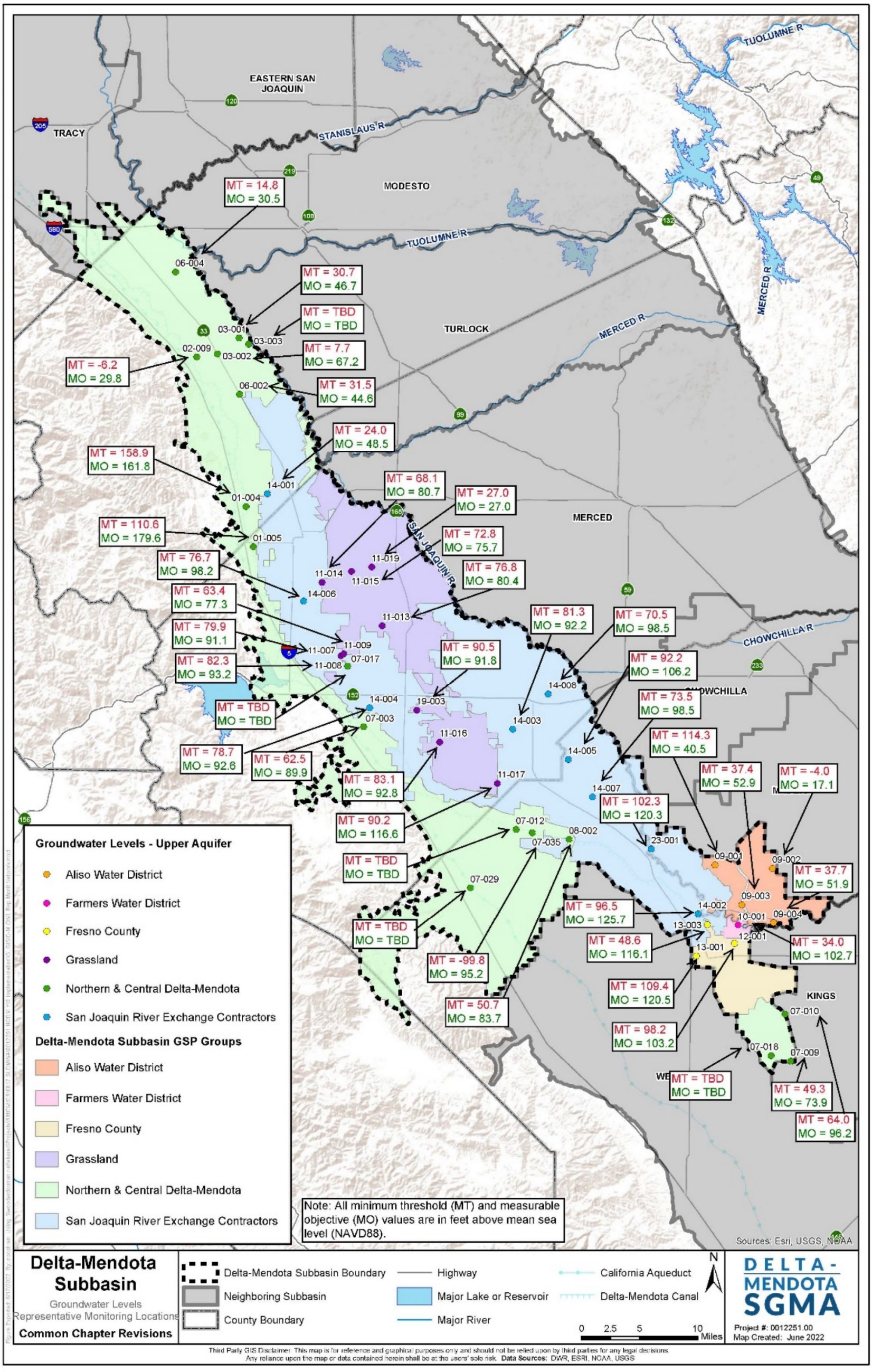


Figure CC-65: Groundwater Level Representative Monitoring Locations with SMC – Upper Aquifer

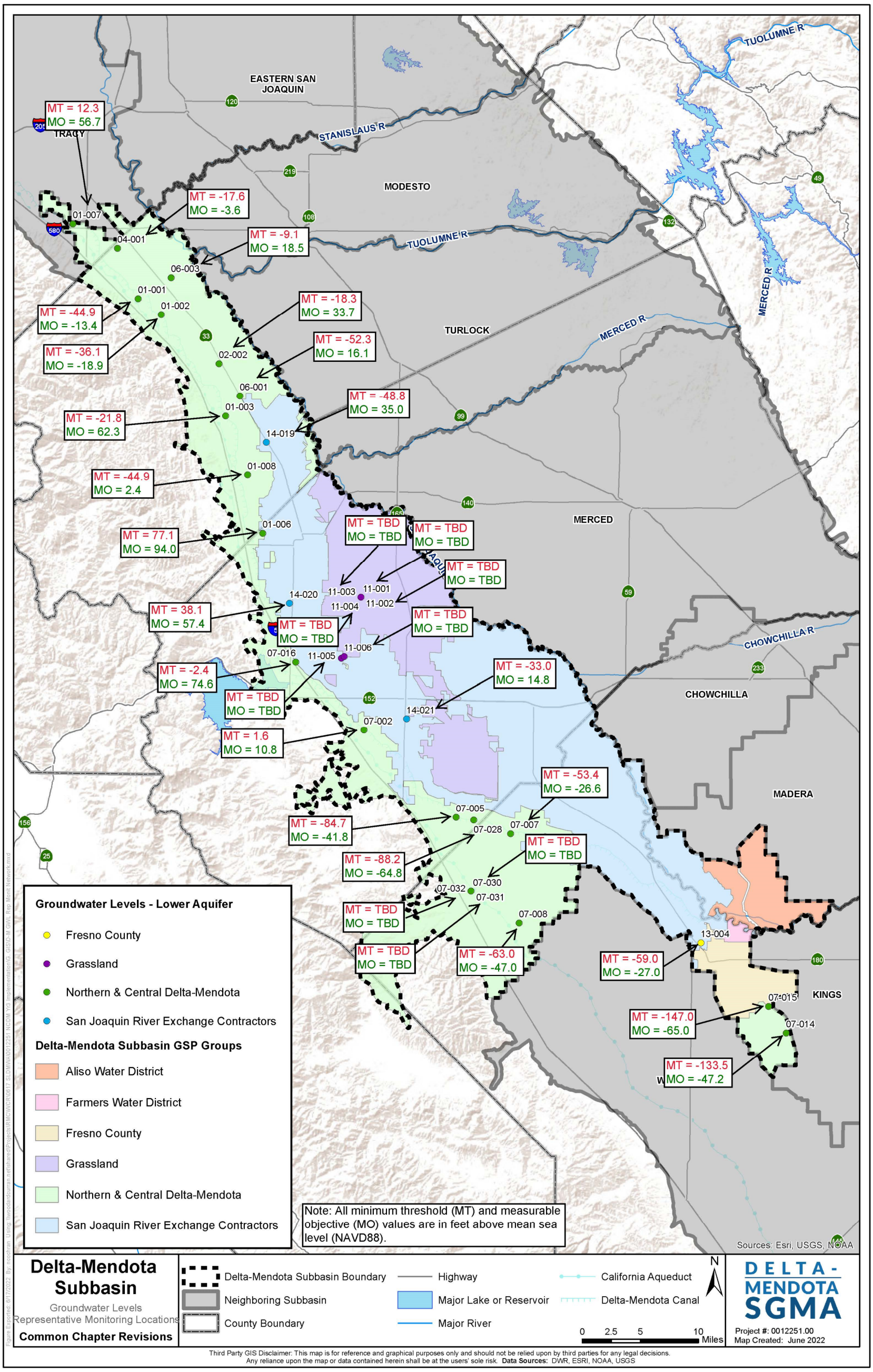


Figure CC-66: Groundwater Level Representative Monitoring Locations with SMC – Lower Aquifer

5.4.2 Reduction in Groundwater Storage

The GSAs intend to maintain groundwater storage at volumes that will continue to meet the demands of beneficial uses and users of groundwater, provide a three-year drought buffer, and minimize reductions in groundwater storage during extended dry periods. Further, the GSAs will coordinate with neighboring subbasins to address reductions in groundwater storage caused by pumping outside of the Subbasin. The SMCs were developed using common data and coordinated assumptions, as detailed in **Table CC-18** and will be monitored a minimum of bi-annually as detailed for Chronic Lowering of Groundwater Levels in Section 5.4.1 (**Table CC-16**) and consistent Land Subsidence monitoring as detailed in Section 5.4.4 (**Table CC-21**).

Pursuant to 23 CCR § 354.28(d), the MTs for Reduction of Groundwater Storage may be set by using groundwater levels as a proxy if it is demonstrated that a correlation exists between the two metrics. It is logical to link these two Sustainability Indicators for the Upper Aquifer, as the amount of groundwater in storage is directly, if not linearly, related to groundwater levels. As such, in the Upper Aquifer, it is not necessary to set a unique MT for Reduction of Groundwater Storage, and the MTs for Chronic Lowering of Groundwater Levels are used as a proxy for the Reduction of Groundwater Storage Sustainability Indicator. Similarly, the MOs for Chronic Lowering of Groundwater Levels serves as a proxy for Reduction of Groundwater Storage. Because the SMCs established for Chronic Lowering of Groundwater Levels are designed to maintain groundwater levels above historic low conditions, they are protective of the Reduction of Groundwater Storage Sustainability indicator and local beneficial uses and users of the Upper Aquifer, as the SMCs maintain sufficient water storage to maintain beneficial uses, including the conjunctive use of groundwater.

In the Lower Aquifer, the physical reduction in groundwater storage is caused by inelastic land subsidence, as detailed in Section 5.4.4 (**Table CC-21**). As such, the SMCs set for Land Subsidence (which are designed to reduce subsidence caused by groundwater extraction in the Subbasin, with no additional subsidence after 2040) are reasonably protective and used as a tool to calculate the Reduction of Groundwater Storage Sustainability Indicator SMCs in the Lower Aquifer[1].

[1] The most significant subsidence in the Subbasin observed between from 2014-2018 was a 0.6-foot decline at Check 18 of the Delta-Mendota Canal. During those same years, the water budget calculation estimated what the change in storage was in the Lower Aquifer. Given the apparent relationship between the loss in groundwater storage and the observed subsidence, the projected allowable additional subsidence (i.e., two feet by 2040) was converted to a groundwater storage volume in the Lower Aquifer and used as the SMC.

Table CC-18: Delta-Mendota Subbasin SMC for Reduction in Groundwater Storage	
Definition of Undesirable Results	A chronic decrease in groundwater storage that causes a significant and unreasonable impact to the beneficial uses and users of groundwater.
Definition of Significant and Unreasonable	A significant and unreasonable impact to beneficial uses and users of groundwater is insufficient water storage to maintain beneficial uses and natural resource areas in the Subbasin, including the conjunctive use of groundwater.
Sustainability Goal	Maintain historic groundwater storage volumes in order to continue meeting the demand of beneficial uses and users of groundwater and to provide a 3-year drought buffer. Minimize reductions in groundwater storage during extended dry periods. Work with neighboring Subbasins to address reduction in groundwater storage caused by pumping outside of the Subbasin.
Minimum Threshold	For the Upper Aquifer, as a reasonable proxy for an individual groundwater storage threshold, maintain groundwater levels in accordance with the minimum threshold set for Chronic Lowering of Groundwater Levels. For the Lower Aquifer, correlate the SMCs for inelastic land subsidence with the reduction in groundwater storage that would cause undesirable results, estimated to be 1.1 million acre-feet of storage loss by 2040 attributable to groundwater extraction in the Subbasin.
Measurable Objective	For the Upper Aquifer, maintain groundwater levels in accordance with the measurable objectives set for Chronic Lowering of Groundwater Levels. For the Lower Aquifer, minimize loss of groundwater storage caused by inelastic land subsidence.
5-Year Interim Milestones	**Year 5:** Maintain groundwater levels in accordance with the measurable objectives. Identify reduction in groundwater storage caused by pumping outside the Subbasin. **Year 10:** Maintain groundwater levels in accordance with the measurable objectives. Where reduction in groundwater storage is caused by pumping outside of the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs. **Year 15:** Maintain groundwater levels in accordance with the measurable objectives. Where reduction in groundwater storage is caused by pumping outside of the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs.

5.4.3 Degraded Groundwater Quality

The GSP groups within the Delta-Mendota Subbasin are committed to preventing the migration or elevated concentrations of constituents of concern due to groundwater management activities. The primary constituent of concern in the Subbasin is salinity, frequently reported as total dissolved solids (TDS).

For drinking water, California has three secondary maximum contaminant level (SMCL) standards for TDS, all based on aesthetic considerations such as taste and odor, not public health concerns. These are 500 mg/L (recommended limit), 1,000 mg/L (upper limit), and 1,500 mg/L (short-term limit). To reflect the Subbasin's designation as a Municipal (MUN) beneficial use, as established in the Central Valley Water Control Plans (often referred to as Basin Plans), the Subbasin has selected the upper limit of 1,000 mg/L as the Minimum Threshold.

The Delta-Mendota GSAs also recognize that a Salt Control Program for the San Joaquin Valley was recently developed through the collaborative CV-SALTS Program and was adopted into the Central Valley Basin Plans to address the long-term problem of salt accumulation in the Valley. The program recognizes that salt accumulation and water uses vary widely across the Valley. The program approach is intended to protect beneficial uses by maintaining water quality that meets applicable objectives, allow some salt accumulation in areas where salt can be stored without impairing beneficial uses of water, and, through long-term management, restore water quality where reasonable, feasible, and practicable.

A Prioritization and Optimization (P&O) Study planning process is now underway to identify potential requirements that will protect beneficial uses, improve salt management, and restore water quality where possible. During the next ten years (Phase 1), the P&O Study will: characterize the salt conditions and trends in the Valley; identify salt management needs and mechanisms; evaluate the feasibility of potential solutions; prepare an implementation plan; and review and recommend revising salinity regulations as necessary. [1]

The minimum thresholds and measurable objectives for groundwater quality incorporate these standards and objectives for salinity. The minimum threshold is therefore set as 1,000 mg/L TDS, and the measurable objective is a concentration less than 1,000 mg/L TDS with acknowledgement that salinity standards are still being developed by water quality experts and regulatory agencies in the Central Valley, and thus may need to be revised in the future. Additionally, groundwater is frequently blended with other water supplies to reduce TDS concentrations to meet the salinity sensitivity of a particular beneficial use.

For any representative monitoring site that currently exceeds the TDS thresholds set forth above, the existing regulatory water quality compliance and remediation programs will apply. These include, but are not limited to, the CV-SALTS Salt Control Program, the County Drought Plan requirements for State Small Water Systems and Domestic Wells (SB 552), the Safe and Affordable Funding for Equity and Resilience (SAFER) program, and the Bureau of Reclamation's Refuge Water Supply Program. For any future exceedance of the TDS thresholds at representative monitoring sites that do not currently exceed the objectives, the applicable GSP group is required to coordinate and publish an assessment of the effect of groundwater management activities on the documented exceedance, and propose timely actions to manage groundwater differently in order to avoid exacerbating the exceedance.

The sustainable management criteria also incorporate by reference the specific requirements for preventing the migration of contaminants adopted by the Central Valley Regional Water Quality Control Board in Cleanup and Abatement Orders for individual contaminated sites.[2]

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[1] *See* https://www.cvsalinity.org/salt-program/; https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201805.pdf

[2] *E.g.,* the Cleanup and Abatement Order R5-2018-0033 for the Spreckels facility: https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/fresno/r5-2018-0033.pdf

Table CC-19: Delta-Mendota Subbasin SMC for Degraded Groundwater Quality	
Definition of Undesirable Results	Degradation of groundwater quality as a result of groundwater management activities that causes significant and unreasonable impacts to beneficial uses and users of groundwater.
Definition of Significant and Unreasonable	Significant and unreasonable impacts to beneficial uses and users of groundwater as a result of groundwater management activities are the migration of contaminant plumes or elevated concentrations of constituents of concern that reduce groundwater availability, and the degradation of surface water quality as a result of groundwater migration that substantially impair an existing beneficial use. Significant and unreasonable is quantitatively defined as exceeding the MT at more than 50% of representative monitoring sites by aquifer in a GSP area where current groundwater quality (as established in the Subbasins GSPs) does not exceed 1,000 mg/L TDS.
Sustainability Goal	Minimize further impairment of water supplies resulting from groundwater management activities that cause the migration or concentration of contaminant plumes or the increased rate of movement or concentrations of constituents of concern. Coordinate with and support compliance with existing regulatory groundwater quality orders and objectives for drinking water, agricultural irrigation, and managed wetlands. Work with neighboring Subbasins to address existing or potential impairments of groundwater quality in the Subbasin caused by groundwater management activities outside the Subbasin.
Minimum Threshold	The minimum threshold for salinity is 1,000 mg/L TDS. For representative monitoring sites that currently exceed the minimum threshold, existing regulatory water quality compliance and remediation programs will apply, including but not limited to, the CV-SALTS Salt Control Program, the Irrigated Lands Regulatory Program, the County Drought Plan requirements for State Small Water Systems and Domestic Wells (SB 552), and the Safe and Affordable Funding for Equity and Resilience (SAFER) program. For any RMS without data prior to the end of Water Year 2016, current (ambient) groundwater quality will be established using data collected during the first five years of monitoring following Water Year 2016 or following construction of the well. For representative monitoring sites that do not currently exceed the minimum threshold, but are found to exceed minimum thresholds in the future, the applicable GSP group will conduct and publish an assessment of the effect of groundwater management activities on the documented exceedance, and propose timely actions to manage groundwater differently, if needed, to avoid exacerbating the exceedance. The applicable GSP group will also coordinate with the appropriate regulatory program to address the impact.
Measurable Objective	The measurable objective for salinity will be concentrations less than 1,000 mg/L TDS. Each GSP group will participate in, provide data for, and track and report on compliance with orders and objectives adopted by the State and Central Valley Regional Water Quality Control Boards and similar regulatory agencies, in coordination with the Central Valley Groundwater Monitoring Collaborative.

Table CC-19: Delta-Mendota Subbasin SMC for Degraded Groundwater Quality	
5-Year Interim Milestones	**Year 5:** Maintain salinity consistent with measurable objectives. Participate in, provide data for, and track and report on compliance with orders and objectives adopted by the State Water Resources and Central Valley Regional Water Quality Control Boards and similar regulatory agencies, in coordination with the Central Valley Groundwater Monitoring Collaborative. Develop correlation between groundwater quality and groundwater levels in order to establish methodology for the use of groundwater levels as a proxy for groundwater quality. **Year 10:** Maintain water quality consistent with measurable objectives. Continue monitoring and publishing groundwater quality data, and tracking and reporting on compliance with regulatory orders and objectives. Where water quality impairments are caused by activities outside the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs. Utilizing the methodology developed by the Year 5 Interim Milestone, develop minimum thresholds and measurable objectives for groundwater quality that utilize groundwater elevations as a proxy for monitoring. **Year 15:** Maintain water quality consistent with measurable objectives. Continue monitoring and publishing groundwater quality data, and tracking and reporting on compliance with regulatory orders and objectives. Where water quality impairments are caused by activities outside the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs.

The numeric MTs and MOs by RMS are shown below in **Figure CC-67** for the Upper Aquifer and **Figure CC-68** for the Lower Aquifer, with the numeric SMC tabulated in **Table CC-20**.

Table CC-20: Numeric SMC for Degraded Groundwater Quality

DMS ID	GSP Region	Principal Aquifer	Minimum Threshold (TDS in mg/L)	Measurable Objective (TDS in mg/L)
09-002	Aliso Water District	Upper	1,000	< 1,000
09-003	Aliso Water District	Upper	1,000	< 1,000
09-005	Aliso Water District	Upper	1,000	< 1,000
09-196	Aliso Water District	Upper	1,000	< 1,000
10-001	Farmers Water District	Upper	1,000	< 1,000
10-005	Farmers Water District	Upper	1,000	< 1,000
12-002	Fresno County	Upper	N/A	N/A
12-003	Fresno County	Upper	N/A	N/A
12-004	Fresno County	Upper	N/A	N/A
12-005	Fresno County	Upper	N/A	N/A
12-006	Fresno County	Upper	1,000	< 1,000
12-007	Fresno County	Upper	N/A	N/A
13-006	Fresno County	Upper	N/A	N/A
13-007	Fresno County	Upper	N/A	N/A

DMS ID	GSP Region	Principal Aquifer	Minimum Threshold (TDS in mg/L)	Measurable Objective (TDS in mg/L)
13-008	Fresno County	Upper	N/A	N/A
11-010	Grassland	Lower	TBD	TBD
11-011	Grassland	Lower	1,000	< 1,000
11-012	Grassland	Lower	1,000	< 1,000
11-021	Grassland	Upper	N/A	N/A
19-002	Grassland	Upper	1,000	< 1,000
19-004	Grassland	Upper	N/A	N/A
01-001	NCDM	Lower	1,000	< 1,000
01-002	NCDM	Lower	1,000	< 1,000
01-003	NCDM	Lower	N/A	N/A
01-004	NCDM	Upper	1,000	< 1,000
01-006	NCDM	Lower	1,000	< 1,000
01-007	NCDM	Lower	1,000	< 1,000
01-008	NCDM	Lower	1,000	< 1,000
01-018	NCDM	Upper (assumed)	1,000	< 1,000
02-002	NCDM	Lower	1,000	< 1,000
02-009	NCDM	Upper	1,000	< 1,000
03-001	NCDM	Upper	N/A	N/A
03-003	NCDM	Upper	N/A	N/A
03-007	NCDM	Upper	1,000	< 1,000
04-001	NCDM	Lower	1,000	< 1,000
06-001	NCDM	Lower	1,000	< 1,000
06-002	NCDM	Upper	1,000	< 1,000
06-003	NCDM	Lower	1,000	< 1,000
06-004	NCDM	Upper	N/A	N/A
07-002	NCDM	Lower	1,000	< 1,000
07-003	NCDM	Upper	1,000	< 1,000
07-007	NCDM	Lower	1,000	< 1,000
07-008	NCDM	Lower	N/A	N/A
07-012	NCDM	Upper	N/A	N/A
07-014	NCDM	Lower	1,000	< 1,000
07-015	NCDM	Lower	1,000	< 1,000
07-016	NCDM	Lower	1,000	< 1,000
07-017	NCDM	Upper	1,000	< 1,000
07-018	NCDM	Upper	N/A	N/A
07-028	NCDM	Lower	N/A	N/A
07-029	NCDM	Upper	N/A	N/A
07-030	NCDM	Lower	N/A	N/A
07-031	NCDM	Lower	N/A	N/A
07-032	NCDM	Lower	N/A	N/A

DMS ID	GSP Region	Principal Aquifer	Minimum Threshold (TDS in mg/L)	Measurable Objective (TDS in mg/L)
07-033	NCDM	Upper	1,000	< 1,000
07-034	NCDM	Lower (assumed)	N/A	N/A
07-035	NCDM	Upper	N/A	N/A
08-002	NCDM	Upper	N/A	N/A
14-001	SJREC	Upper	1,000	< 1,000
14-002	SJREC	Upper	1,000	< 1,000
14-003	SJREC	Upper	N/A	N/A
14-004	SJREC	Upper	1,000	< 1,000
14-005	SJREC	Upper	N/A	N/A
14-006	SJREC	Upper	1,000	< 1,000
14-007	SJREC	Upper	N/A	N/A
14-008	SJREC	Upper	1,000	< 1,000
14-019	SJREC	Lower	1,000	< 1,000
14-020	SJREC	Lower	1,000	< 1,000
14-021	SJREC	Lower	N/A	N/A
23-001	SJREC	Upper	1,000	< 1,000

Notes:

1. Current TDS concentration is defined as prior to the end of WY 2016.
2. N/A - Current groundwater quality exceeds 1,000 mg/L TDS.
3. TBD - Numeric SMC to be determined after five years of data have been collected for this representative monitoring site.

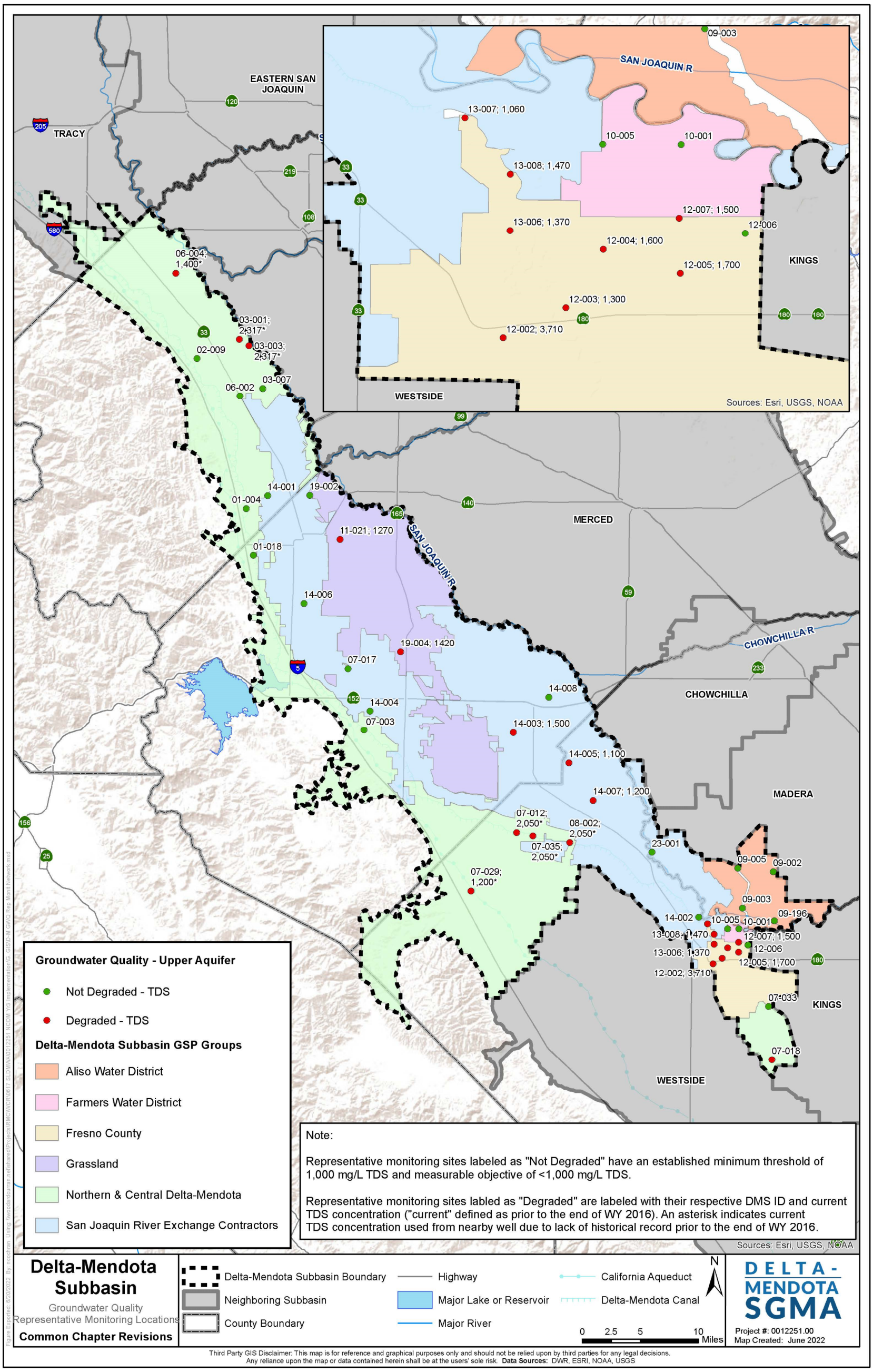

Figure CC-67: Groundwater Quality Representative Monitoring Locations with SMC – Upper Aquifer

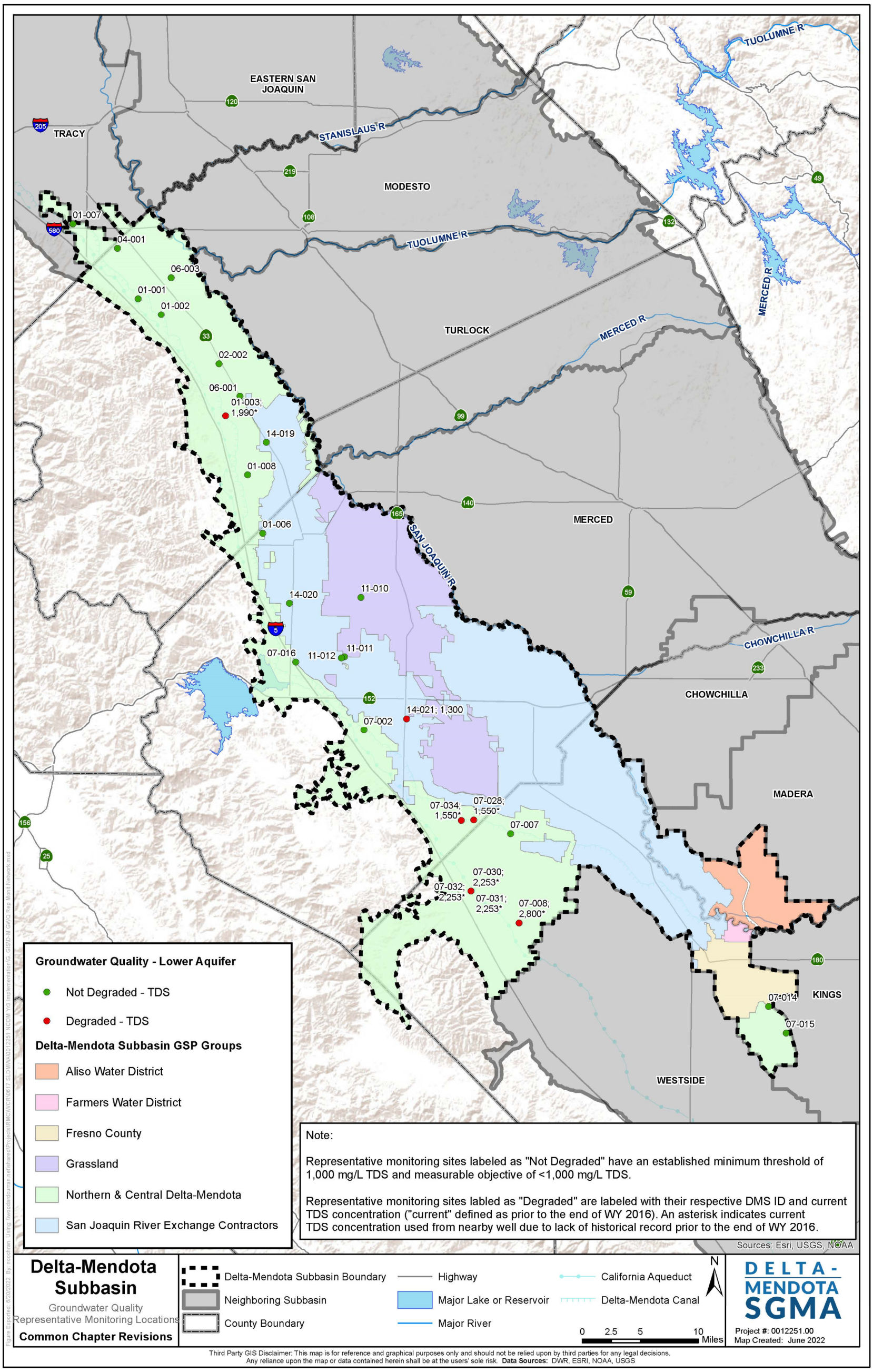

Figure CC-68: Groundwater Quality Representative Monitoring Locations with SMC – Lower Aquifer

5.4.4 Inelastic Land Subsidence

The Subbasin GSAs are committed to ramping down the amount of allowable subsidence caused by groundwater extraction in the Subbasin and eliminating additional subsidence within the Subbasin by 2040. Further, the GSAs will coordinate with neighboring subbasins to address inelastic land subsidence caused by groundwater management activities that occur outside of the Subbasin.

The SMCs for Land Subsidence were coordinated at the Subbasin level and are designed to be protective of critical infrastructure, including significant and unreasonable reductions of conveyance capacity (i.e., structural damage that creates an unmanageable reduction of design capacity), impacts to natural resource areas (i.e., unmitigated decreases in the ability to irrigate or drain these areas by gravity), or conditions that threaten public health and safety (i.e., unmitigated reduction of freeboard that allows for flooding, or unmitigated damage to roads and bridges). The Subbasin-wide MT is set to prevent subsidence that exceeds the corrective design standards or established triggers for critical infrastructure, including the Delta-Mendota Canal and California Aqueduct. At the RMS, the MT is defined as two feet of additional inelastic subsidence by 2040 attributable to groundwater extraction within the Subbasin. The MO is set at no additional subsidence after 2040 based on groundwater extractions within the Delta-Mendota Subbasin.

The GSAs further developed Interim Milestones (IMs) to periodically reduce the amount of allowable subsidence and meet the MO by 2040. The IMs allow for no more than 1.0 foot of additional subsidence by 2025, 0.5 feet of additional subsidence by 2030 (1.5 feet of cumulative subsidence), 0.25 feet of additional subsidence by 2035 (1.75 feet of cumulative subsidence), and 0.25 feet of additional subsidence by 2040 (2.0 feet of cumulative subsidence). The SMCs were defined at 45 RMS in the Subbasin, and the GSAs will conduct monitoring to track progress towards sustainability. Additionally, as part of the 5-year update to the GSPs, the Subbasin Hydrogeologic Conceptual Model (HCM) will be reviewed and revised to incorporate new data, including Airborne Electromagnetic (AEM) survey data provided by DWR and data/results from the Subsidence Study prepared using Prop 68 grant funding. Additionally, the GSAs will continue work with USBR on revisions to the CVHM2 model for simulating groundwater extraction-subsidence interactions, to re-evaluate inelastic land subsidence SMC to consider new data and studies, and to assess allowable land subsidence on a Subbasin and localized (subbasin subarea) basis.

Table CC-21: Delta-Mendota Subbasin SMC for Inelastic Land Subsidence

Definition of Undesirable Results	Changes in ground surface elevation that cause damage to critical infrastructure, including significant and unreasonable reductions of conveyance capacity, impacts to natural resource areas, or conditions that threaten public health and safety.
Definition of Significant and Unreasonable	Significant and unreasonable damage to conveyance capacity from inelastic land subsidence is structural damage that creates an unmitigated and unmanageable reduction of design capacity or freeboard. Significant and unreasonable impacts to natural resource areas from inelastic land subsidence are unmitigated decreases in the ability to flood or drain such areas by gravity. Significant and unreasonable threats to public health and safety from inelastic land subsidence are those that cause an unmitigated reduction of freeboard that allows for flooding, or unmitigated damage to roads and bridges.

Table CC-21: Delta-Mendota Subbasin SMC for Inelastic Land Subsidence	
Sustainability Goal	Minimize inelastic land subsidence by ramping down allowable subsidence caused by groundwater extraction in the Subbasin, with no additional subsidence after 2040. Work with neighboring Subbasins to address inelastic land subsidence caused by groundwater extraction outside of the Subbasin.
Minimum Threshold	At representative monitoring sites, the change in ground surface elevation that would cause undesirable results is up to 2 feet of additional inelastic land subsidence attributable to groundwater extraction in the Subbasin. Prevent subsidence caused by groundwater extractions in the Delta-Mendota Subbasin that exceeds corrective design standards or established triggers for critical infrastructure including the Delta-Mendota Canal, California Aqueduct, and roads and bridges.
Measurable Objective	Minimize inelastic land subsidence attributable to groundwater extraction within the Subbasin, with no additional subsidence after 2040.
5-Year Interim Milestones	**Year 5:** Interim goal of no more than 1 foot of additional inelastic land subsidence attributable to groundwater extraction in the Subbasin during the first 5-year period of SGMA implementation. Review and revise Hydrogeologic Conceptual Model (HCM) to incorporate new data. Re-evaluate inelastic land subsidence SMC to consider new data and studies and to assess allowable land subsidence on a Subbasin and localized (subbasin subarea) basis. Gather data and complete the selection or establishment of representative monitoring sites (RMS) for land subsidence, with particular attention to the locations of critical infrastructure in the Subbasin, and in coordination with the Bureau of Reclamation and Department of Water Resources. Determine the relative proportion of subsidence caused by groundwater extraction within and outside the Subbasin for each RMS. Where subsidence is caused by pumping outside the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs. **Year 10:** Interim goal of no more than 0.5 feet of additional inelastic land subsidence attributable to groundwater extraction in the Subbasin during the second 5-year period of SGMA implementation, for a cumulative total of 1.5 feet in the first 10 years. Where subsidence is caused by groundwater extraction outside the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs. Continue work to improve understanding of interconnection between groundwater extractions and land subsidence, utilizing model simulations and/or data collection and analysis. **Year 15:** Interim goal of no more than 0.25 feet of additional inelastic land subsidence attributable to groundwater extraction in the Subbasin during the third 5-year period of SGMA implementation, for a cumulative total of 1.75 feet in the first 15 years. Where subsidence is caused by groundwater extraction outside the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs. Continue work to improve understanding of interconnection between groundwater extractions and land subsidence, utilizing model simulations and/or data collection and analysis.

The numeric MTs and MOs by RMS are shown below in **Figure CC-69**, with the numeric SMC tabulated in **Table CC-22**.

Table CC-22: Numeric SMC for Inelastic Land Subsidence

DMS ID	GSP Region	Minimum Threshold (Inelastic Land Subsidence in ft Attributable to Groundwater Extraction)	Measurable Objective (Inelastic Land Subsidence in ft Attributable to Groundwater Extraction)
09-006	Aliso Water District	2	0
09-007	Aliso Water District	2	0
09-008	Aliso Water District	2	0
10-008	Farmers Water District	2	0
12-010	Fresno County	2	0
13-010	Fresno County	2	0
11-018	Grassland	2	0
11-019	Grassland	2	0
11-020	Grassland	2	0
01-009	NCDM	2	0
01-010	NCDM	2	0
01-011	NCDM	2	0
01-012	NCDM	2	0
01-013	NCDM	2	0
01-014	NCDM	2	0
01-015	NCDM	2	0
01-016	NCDM	2	0
01-017	NCDM	2	0
02-003	NCDM	2	0
02-004	NCDM	2	0
02-005	NCDM	2	0
02-006	NCDM	2	0
02-007	NCDM	2	0
02-008	NCDM	2	0
03-004	NCDM	2	0
03-005	NCDM	2	0
03-006	NCDM	2	0
04-003	NCDM	2	0
04-004	NCDM	2	0
04-005	NCDM	2	0
06-006	NCDM	2	0
07-019	NCDM	2	0
07-020	NCDM	2	0
07-021	NCDM	2	0
07-022	NCDM	2	0

DMS ID	GSP Region	Minimum Threshold (Inelastic Land Subsidence in ft Attributable to Groundwater Extraction)	Measurable Objective (Inelastic Land Subsidence in ft Attributable to Groundwater Extraction)
07-023	NCDM	2	0
07-024	NCDM	2	0
07-025	NCDM	2	0
07-026	NCDM	2	0
07-027	NCDM	2	0
14-014	SJREC	2	0
14-015	SJREC	2	0
14-016	SJREC	2	0
14-017	SJREC	2	0
14-018	SJREC	2	0

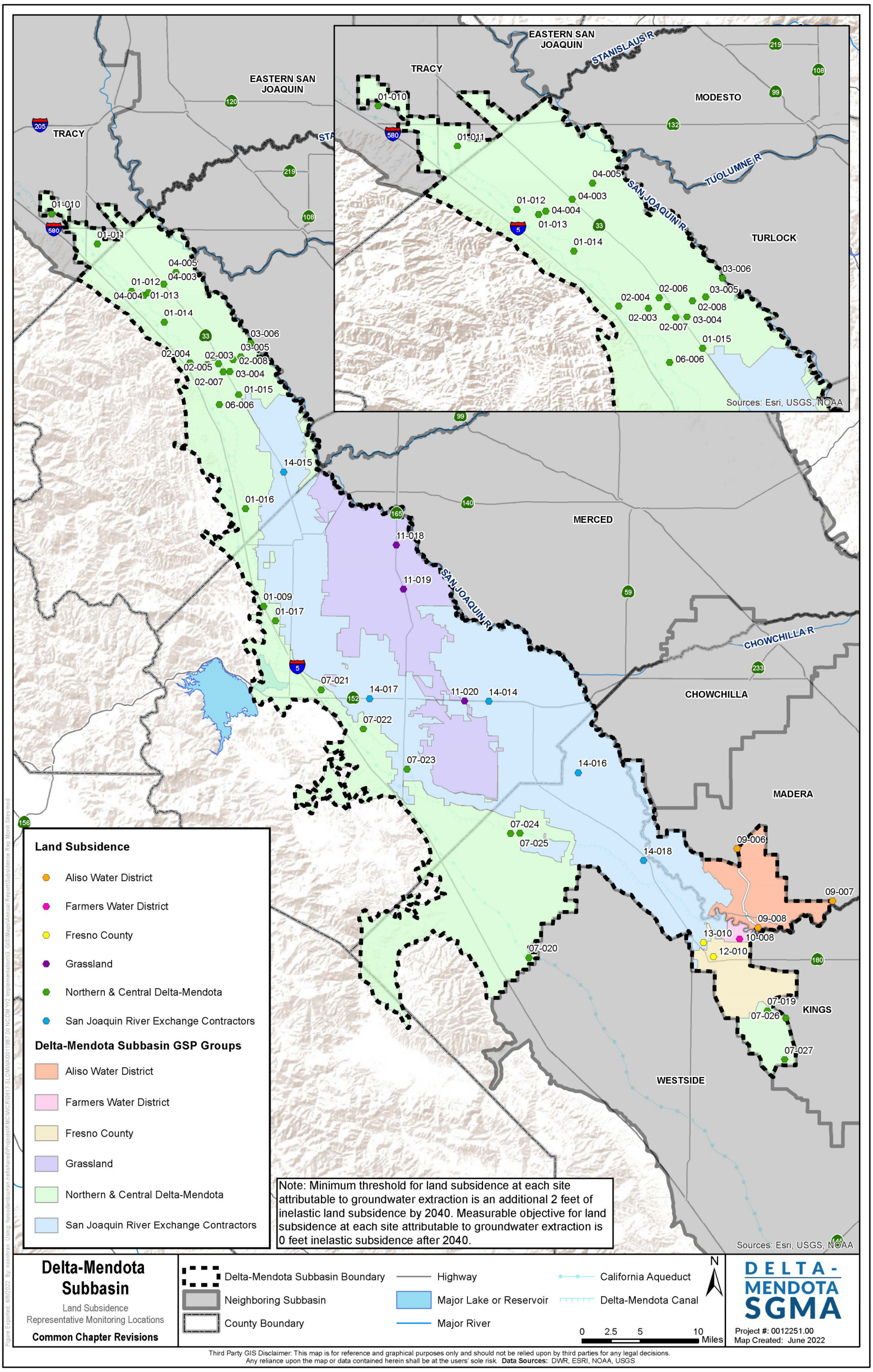

Figure CC-69: Land Subsidence Representative Monitoring Locations with SMC

5.4.5 Depletion of Interconnected Surface Water

The GSAs are committed to managing groundwater within the Subbasin to maintain interconnected surface waters comparable to existing conditions and prevent a trend of increasing interconnected surface water losses from the San Joaquin River. The GSAs will coordinate with neighboring subbasins to address interconnected surface water losses caused by groundwater management activities that occur outside of the Subbasin.

Presently, the Depletion of Interconnected Surface Water Sustainability Indicator is identified as a data gap within the Subbasin. Until the GSAs are able to collect the additional data necessary to set quantitative SMCs for this Sustainability Indicator, the SMCs for Chronic Lowering of Groundwater Levels serve as a proxy in the Upper Aquifer, pursuant to 23 CCR §354.28(d). Because the SMCs established for Chronic Lowering of Groundwater Levels are designed to maintain groundwater levels above historic low conditions, they are understood to be protective of the Depletion of Interconnected Surface Water Sustainability indicator and local natural resources and downstream beneficial uses and users. The RMS locations and frequency are consistent with that detailed in Section 6.

The GSAs plan to establish an Interconnected Surface Water monitoring network and develop SMCs as detailed in Table CC-18. By 2025, the GSAs anticipate completing an Interconnected Surface Water monitoring network that includes nine existing sites in the San Joaquin River Restoration Program and additional sites funded by the SGMA Implementation Grant award. The additional RMS will focus on the Northern & Central Delta-Mendota and Grassland GSP areas along the San Joaquin River. By 2030, the GSAs anticipate being able to gather and analyze data from these new RMS to estimate the influence of groundwater levels on gains and losses observed on the San Joaquin River. At this point, the Subbasin GSAs will establish Interconnected Surface Water SMCs as a rate or volume of surface water depletions that have adverse impacts on beneficial uses and users and may lead to undesirable results.

Table CC-23: Delta-Mendota Subbasin SMC for Depletions of Interconnected Surface Water

Definition of Undesirable Results	Depletions of interconnected surface water as a direct result of groundwater pumping that cause significant and unreasonable impacts on natural resources or downstream beneficial uses and users.
Definition of Significant and Unreasonable	Significant and unreasonable impacts on natural resources or downstream beneficial uses and users of groundwater are a reduction in available surface water supplies for natural resource areas, and reductions in downstream water availability as a result of increased streamflow depletions along the San Joaquin River when compared to similar historic water year types.
Sustainability Goal	Maintain interconnected surface waters comparable to existing conditions (historic low conditions as of Water Year 2016) in order to prevent a trend of increasing interconnected surface water losses from the San Joaquin River. Work with neighboring Subbasins to address increased interconnected surface water losses caused by pumping outside of the Subbasin.
Minimum Threshold	Interconnected Surface Water is an identified data gap in the Delta-Mendota Subbasin. As an interim minimum threshold, use the Chronic Lowering of Groundwater Level Minimum Threshold as a proxy for impacts to interconnected surface waters (see below). The groundwater elevation indicating a chronic lowering of groundwater levels that may lead to undesirable results is an elevation that is lower than the historical seasonal low. The historic seasonal low is a fixed elevation at each

Table CC-23: Delta-Mendota Subbasin SMC for Depletions of Interconnected Surface Water	
	site, based on available groundwater level data prior to the end of Water Year 2016. To account for future year-to-year variations in hydrology, compliance with the fixed historic seasonal low threshold will be compared with a 4-year rolling average of annual groundwater level measurements. Groundwater levels are measured as water surface elevation (WSE). Each GSP area includes multiple representative monitoring sites (RMS) to which the minimum threshold applies. For any RMS without data prior to Water Year 2016, Minimum Thresholds and acute thresholds will be established using the aforementioned methodologies and the data resulting from the first five years of monitoring following Water Year 2016 or following construction of the well.
Measurable Objective	Interconnected Surface Water is an identified data gap in the Subbasin. As an interim measurable objective, use the Chronic Lowering of Groundwater Level Measurable Objective as a proxy for interconnected surface waters (see below). Maintain seasonal high groundwater levels at an elevation that is at or above the Water Year 2015 seasonal high at representative monitoring sites in a GSP area. The Water Year 2015 seasonal high is a fixed elevation at each site, based on available groundwater level data. If data are unavailable for Water Year 2015 at a representative monitoring site, either a Water Year 2014 or Water Year 2016 Seasonal High will be used. To account for future year-to-year variations in hydrology, compliance with the fixed seasonal high threshold will be compared with a 4-year rolling average of annual groundwater level measurements. Groundwater levels are measured as water surface elevation (WSE). Each GSP area includes multiple representative monitoring sites (RMS) to which the measurable objective applies. For any RMS without data prior to Water Year 2016, Measurable Objectives will be established using the aforementioned methodology and the data resulting from the first five years of monitoring following Water Year 2016 or following the construction of the well.
5-Year Interim Milestones	**Year 5:** Fill data gaps, establish, and manage groundwater use to avoid the rate or volume of surface water depletions that have adverse impacts on beneficial uses and users and may lead to undesirable results. The Subbasin will complete a monitoring network of Interconnected Surface Water sites that will include six existing sites and datasets. GSP groups will complete the monitoring network with additional sites installed with SGMA Implementation Grant funding awarded to the Subbasin. The existing nine sites are part of the San Joaquin River Restoration Program and are located along the San Joaquin River at the southern end of the Subbasin. These nine sites, and the associated datasets, will continue to be utilized by the Subbasin as part of its monitoring network. Additional representative monitoring network sites for Interconnected Surface Water will focus on the Northern & Central Delta-Mendota and Grassland GSP areas along the San Joaquin River. **Year 10:** Gather and analyze data from Subbasin's established representative monitoring network sites. Also gather and analyze available data in cooperation with neighboring subbasins, the U.S. Bureau of Reclamation's San Joaquin River Restoration Program, the U.S. Geological Survey, and DWR's California Data Exchange Center (CDEC), to estimate the influence of groundwater on gains and losses in the San Joaquin River. Establish minimum thresholds and

Table CC-23: Delta-Mendota Subbasin SMC for Depletions of Interconnected Surface Water	
	measurable objectives as a rate or volume of surface water depletions that have adverse impacts on beneficial uses and users and may lead to undesirable results. **Year 15:** Monitor and maintain interconnected surface waters in accordance with revised minimum thresholds and measurable objectives. Where increased interconnected surface water losses are caused by pumping outside of the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs.

The RMN for this sustainability indicator is shown below in **Figure CC-70**. Please see **Table CC-17** for the numeric SMC associated with the Chronic Lowering of Groundwater Levels.

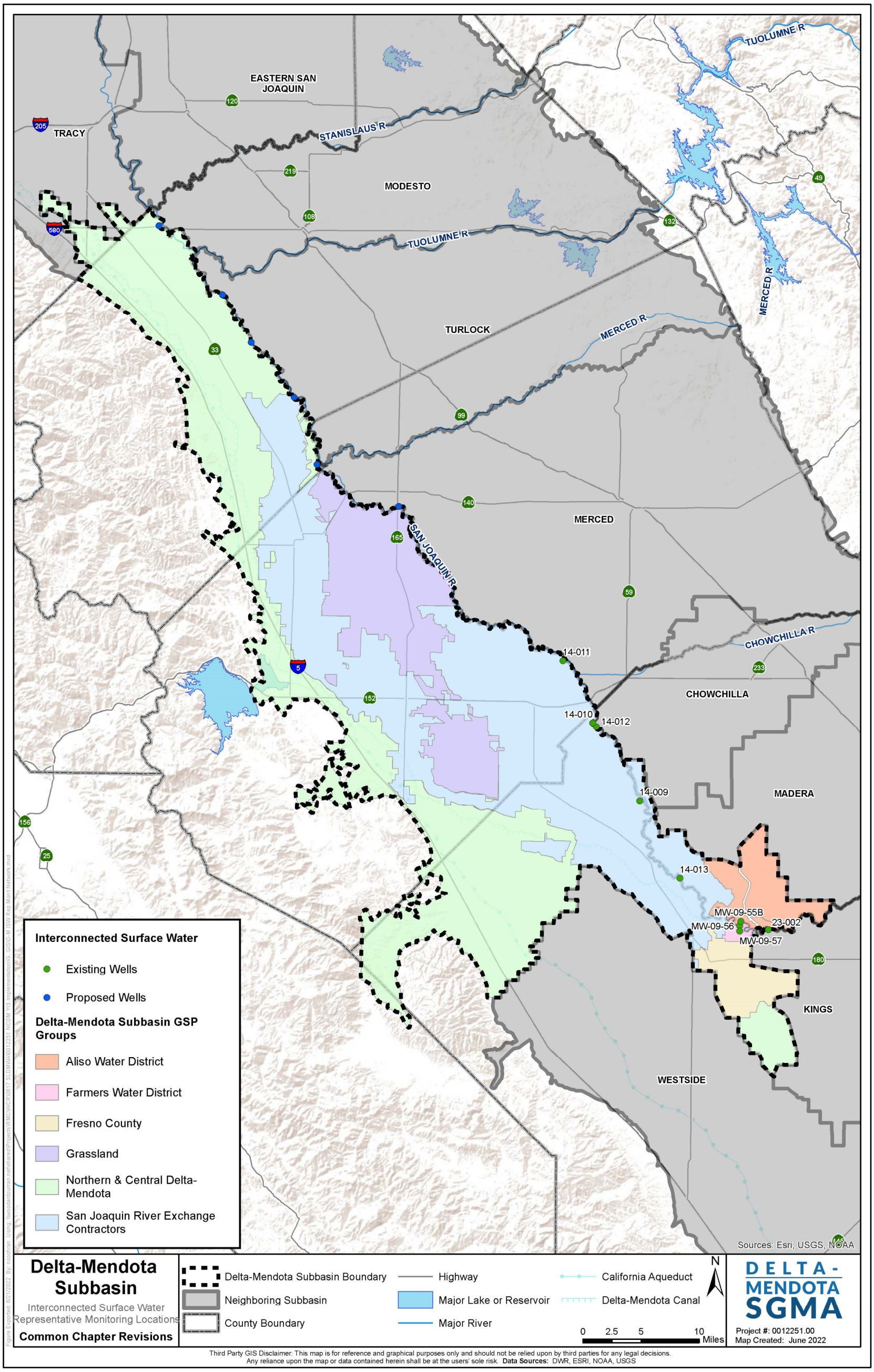

Figure CC-70: Interconnected Surface Water Representative Monitoring Locations with SMC

6. SUBBASIN MONITORING PROGRAM

As required by Subarticle 4. Monitoring Networks of the GSP regulations, the GSPs must include a monitoring network for each sustainability indicator, in addition to describing the monitoring protocols and data management to be followed in implementing the GSP monitoring program. Given the variability of conditions within the Delta-Mendota Subbasin, each GSP Group initially developed their individual monitoring networks, in coordination with their neighboring GSP Groups, such that the subbasin-wide monitoring program is simply a compilation of those coordinated individual monitoring networks. These representative monitoring networks were then re-evaluated as part of the update to the Subbasin GSP in 2022. Please see the individual GSPs for further discussion as to how the monitoring networks were developed.

The subbasin-wide monitoring networks presented herein are the representative monitoring networks for each of the applicable sustainability indicators, as defined according to the GSP Regulations § 354.36, *Representative Monitoring*. It is at the representative monitoring sites where each GSP Group has defined minimum thresholds, measurable objectives, and interim milestones to evaluate progress in achieving the Subbasin's sustainability goal by 2040. Data collected at the representative monitoring locations may be augmented with additional data, as available and appropriate, from other locations and/or publicly available datasets, in evaluating Subbasin conditions on an annual basis.

6.1.1 Coordinated Assumptions and Data

As previously noted, the required monitoring networks were initially developed at the GSP-level in order to appropriately capture the variability of hydrogeologic and water quality conditions in the Delta-Mendota Subbasin, and then re-evaluated at the Subbasin level to confirm that the monitoring networks meet the necessary requirements. All common coordinated assumptions agreed upon and implemented by each GSP Group in developing their respective monitoring networks are presented in Technical Memorandum 5 (*Assumptions for Delta-Mendota Subbasin Monitoring Network*) which is included in **Appendix B** of this Common Chapter.

6.1.2 Coordinated Monitoring Activities

All Delta-Mendota Subbasin GSP Groups have agreed to utilize the following monitoring protocols, data management, and roles and responsibilities for implementing and reporting from their respective monitoring plans under SGMA to ensure consistency in data collection, analysis and management allowing for subbasin-wide evaluation of groundwater conditions relative to the Subbasin sustainability goal, as defined and agreed upon by all GSP Groups.

Monitoring Protocols

Each GSP Group will utilize agreed-upon protocols, which may be the same as, or equal to, data collection protocols (i.e., industry standards and best management practices) to ensure the collection of comparable data using comparable methods. Additionally, the following minimum monitoring frequency for each applicable sustainability indicator was agreed upon by each GSP Group during the joint Delta-Mendota Subbasin Coordination Committee and Technical Working Group meeting on June 18, 2019:

- **Chronic lowering of groundwater levels/reduction in groundwater storage** - Twice per year, with seasonal high groundwater elevation data collected between February and April, and seasonal low groundwater elevation data collected between September and October. All measurements will be collected to a tenth of a foot.

- **Degraded water quality** – Once per year during irrigation season, typically between May and July.
- **Depletions of interconnected surface water** – Twice per year in conjunction with groundwater level monitoring.
- **Subsidence** – Publicly available subsidence data will be used along with locally-collected data. At a minimum, three data points will be collected within the first five years of GSP implementation, with a baseline value from 2019 or a date prior to that.

For non-monitored data to be reported as part of the annual reports (e.g., groundwater extractions, surface water deliveries), actual metered data will be used where such data exists, and when direct data do not exist, estimated quantities will be calculated based on existing indirect data (e.g., electrical usage, crop demand, ET) and/or other industry best practices. Additionally, where available and applicable, public datasets will be used to augment monitoring data collected by the Subbasin and analyzed on an annual basis.

Data Management

Each GSP Group will be responsible for conducting quality control reviews of data collected from the monitoring networks. As described in the Coordination Agreement, each GSP Group will exchange and share collected data in order to facilitate analysis and reporting at the Subbasin level. The Coordinated Data Management System (DMS) will be the primary vehicle by which data are shared amongst the GSP Groups, and it will be the responsibility of each GSP Group to conduct a quality control review of data entered into the DMS.

Roles and Responsibilities

It will be the responsibility of each GSP Group, and the GSAs included in that group, to conduct the monitoring program as agreed upon at the Subbasin level, for reviewing the data collected, and for ensuring that these data are available at the Subbasin level. **Figure CC-71** shows the general flow of data collected from the Delta-Mendota monitoring programs.

Figure CC-72 shows the roles and responsibilities of each GSA and GSP Group in the collecting, processing and reporting of data from the GSP monitoring networks. Additionally, it is the responsibility of each GSP Group, including their respective GSAs, to maintain the monitoring network and, as appropriate, revise and/or expand the monitoring networks to fill identified data gaps. Please see the individual GSPs for further information regarding data gaps and the GSAs plans for addressing those gaps.

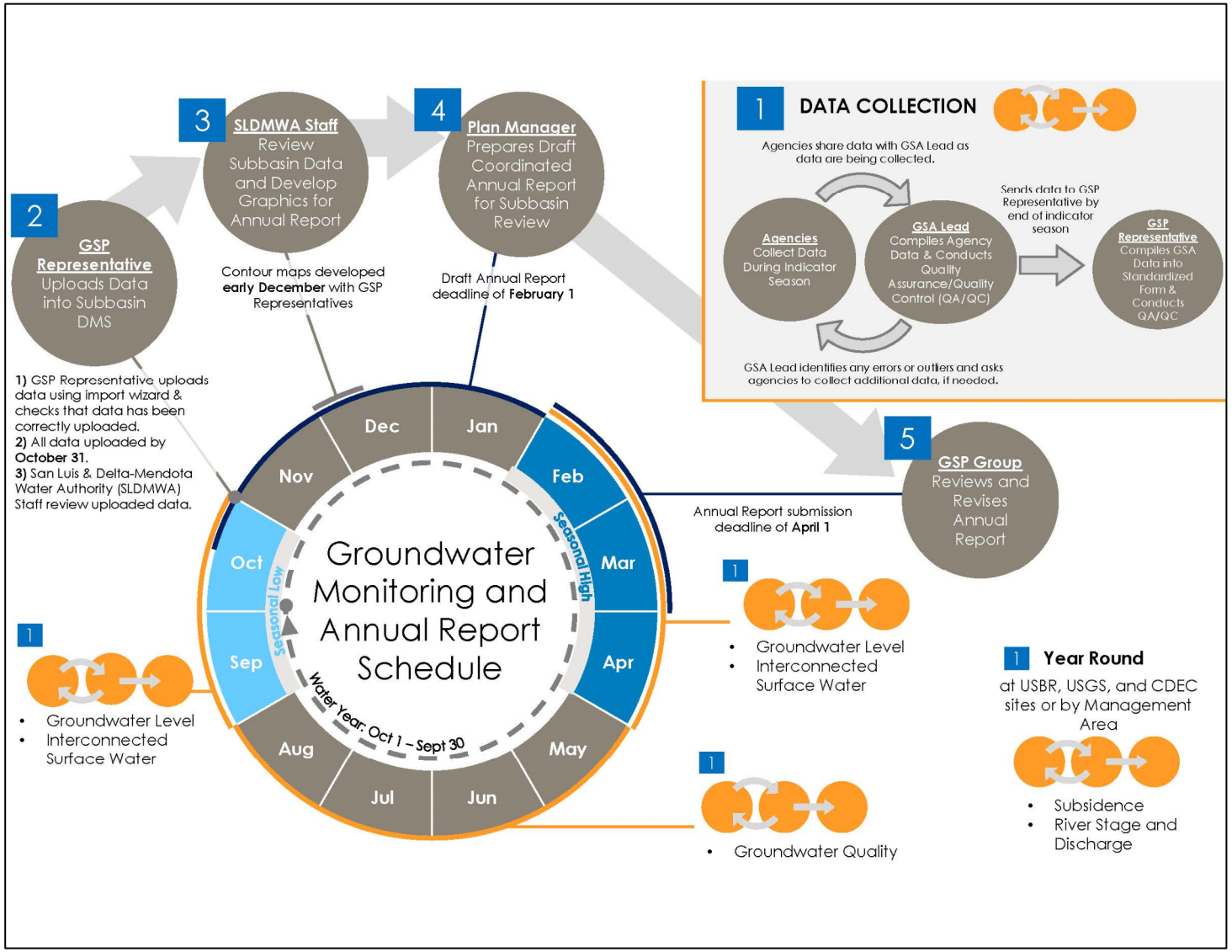

Figure CC-71: Data Flow in Delta-Mendota Subbasin

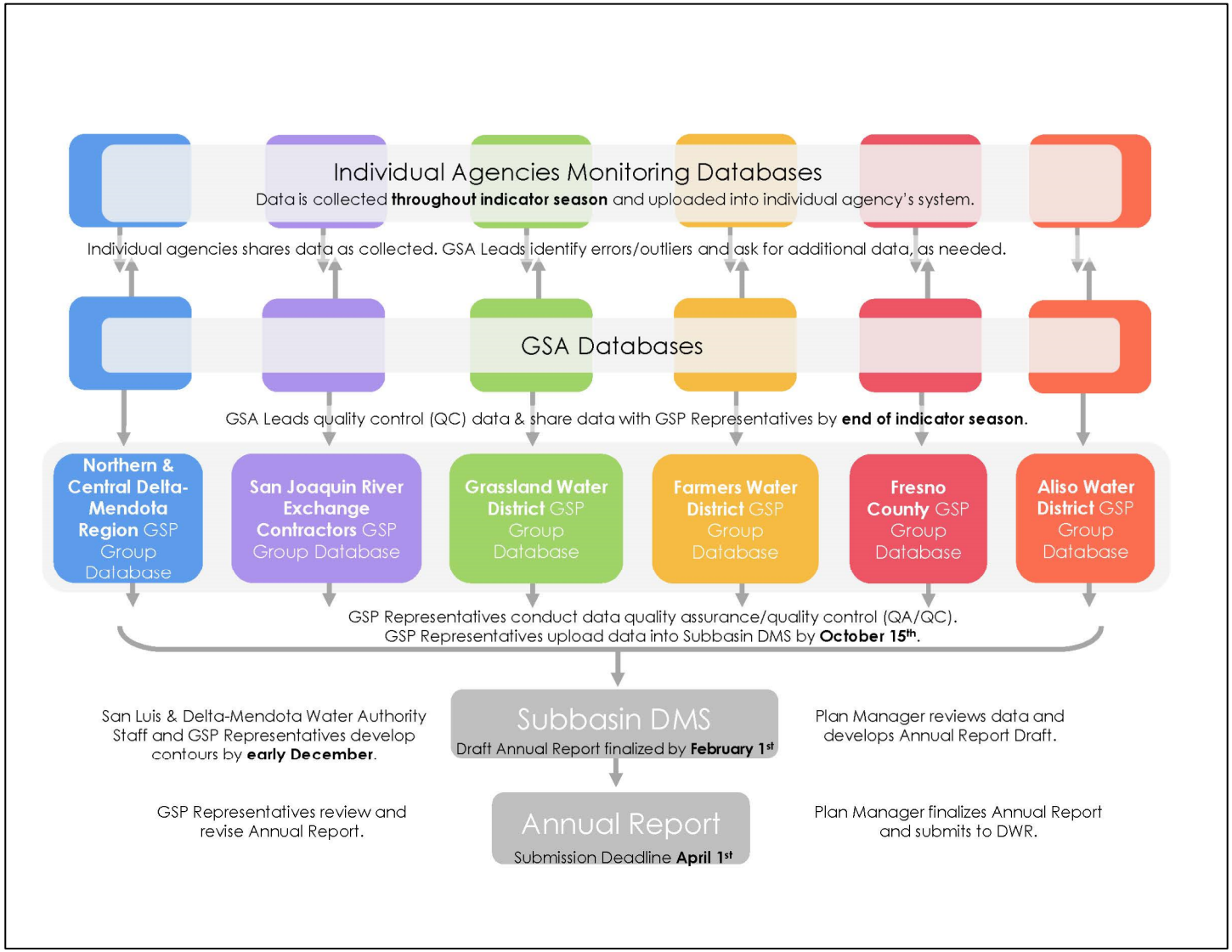

Figure CC-72: Delta-Mendota Monitoring and Data Management Roles and Responsibilities

6.1.3 GSP-Level Monitoring Networks

For more information on the individual GSP monitoring networks for each applicable sustainability indicator, including how the networks were developed, please refer to the individual GSPs. The monitoring networks for each applicable sustainability indicator for each GSP Group were developed in accordance with the GSP Regulations Article 5. Plan Contents, Subarticle 4. Monitoring Networks (§ 354.21 – 354.40). DWR's Best Management Practices for the *Sustainable Management of Groundwater Monitoring Protocols, Standards, and Sites BMP* (2016b) and *Monitoring Networks and Identification of Data Gaps BMP* (2016a) documents were used when and where applicable at the discretion of each GSP group in developing monitoring networks and monitoring protocols.

6.1.4 Delta-Mendota Subbasin Monitoring Networks

The subbasin-level monitoring networks are a compilation of the representative monitoring networks developed by each individual GSP Group and reviewed and modified at the Subbasin level for consistency and appropriate coverage. The monitoring network for the chronic lowering of groundwater sustainability indicator is comprised of two parts, the Upper Aquifer (**Figure CC-73**) and Lower Aquifer (**Figure CC-74**). The monitoring networks for the reduction in groundwater storage for the Upper Aquifer and Lower Aquifer are the same as those utilized for the chronic lowering of groundwater levels. The monitoring network for the degraded water quality sustainability indicator is also comprised of two parts, the Upper Aquifer (**Figure CC-75**) and Lower Aquifer (**Figure CC-76**). Data gaps (areas without wells of known construction) are shown for the Upper Aquifer and Lower Aquifer for the chronic lowering of groundwater and degraded water quality sustainability indicator. The interconnected surface water monitoring network for the Delta-Mendota Subbasin is shown in **Figure CC-77**, and the monitoring network for land subsidence for the Delta-Mendota Subbasin is shown in **Figure CC-78**.

The Delta-Mendota Subbasin representative monitoring networks will be periodically reviewed and revised, as appropriate, by the GSP Groups responsible for maintaining them and coordinated at the Subbasin level. Revised monitoring networks will be included in the five-year updates to the GSPs.

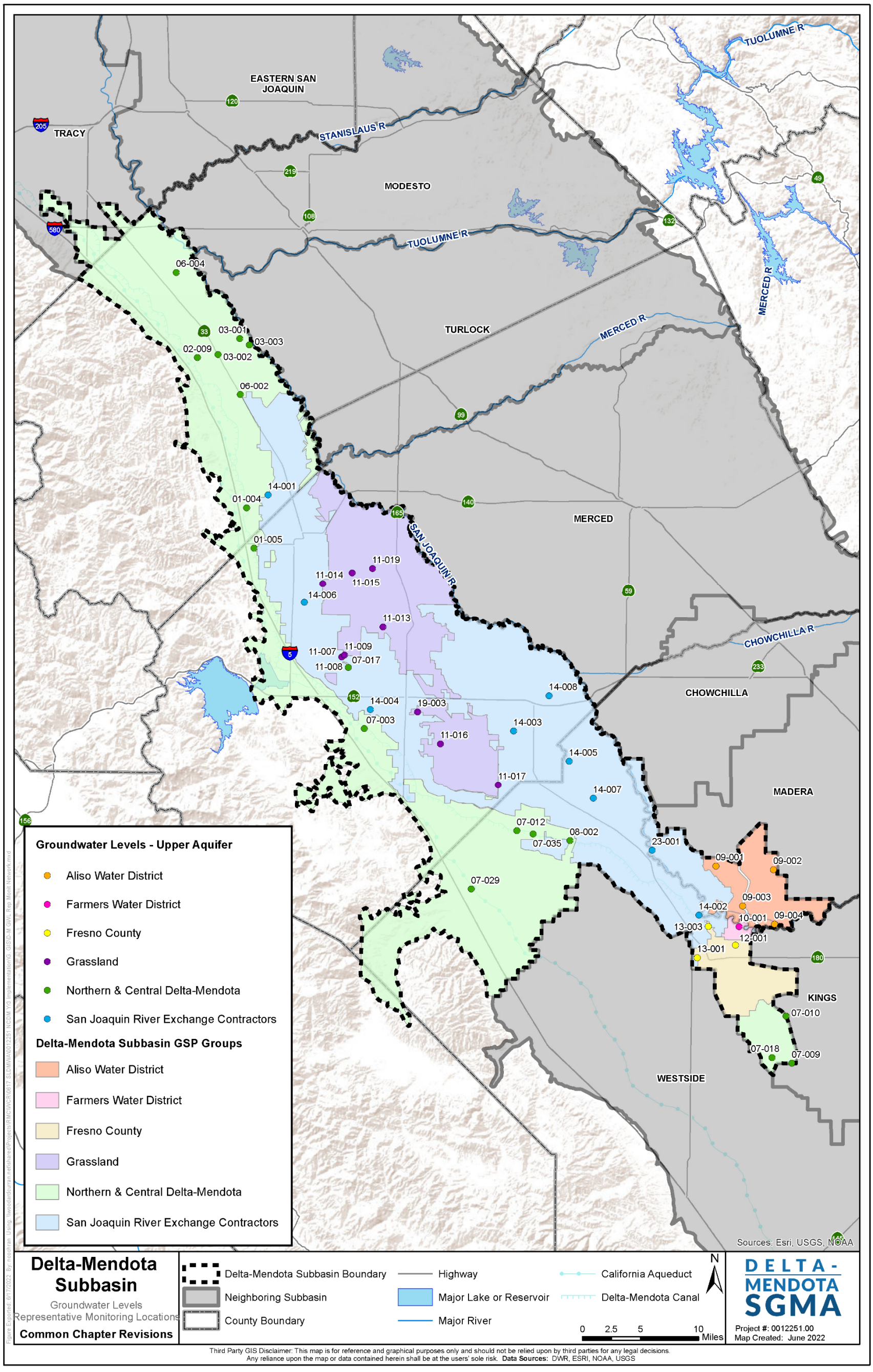

Figure CC-73: Upper Aquifer Groundwater Level Monitoring Network

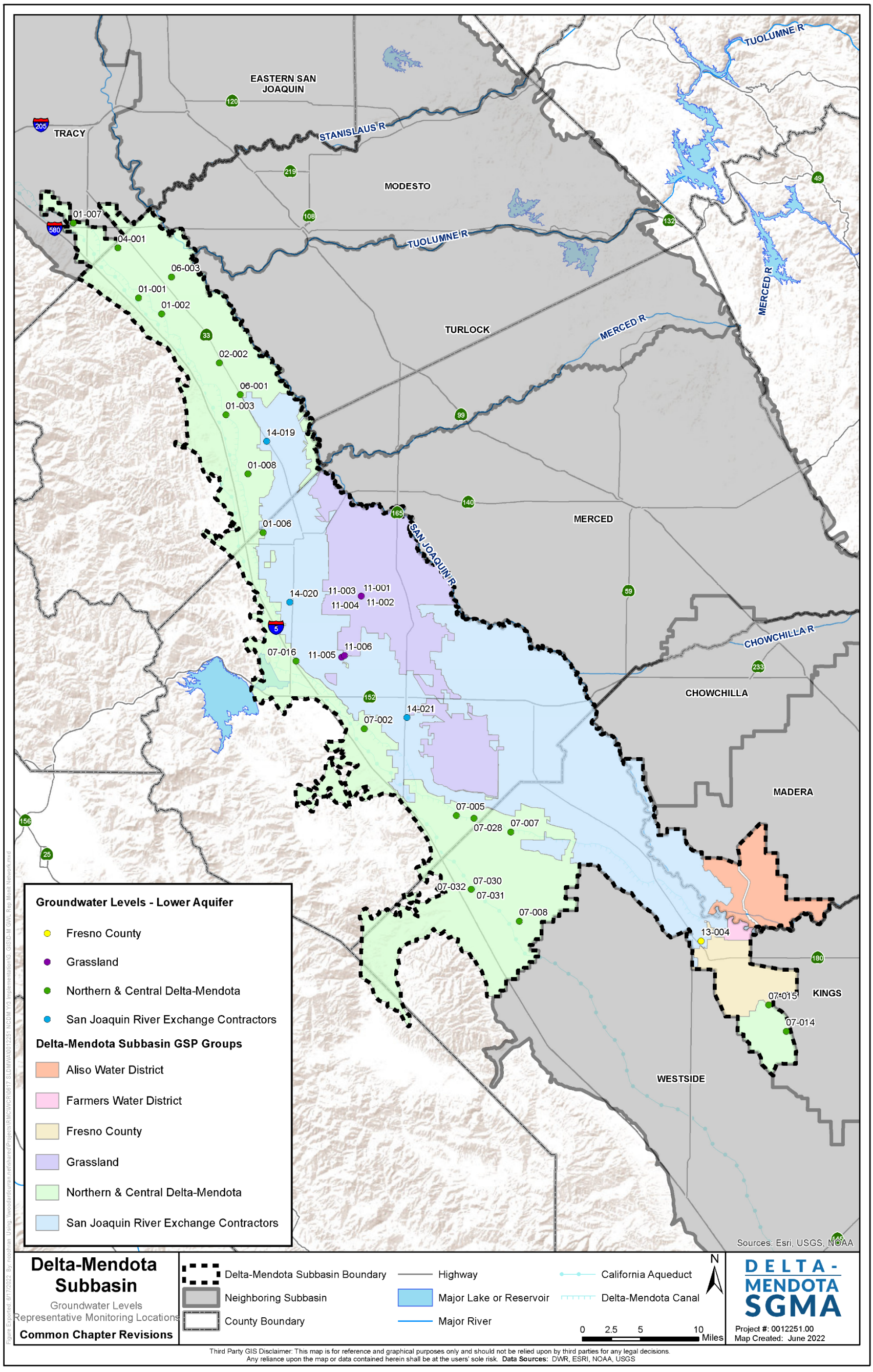

Figure CC-74: Lower Aquifer Groundwater Level Monitoring Network

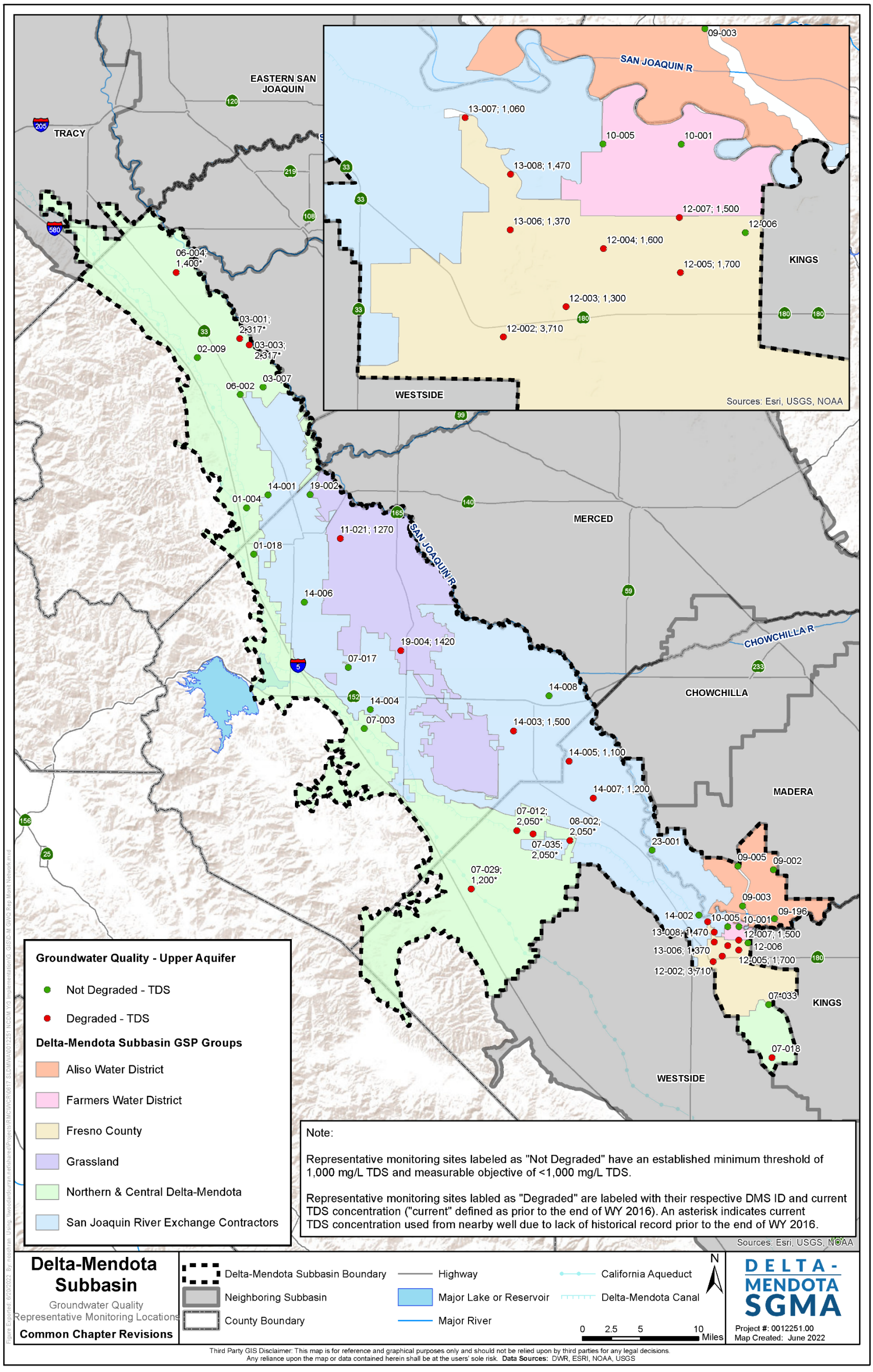

Figure CC-75: Upper Aquifer Groundwater Quality Monitoring Network

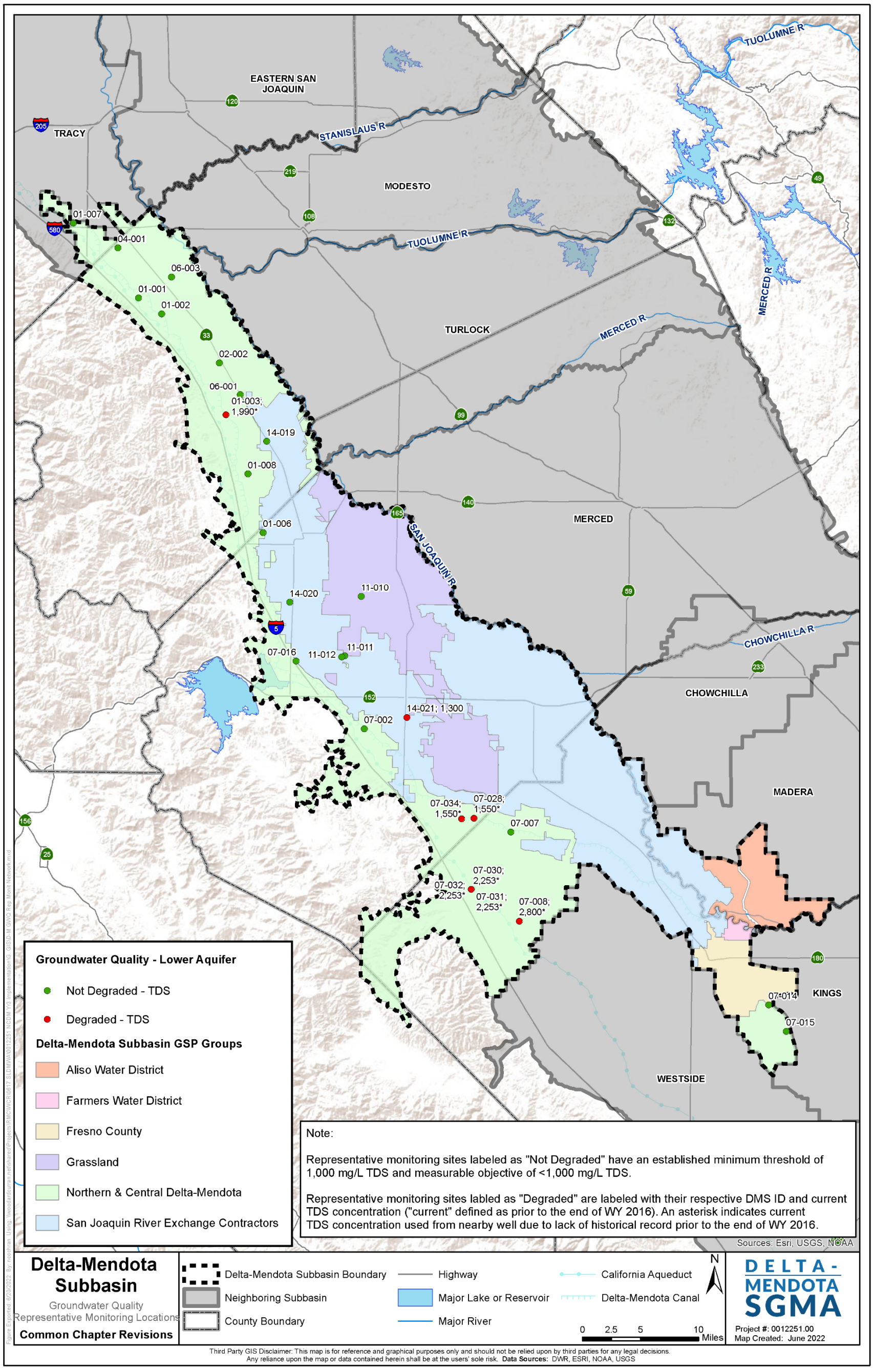

Figure CC-76: Lower Aquifer Groundwater Quality Monitoring Network

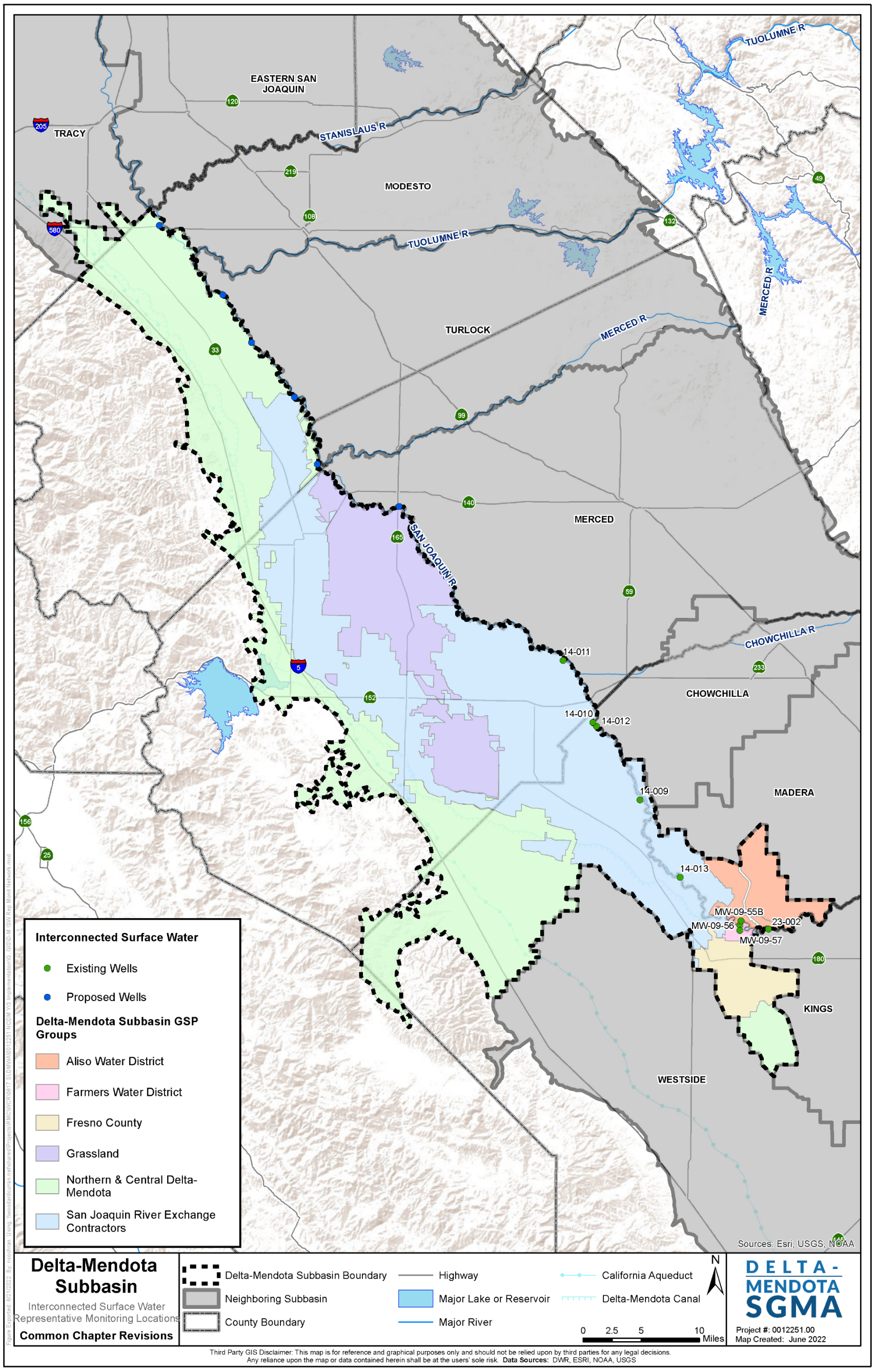

Figure CC-77: Interconnected Surface Water Monitoring Network

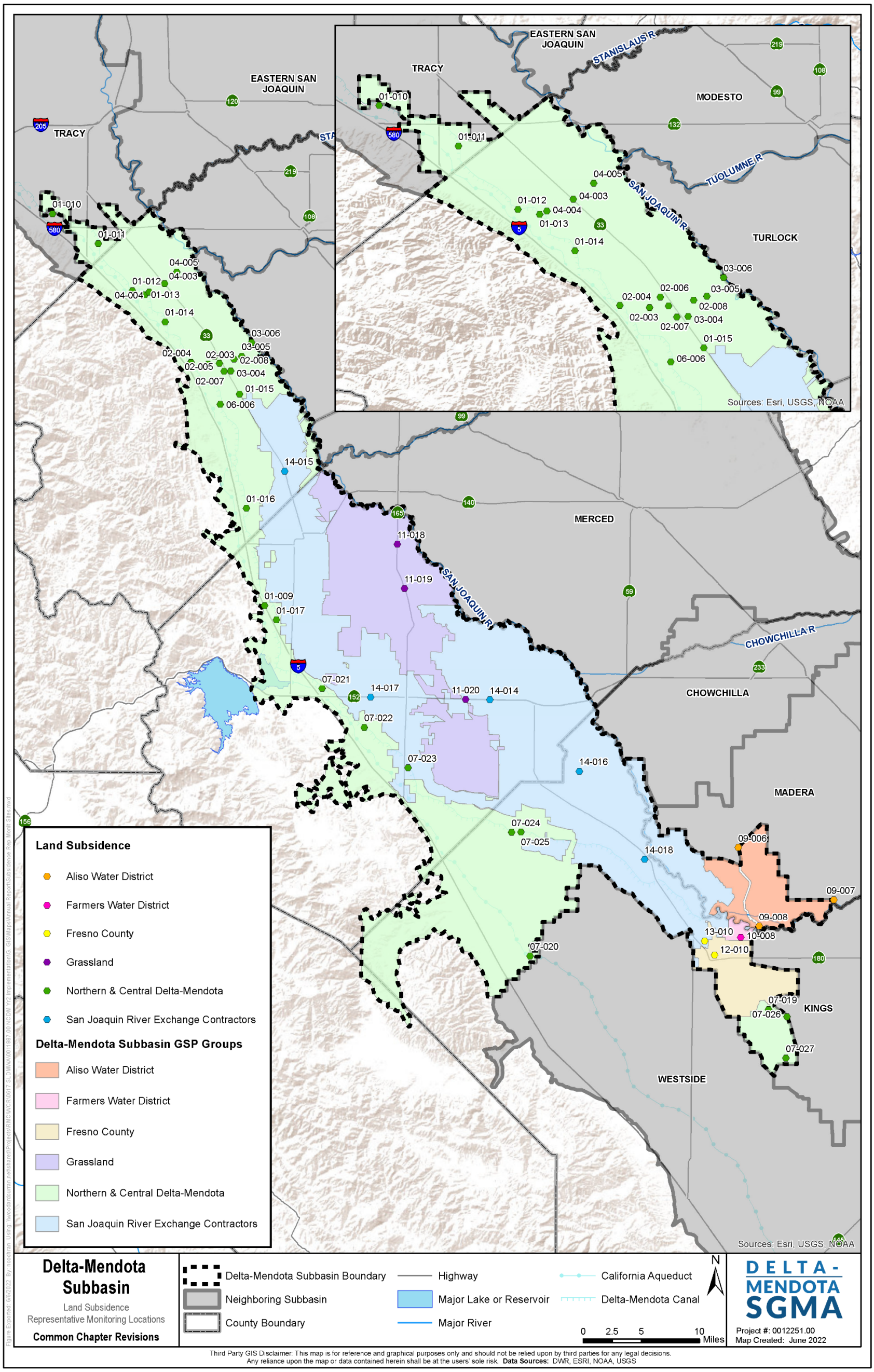

Figure CC-78: Land Surface Elevation Monitoring Network

7. SUBBASIN DATA COLLECTION AND MANAGEMENT

As required in §352.6, Data Management System of the GSP regulations, each GSA is required to develop and maintain a data management system (DMS) that is capable of storing and reporting information relevant to the development or implementation of the GSP(s). Additionally, per §354.4, Reporting Monitoring Data to the Department, all monitoring data is to be stored in a DMS with copies of the monitoring data included in the annual report and submitted electronically on forms provided by DWR. Recognizing that GSP implementation, including annual reporting, will require some efforts at the subbasin level, the 23 GSAs overlying the Delta-Mendota Subbasin have chosen to develop a coordinated DMS that can be utilized by each GSP Group for management of their data, but which will allow for the required compendium of data sets for preparation of Subbasin annual reports. The coordinated DMS will also provide a generic framework that can be used by any GSP Group or GSA in the Subbasin for individual data management while allowing for consistent formatting and the simplified uploading of compiled datasets into the Subbasin-wide coordinated DMS.

The individual GSP Groups have also developed and will maintain separate data storage processes or DMSs. Each separate DMS developed for each GSP will store information related to implementation of each individual GSP, monitoring network data and monitoring sites requirements, and water budget data requirements. Each system will be capable of reporting all pertinent information to the respective GSA and/or GSP Group, and ultimately to the Coordination Committee. After providing the Coordination Committee with data from the individual GSPs, the Subbasin Plan Manager and Coordination Committee will ensure the data are stored and managed in a coordinated manner throughout the Subbasin and reported to DWR on an annual basis.

The DMS constructed for the Delta-Mendota Subbasin is a secured web-based application hosted on Amazon Web Services (AWS). The DMS focuses on five core business requirements including: centralized data warehouse, security of data, permissioned based access, data visualization and reporting. Other goals of the DMS focus around improving data collection/aggregation processes, creating data standards, gaining efficiencies in reporting and improving data sharing with stakeholders. The DMS is designed to aggregate data through import processes by GSP to support data visualization and annual report generation.

Underlying the web application is a relationship database used to store the information aggregated from GSPs across primary data types identified to support monitoring and Annual Report development. Those data types include groundwater extractions, surface water deliveries, groundwater storage, groundwater elevations, groundwater quality, interconnected surface water and land subsidence. The web application functionality includes an embedded GIS viewer, screens to view tables of time series data, and charting capabilities for hydrographs. The embedded GIS viewer contains functionality to store map layers such as reference data, GSA/GSP boundaries and derived information such as water level contours.

Section 6.1.2 describes the process by which monitoring data are collected by each GSP Group and processed for inclusion in the Coordinated DMS. In order to be able to track data by location in the Subbasin, each monitoring locations in the Delta-Mendota Subbasin is assigned a unique identifier in the DMS. The number system is in a format of ##-####, where the first two digits indicates which GSA the monitoring location is associated with, the subsequent four digits indicate which specific monitoring

location in that GSA area. As shown in **Figure CC-72**, the general methodology agreed upon for data import and management is as follows:

- Each GSA collects their respective data per agreed-upon monitoring protocols and transmits it to the GSA Representative.
- Each GSA Representative then compiles the data and conducts a quality control check.
- The GSA Representative then transmits the compiled data set to the GSP Lead or Representative, who then aggregates the data from all GSAs and conducts a second quality control check.
- The GSP Lead or Representative then uploads the data set into the DMS using import wizards designed specifically for this process.
- The Subbasin Plan Manager then uses the data in the DMS to compile information as required for the annual report.

Compiled data sets from the DMS are then augmented with required maps generated externally to produce the required annual report. Mapping prepared outside the DMS are subsequently imported into the DMS as GIS files to ensure all data are kept in one place and to allow for access by GSAs and other Subbasin stakeholders.

The DMS will be maintained by the San Luis & Delta-Mendota Water Authority, while acting as the Plan Manager, with a contract with the software vendor for hosting, maintenance and future maintenance. Each GSP will pay a maintenance fee for the continued hosting and support of the Subbasin coordinated DMS.

The Coordinated DMS as described herein may be supplemented by additional DMS developed and maintained by each GSP Group in the Subbasin. The reader is referred to each of the six Subbasin GSPs for specific information relative to data collection and management in each GSP Plan area.

8. STAKEHOLDER OUTREACH

California Code of Regulations, Title 23, §354.10 identifies the requirements for notice and communication information presented in a GSP, which includes:

- A summary of information relating to notification and communication by the GSAs with other agencies and interested parties;
- A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties;
- A list of public meetings at which the GSP was discussed or considered by the GSAs;
- Comments regarding the GSP received by the GSAs and a summary of any responses by the GSAs;
- A communication section of the GSP that includes an explanation of the GSAs' decision-making process, identification of opportunities for public engagement, a discussion of how public input and response was used, a description of how the GSAs encouraged the active involvement of diverse social, cultural and economic elements of the population within the basin, and the methods used by the GSAs to inform the public about progress implementing the GSP, including the status of projects and actions.

In meeting these requirements, outreach and educational activities were conducted at the Subbasin, GSP and GSA level throughout the GSP development process. This section describes the noticing and outreach conducted at the Delta-Mendota Subbasin level for GSP development. Please refer to each individual Subbasin GSP for specific details regarding noticing and communication, and descriptions of the beneficial uses and users of groundwater at the GSP and GSA level. Information regarding Subbasin coordination and committees can be found in Section 2, Delta-Mendota Subbasin Governance, of this document.

8.1 Situation Assessment and Communications Plan

To assist in GSA formation and GSP development, agencies in the Delta-Mendota Subbasin sought and received Facilitation Support Services funding from DWR in August 2016. Under this funding, a neutral, third-party facilitation team conducted a situation assessment on behalf of the Subbasin GSAs. The purpose of the assessment was to understand how stakeholders perceived the status of the Subbasin's groundwater resources and identify potential barriers to the successful development of the GSPs. The facilitation team, with input from local agencies, identified 30 stakeholders representing diverse interests and beneficial users in the Subbasin, together with disadvantaged communities, agricultural well owners, government and land use agencies, and environmental and ecosystem interests. From February 2017 to May 2017, the facilitators conducted over 30 phone and in-person interviews with stakeholders. The facilitators recorded the interview responses and summarized the results in a presentation made to the GSA representatives.

The assessment results were used to inform the development of the Delta-Mendota Subbasin Sustainable Groundwater Management Act Communications Plan (Communications Plan), which is provided with this document as **Appendix E**. The Communications Plan identifies near- and long-term outreach and engagement strategies, tactics, and tools for stakeholder engagement in GSP development and

implementation. The Subbasin GSAs used the Communications Plan as a framework for conducting the stakeholder outreach and engagement activities described in this document.

The Delta-Mendota Subbasin is home to a large Hispanic or Latino population with many using Spanish as their primary language. As such, public noticing, educational materials and other outreach efforts were developed and presented in both English and Spanish throughout the GSP development process.

8.2 Public Noticing and Information

The Delta-Mendota Subbasin GSAs developed and used several coordinated tools, in addition to their own resources to inform members of the public about GSP development activities and promote opportunities for public engagement. These tools are described below.

- **Website:** The Subbasin website – www.deltamendota.org – is the primary location for information related to SGMA implementation in the Subbasin. Information provided on the website includes: an overview of SGMA, a description of each of the GSP groups, contact information for each of the GSAs, and upcoming workshops and public meetings. The website also serves as a repository for outreach collateral, workshop materials, and meeting packets and minutes for the Delta-Mendota Subbasin Coordination Committee, Technical Working Group, and Communications Working Group (described below), and provides links to the individual GSP websites maintained by each GSP Group.

- **Delta-Mendota Subbasin Newsletter:** The Delta-Mendota Subbasin Newsletter is distributed on a monthly basis and serves as an informational tool to keep interested parties, beneficial users, and members of the general public informed about the development and status of the GSPs. Newsletter topics include Subbasin-wide activities, general announcements, upcoming meetings and workshops, and past and upcoming GSP development activities. Copies of the newsletters are archived on the Subbasin website.

- **Informational Materials**: GSAs in the Subbasin developed a suite of materials in English and Spanish to educate and inform members of the public about SGMA and topics covered in the GSP. These materials include bilingual presentations, fact sheets, handouts, frequently asked questions, and videos. Copies of the materials are available on the Subbasin website. GSA representatives distributed these materials before and during meetings, workshops, and other outreach activities.

8.3 List of Public Meetings Where the GSPs were Discussed

Each GSP Group for the Delta-Mendota Subbasin has conducted individual outreach efforts relative to their own GSP Plan area in addition to those same efforts at the subbasin-level. Please refer to each of the individual GSPs for this information. Below is a list of the coordinated public workshops and meetings where the GSPs were discussed. These include meetings of the Delta-Mendota Subbasin Coordination Committee, the two Subbasin Working Groups and coordinated public workshops. All meetings were publicly noticed and held from June 2017 through July 2019. Meeting agenda, minutes and handouts are available on the Delta-Mendota Subbasin website at www.deltamendota.org.

Delta-Mendota Coordination Committee Meetings

The Delta-Mendota Subbasin Coordination Committee meets on the second Monday of each month at 9:30 am at the SLDMWA Administration Offices located at 842 6th Street, Los Banos, California. These meetings are noticed as required under the Brown Act and are open to the public.

In addition to the monthly meetings, a special meeting of the Coordination Committee was held on March 8, 2019 to discuss sustainable yield estimation methodologies.

Delta-Mendota Technical Working Group Meetings

The Delta-Mendota Technical Working Group meets on the third Tuesday of each month at 10:00 am at the SLDMWA Administration Offices located at 842 6th Street, Los Banos, California. These meetings are noticed as required under the Brown Act and are open to the public.

In addition to the monthly meetings, several special meetings of the Technical Working Group were held to discuss specific topics. These additional meetings were as follows:

- August 24, 2018 and September 19, 2018 meetings to discuss Groundwater Dependent Ecosystems
- August 8, 2018, October 30, 2018 and December 19, 2018 meetings to discuss water budgets

Delta-Mendota Communication Working Group Meetings

The Delta-Mendota Communications Working Group meets on the fourth Tuesday of each month at 1:00 pm. These meetings typically conducted via conference call. Meeting information for this working group is available on the Delta-Mendota Subbasin website.

Coordinated Public Workshops

Coordinated public workshops were held for the Delta-Mendota Subbasin shown in the table below. All workshops were advertised and conducted in both English and Spanish.

Table CC-24: Coordinated Public Workshops

Date	Location, Venue	Topic
Spring 2018 Workshops		
May 14, 2018	Los Banos, San Luis & Delta Mendota Water Authority	• Sustainable Groundwater Management Act overview • Delta-Mendota Subbasin overview • Opportunities for engagement
May 16, 2018	Patterson, Hammon Senior Center	
May 17, 2018	Mendota, Mendota Library	
Fall 2018 Workshops		
October 22, 2018	Firebaugh, Firebaugh Middle School	• GSP development and implementation process • Data collection • Hydrogeologic Conceptual Model • Numerical and analytical models • Water budgets
October 24, 2018	Los Banos, College Greens Building	
October 25, 2018	Patterson, Hammon Senior Center	
Winter 2019 Workshops		
February 19, 2019	Los Banos, College Greens Building	• Historic and current water budgets
February 20, 2019	Patterson, Patterson City Hall	

Date	Location, Venue	Topic
March 4, 2019	Santa Nella, Romero Elementary School	• Sustainability criteria • Undesirable results • Projects and management actions
Spring 2019 Workshops		
May 20, 2019	Patterson, Patterson City Hall	• Projected water budgets • Sustainable yield • Groundwater monitoring networks • Projects and management actions
May 21, 2019	Los Banos, College Greens Building	
May 22, 2019	Santa Nella, Romero Elementary School	
May 23, 2019	Mendota, Mendota Library	

Please see **Appendix F** for summaries of the coordinated public workshops, and **Appendix G** for example promotional materials for the public workshops.

8.4 Comments Regarding the GSPs

Key components of the six Subbasin GSPs were presented at the public workshops conducted throughout the GSP development process. **Appendix F** contains summaries of the coordinated public workshops, including comments received from and feedback provided to workshop participants. Additionally, each of the GSP Groups in the Delta-Mendota Subbasin are individually responsible for the public review of their plans and for addressing any public comments received. Please see the individual GSPs for additional information regarding plan review.

8.5 Subbasin Decision Making Process

The Delta-Mendota Subbasin Coordination Agreement outlines the responsibilities of all Subbasin parties, including decision making protocols and voting structure. These are further discussed in Chapter 2 of this document.

During the GSP development process, the Technical Working Group was charged with coordinating implementation of the required technical elements of the GSP (e.g., water budgets, monitoring networks), and to provide recommendations to the Delta-Mendota Subbasin Coordination Committee. Similarly, the Communications Working Group was charged with implementing the Subbasin Communications Plan and with providing recommendations for workshops and other outreach activities to the Coordination Committee. The Coordination Committee took actions and approved recommendations and work products and provided direction to both working groups and other ad hoc committees.

In general, the coordinated decision-making process included developing agendas for each meeting of the Delta-Mendota Subbasin Coordination Committee and for each Working Group meeting. The agendas were developed in concert with the Technical and Communications Working Groups, and the respective representatives of each GSP Group. Agenda items were either educational, informational, or required direction or decision. Meeting agendas, meetings minutes and handouts have been posted on the Delta-Mendota Subbasin website for public access.

8.6 Opportunities for Public Engagement and How Public Input was Used

Community input was encouraged and received at all meetings of the Coordination Committee, Technical Working Group, Communications Working Group meetings and at the public workshops. The Subbasin GSPs (and therefore, this Common Chapter) was shaped by community input, Working Group input, and Coordination Committee direction and decisions.

8.6.1 Opportunities for Public Engagement

Regular opportunities for public engagement were available throughout GSP development. The Coordination Committee, Technical and Communications Working Groups, and individual GSA staff encouraged public input throughout the development of the GSPs as described below. A list of stakeholder and community organizations contacted as part of the Subbasin coordinated outreach efforts is included in **Appendix H**.

Meetings and Direct Engagement

Open meetings and public workshops were held as described in Section 8.1. In addition, GSA staff made direct contact with community representatives to encourage their participation in the GSP development process. GSA representatives provided their contact information by phone, email, or mail both online (on the Subbasin website) and at workshops for stakeholder questions and comments.

Targeted Stakeholder Engagement

The Subbasin GSAs also conducted targeted outreach and engagement to hard-to-reach communities, interested parties, and stakeholders that were previously underrepresented in other engagement activities. This included outreach to the following stakeholder types:

- **Agricultural Interests:** Agricultural stakeholders in the Subbasin include agricultural well operators, growers, ranchers, farmworkers, and agricultural landowners. Strong agricultural representation exists within the leadership of the GSAs. To augment direct outreach being conducted by individuals GSAs, Subbasin representatives also coordinated closely with local county farm bureaus to disseminate information related to GSP development and public workshops.
- **School Districts:** Schools districts are considered for both beneficial users of groundwater (for drinking water), as well communication channels to disseminate information about SGMA and GSP development. GSA representatives directly contacted local school districts to notify them of the public workshops. Some schools also help distributed informational materials and workshop flyers to their students and parents.
- **Industrial Interests:** There are many industrial interested in the Subbasin, including packaging and processing plants, mining industries, and other similar facilities that use groundwater in some fashion. The GSP Groups have identified these interests within their respective Plan areas and have disseminated information related to GSP development during individual outreach efforts.
- **Environmental/Conservation Interests:** Environmental and conservation interests in the Subbasin have been contacted and communicated with during GSP development. Specific related interest groups contacted during GSP development include The Nature Conservancy, the California Department of Fish and Wildlife, Audubon, and various sportsman clubs and wetland managers.

- **Disadvantaged Communities:** The GSAs followed best practices identified in Collaborating for Success: Stakeholder Engagement for Sustainable Groundwater Management Act Implementation (Community Water Center, 2015) and other guidance documents to engage disadvantaged and severely disadvantaged communities. This included holding meetings in disadvantaged communities; holding meetings in the evening at known local venues, such as schools, civic centers, and community centers; translating fact sheets, meeting materials, and presentations into other languages; and providing interpreting services at all public workshops.
- **Other Interests:** Other potential groundwater users in the Subbasin (or those with groundwater-related interests) contacted during GSP development included the various counties in which the Delta-Mendota Subbasin lie and/or are adjoining (including San Joaquin County and San Benito County), Caltrans, the DWR State Water Project Division of Operations and Maintenance, the U.S. Bureau of Reclamation, the U.S. Geological Survey and the San Joaquin River Restoration Program.

The Reader should refer to each individual GSP for a more complete description of GSP-specific meetings and direct engagement.

GSP Section Review and Comment Periods

Each GSP Group was responsible for coordinating the individual review of their GSP. Please see each GSP for additional information as to their specific public review process. This Common Chapter to the six Delta-Mendota Subbasin GSPs was posted on the Subbasin's website (www.deltamendota.org) following submittal of the Subbasin GSPs.

8.6.2 How Public Input and Response was Used in the Development of the GSP

Each GSP Group was responsible for coordinating the individual review of their GSP and for determining how to incorporate public input and responses into their respective plans. Public input to the GSPs was solicited through the GSP development process through a number of means, including coordinated public workshops, Board of Directors presentations, City Council presentations, and growers' meetings. Please see the individual GSPs for more information regarding GSP-specific outreach efforts and how stakeholder and public input was received and factored into the GSPs.

8.7 Revisions to Common Chapter and Subbasin GSPs

As previously noted in this document, the Delta-Mendota Subbasin received a Consultation Initiation Letter on January 21, 2022 from DWR. The CIL identified four potential deficiencies across the six Subbasin GSPs which may preclude DWR's approval, as well as potential corrective actions to address each potential deficiency. The CIL thus initiated consultation between DWR, the Basin Manager, Plan Managers, and the Subbasin's 23 Groundwater Sustainability Agencies (GSAs) on February 18, 2022 regarding the amount of time needed to address the potential deficiencies and corrective actions. Subsequent meetings were held on March 7, March 30, April 19, May 24, and June 20 2022 to discuss the Subbasin's proposed approach to addressing the identified deficiencies.

The four deficiencies identified in DWR's CIL are summarized as follows:

Potential Deficiency 1: The GSPs do not use the same data and methodologies.

Potential Deficiency 2: The GSPs have not established common definitions of undesirable results in the Subbasin.

Potential Deficiency 3: The GSPs in the Subbasin have not set sustainable management criteria in accordance with GSP regulations.

Potential Deficiency 4: The management areas established in the Plan have not sufficiently addressed the requirements specified in 23 CCR §354.20.

This revised Common Chapter, and associated revisions to the six Subbasin GSPs, have been prepared in response to the deficiencies identified in the CIL based on direction provided by the Delta-Mendota Subbasin Coordination Committee, the Delta-Mendota Technical Working Group, the Subbasin GSAs and DWR. It is intended to document how the deficiencies identified in the CIL were addressed in the revised GSPs and associated Common Chapter, and where those revisions are addressed in the Common Chapter.

A Notice of Intent to Adopt the revised Common Chapter and six Subbasin GSPs (known as the Amended Groundwater Sustainability Plan) was distributed on March 15, 2022. Public meetings for the adoption of the Common Chapter and Subbasin GSPs were held in June and July of 2022; please see the Subbasin's website (www.deltamendota.org) for the respective dates for each GSAs meeting and adoption.

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DELTA-
MENDOTA
SGMA

Common Chapter - Appendices

For the Delta-Mendota Subbasin Groundwater Sustainability Plan

August 2019

PROP 1 GOVERNOR EDMUND G. BROWN, JR. WATER BOND 2014 RELIABILITY | RESTORATION | RESILIENCE

DEPARTMENT OF WATER RESOURCES · STATE OF CALIFORNIA

San Joaquin River Exchange Contractors GSP Group

THE COUNTY OF FRESNO 1856

GRASSLAND WATER DISTRICT

NORTHERN & CENTRAL DELTA-MENDOTA

Aliso Water District Groundwater Sustainability Agency

FARMERS WATER DISTRICT

Appendix A - Coordination Agreement

DELTA-MENDOTA SUBBASIN COORDINATION AGREEMENT

THIS DELTA-MENDOTA SUBBASIN COORDINATION AGREEMENT is made effective as of December 12, 2018 by and among the groundwater sustainability agencies within the Delta-Mendota Subbasin (each a "**Party**" and collectively the "**Parties**") and is made with reference to the following facts:

WHEREAS, On September 16, 2014, Governor Jerry Brown signed into law Senate Bills 1168 and 1319 and Assembly Bill 1739, known collectively as the Sustainable Groundwater Management Act ("**SGMA**");

WHEREAS, SGMA requires all groundwater subbasins designated as high or medium priority by the California Department of Water Resources ("**DWR**") to manage groundwater in a sustainable manner;

WHEREAS, the Delta-Mendota Subbasin (Basin Number 5-22.07, DWR Bulletin 118) within the San Joaquin Valley Groundwater Basin ("**Subbasin**"), has been designated as a high-priority basin by DWR;

WHEREAS, the Delta-Mendota Subbasin includes multiple groundwater sustainability agencies that intend to manage the Subbasin through the development and implementation of multiple different groundwater sustainability plans ("**GSP**");

WHEREAS, SGMA allows local agencies to engage in the sustainable management of groundwater, but requires groundwater sustainability agencies in all basins that are managed by more than one groundwater sustainability plan to enter into a coordination agreement to coordinate the multiple groundwater sustainability plans to sustainably manage the Subbasin pursuant to SGMA;

WHEREAS, pursuant to the requirements of SGMA, and the California Code of Regulations, and in recognition of the need to sustainably manage the groundwater within the Delta-Mendota Subbasin, the Parties desire to enter into this Agreement between their individual groundwater sustainability agencies;

WHEREAS, in order to efficiently coordinate among the large number of groundwater sustainability agencies ("**GSA**") in the Subbasin, the Parties intend to organize themselves into "**GSP Groups**" and to be represented by the "**GSP Group Representatives**," on terms

to be developed and implemented by separate Agreements between each GSP Group and the Parties within such GSP Group; and

WHEREAS, this Coordination Agreement is being executed before the respective GSPs have been prepared, and the Parties anticipate attaching and incorporating technical reports covering such additional required information before submittal of this Agreement to DWR with the Parties' respective GSPs without separate amendment being required.

THEREFORE, in consideration of the facts recited above and of the covenants, terms and conditions set forth herein, the Parties agree as follows:

SECTION 1 – PURPOSE

1.1 Compliance with SGMA

In subbasins with multiple GSPs, SGMA requires the GSPs to be coordinated through a coordination agreement. The purpose of this Coordination Agreement including the anticipated attachment and incorporation of technical reports to be developed after the initial execution of this Agreement, is to comply with that SGMA requirement and ensure that the multiple GSPs within the Subbasin are developed and implemented utilizing the same methodologies and assumptions, that the elements of the GSPs are appropriately coordinated to support sustainable management, and to ultimately set forth the information necessary to show how the multiple GSPs in the Subbasin will achieve the sustainability goal, as determined for the Subbasin in compliance with SGMA and its associated regulations.

1.2 Description of Criteria & Function

An additional purpose of this Coordination Agreement is to describe the criteria for establishing the responsibilities of each Party for meeting the terms of this Coordination Agreement, the procedure for the exchange of information between the Parties, and procedures for resolving conflicts between the Parties. The goal of the coordination is to ensure that the Subbasin GSPs utilize the same data and methodologies, including but not limited to, groundwater elevation data, groundwater extraction data, surface water supply, total water use, changes in groundwater storage, water budgets, and sustainable yield during their development as required by SGMA and associated regulations. Additionally, this Coordination Agreement sets out the process for identifying a Plan Manager.

SECTION 2 – DEFINITIONS

2.1 **"Coordinated Plan Expenses"** shall mean any expenses incurred by the Secretary and the Plan Manager for purposes of developing and implementing the Coordination Agreement.

2.2 "**Coordination Agreement**" shall mean this Coordination Agreement.

2.3 "**Coordination Committee**" shall mean the committee of GSP Group Representatives established pursuant to this Coordination Agreement.

2.4 "**Group Contact"** shall mean one Party designated on Exhibit "A" attached hereto and by reference incorporated herein as responsible to supply notices and to circulate information and invoices for its respective Exhibit "A" GSP Group, as said Exhibit may be updated from time to time.

2.5 "**GSA**" shall mean a groundwater sustainability agency established in accordance with SGMA and its associated regulations, and "GSAs" shall mean more than one such groundwater sustainability agency. Each Party is a GSA.

2.6 "**GSP"** shall mean a groundwater sustainability plan as defined by SGMA and its regulations, and "GSPs" shall mean more than one such plan.

2.7 "**GSP Group**" shall mean a grouping of Parties, stakeholders, and interested parties developing an individual GSP within the Subbasin, as shown in Exhibit "A," who are combined for purposes of representation and voting on the Coordination Committee and for purposes of sharing Coordinated Plan Expenses as set forth in this Coordination Agreement.

2.8 "**GSP Group Alternate Representative," "Alternate Representative,"** or **"Alternate"** and their plural forms shall mean an alternate member of the Coordination Committee selected to represent the GSP Groups in accordance with Exhibit "A" and Section 5.1.2-5.1.4 of this Coordination Agreement who shall serve in the absence of the respective GSP Group Representative and shall be entitled to cast the vote for the absent GSP Representative.

2.9 "**GSP Group Representative"** or **"Representative"** and their plural forms as appropriate shall mean a member or members of the Coordination Committee selected to represent the GSP Groups in accordance with Exhibit "A" and Section 5.1.2 – 5.1.4 this Coordination Agreement.

2.10 "**Participation Percentages"** shall mean that percentage of Coordinated Plan Expenses allocated to each GSP Group as described on Exhibit "A" to this Coordination Agreement, which is attached and incorporated by reference herein, as updated from time to time.

2.11 "**Party**" or "**Parties**" shall mean a Groundwater Sustainability Agency or in the plural, two or more Groundwater Sustainability Agencies within the Delta-Mendota Subbasin.

2.12 "**Plan Manager**" shall mean an entity or individual, appointed at the pleasure of the Coordination Committee, or as provided in section 4.1.2 of this Coordination Agreement, to perform the role of the Plan Manager to serve as the point of contact to DWR as set forth in Section 5.2.3 of this Coordination Agreement.

2.13 "**Seasonal High**" shall mean the highest annual static groundwater elevation associated with stable aquifer conditions following a period of lowest annual groundwater demand.

2.14 "**Seasonal Low**" shall mean the lowest annual static groundwater elevation associated with a period of stable aquifer conditions following a period of highest annual groundwater demand.

2.15 "**San Luis & Delta-Mendota Water Authority"** or "**SLDMWA"** shall mean the San Luis & Delta-Mendota Water Authority, a California joint powers agency.

2.16 "**SGMA**" shall mean the Sustainable Groundwater Management Act, as amended from time to time, commencing at Water Code section 10720, together with its implementing regulations applicable to Groundwater Sustainability Plans, set forth at California Code of Regulations, Title 23, Division 2, Chapter 1.5, Subchapter 2.

2.17 "**SGMA Definitions**" shall mean those SGMA-specific definitions provided by statute or regulation and attached in the Appendix to this Coordination Agreement; in the event of any inconsistency between a term defined in this Section and a SGMA-specific definition, the definition contained in this Coordination Agreement shall prevail.

2.18 "**Subbasin**" shall mean the Delta-Mendota Subbasin (Basin Number 5-22.07, DWR Bulletin 118) within the San Joaquin Valley Groundwater Basin.

2.19 "**Technical Memoranda**" shall mean the memoranda prepared by the Coordination Committee that include the data and methodologies for assumptions described in Water Code section 10727.6 to prepare coordinated plans. Individually, the memoranda shall be referred to as a "**Technical Memorandum**."

2.20 "**Water Year**" shall mean the period from October 1 through the following September 30 as defined by SGMA.

2.21 "**Water Year Type**" shall mean the classification provided by DWR to assess the amount of annual precipitation in a basin and as defined by SGMA.

SECTION 3 – GENERAL GUIDELINES

3.1 Responsibilities of the Parties

3.1.1 Obligation to Coordinate

The Parties to this Coordination Agreement agree to work collaboratively to meet the objectives of SGMA and this Coordination Agreement. Each Party to this Coordination Agreement is a GSA and acknowledges that it is bound by the terms of this Coordination Agreement as an individual Party.

3.1.2 Obligations Outside of Coordination Agreement Regarding GSP Groups

a) Representation and Voting. Each Party understands its participation, as more fully set forth in Section 5 of this Coordination Agreement, is based on representation through and by its GSP Group Representative(s). It is the responsibility and obligation of each Party under this Coordination Agreement to develop its own arrangements for how its respective GSP Group Representative and Alternate Representative are selected and how required actions of GSAs within the GSP Group under its respective GSP are identified and implemented.

b) The Coordination Committee and its members shall have no requirement to recognize a voting status or other decisional authority of any Party to this Coordination Agreement other than through the designated GSP Group Representative(s). For purposes of this Coordination Agreement, it is assumed that GSP Group Representatives have been authorized by the Parties in their GSP Groups to participate as described herein.

c) By signing this Coordination Agreement, each Party commits to provide documentation to the Secretary and the Coordination Committee of the authorization of its GSP Group Representative(s). Provided, that the Secretary shall not be obligated to evaluate or provide an opinion on the legal sufficiency of the documentation.

d) It is the responsibility and obligation of each Party under this Coordination Agreement that is included on Exhibit "A" as part of a multi-party GSP Group to provide documentation to the Secretary and to the Coordination Committee establishing that such GSP Group has a binding agreement or mechanism assuring that the GSP Group will pay its Participation Percentage set forth on Exhibit "A," as said Exhibit "A" may be modified from time to time. Provided, that the Secretary shall not be obligated to evaluate or provide an opinion on the legal sufficiency of the documentation.

3.1.3 Non-Entity Status

The Parties acknowledge and agree that this Coordination Agreement does not create a legal entity with power to sue or be sued, to enter into contract, or to enjoy the benefits or accept the obligations of a legal entity.

3.1.4 Implementation of Individual GSPs

This Coordination Agreement does not otherwise affect each Party's responsibility to implement the terms of its respective GSP in accordance with SGMA. Rather, this Coordination Agreement is the mechanism through which the Parties will coordinate their respective GSPs to the extent necessary to ensure that such GSP coordination complies with SGMA.

3.2 Adjudicated or Alternate Plans in the Subbasin

As of the date of this Coordination Agreement, there are no portions of the Subbasin that have been adjudicated or approved to submit an alternative plan as defined by SGMA.

SECTION 4 – ROLE OF SAN LUIS & DELTA-MENDOTA WATER AUTHORITY

4.1 Agreement to Serve

By executing this Agreement, and not as a Party, the San Luis & Delta-Mendota Water Authority agrees to carry out the functions described in this Section 4 and its subparts consistent with the terms of this Section and under the direction and supervision of the Coordination Committee, subject to the reimbursement and the termination provisions contained in this Section.

4.1.1 Secretary

The SLDMWA agrees to perform the obligations of the Secretary described in this Coordination Agreement, by delegation to one or more of its employees or to a consultant under contract to the SLDMWA.

4.1.2 Plan Manager

The SLDMWA agrees to perform the obligations of the Plan Manager described in this Coordination Agreement, by delegation to one or more of its employees or to a consultant under contract to the SLDMWA.

4.2 Reimbursement of SLDMWA

The commitment of the SLDMWA to perform the designated functions under this Section is contingent upon the execution and performance of a separate cost sharing agreement between the SLDMWA and the Parties.

4.3 Termination of SLDMWA's Services

Either the Parties acting through the Coordination Committee or the SLDMWA at any time may terminate the services being provided by the SLDMWA under this Coordination Agreement upon thirty (30) days' written notice, if from the SLDMWA, to the Coordination Committee and each GSP Group Representative; and if from the Coordination Committee, to the SLDMWA and each GSP Group Representative.

SECTION 5 – RESPONSIBILITIES FOR KEY FUNCTIONS

5.1 Coordination Committee

5.1.1 The Parties agree to establish a Coordination Committee to provide the forum for the Parties to accomplish the coordination obligation of SGMA pursuant to this Coordination Agreement.

5.1.2 The Coordination Committee will consist of the GSP Group Representatives identified on Exhibit "A" attached hereto and incorporated herein by this reference, as said Exhibit "A" may be modified from time to time pursuant to Section 13 of this Agreement. Each GSP Group Representative shall have one Alternate Representative authorized to vote in the absence of the GSP Group Representative.

5.1.3 Individuals serving as GSP Group Representatives and Alternate Representatives shall be selected by each respective GSP Group in the discretion of the respective GSP Group, and such appointments shall be effective upon providing written notice to the Secretary and to each Group Contact listed on Exhibit "A".

5.1.4 The Coordination Committee will recognize each GSP Group Representative and GSP Group Alternate Representative until such time as the Group Contact provides written notice of removal and replacement to the Secretary and to every other Group Contact designated on Exhibit "A." Each GSP Group or GSP Subgroup shall promptly fill any vacancy created by the removal of such Representative or Alternate Representative so that each GSP

Group shall have the number of validly designated Representatives and Alternate Representatives specified on Exhibit "A".

5.1.5. Minutes of the Coordination Committee will be prepared and maintained as set forth in Section 5.5.4.

5.2 Coordination Committee Officers

The Officers of the Coordination Committee will include a Chairperson, Vice Chairperson, Secretary, and Plan Manager. Except where the Parties have named such Officers pursuant to Section 4 of this Coordination Agreement, Officers shall be selected at the initial meeting of the Committee or as soon thereafter as reasonably can be accomplished.

5.2.1 Chairperson and Vice Chairperson

a) A GSP Group Representative shall serve as Chairperson. The Vice Chairperson, who shall also be a GSP Group Representative, shall serve in the absence of the Chairperson. In the absence of both the Chairperson and Vice Chairperson, a meeting may be led by an Acting Chairperson selected on an ad hoc basis.

b) The positions of Chairperson and Vice Chairperson shall rotate among the GSP Groups on an annual basis according to alphabetical order, with the first rotation beginning on the date the first Chairperson is selected. The schedule for rotation among the GSP Groups will be set at the first meeting after the Chairperson is appointed and reviewed and adjusted annually. A GSP Group Representative may waive designation as Chairperson. In such a case the Chairperson office would rotate to the next designated entity.

5.2.2 Secretary

The Coordination Committee shall select a Secretary to carry out the functions described in this subsection, to serve at the pleasure of the Coordination Committee. The Secretary shall be a public agency who may be, but need not be a Party to this Coordination Agreement. The San Luis & Delta-Mendota Water Authority is hereby designated as the initial Secretary, to serve at the pleasure of the Coordination Committee.

a) The Secretary shall select an appointee to implement the Secretary's responsibilities under this Coordination Agreement, for example, to coordinate meetings; prepare agendas; circulate notices and agendas; provide written notice to all Parties that the Coordination Committee has made a recommendation requiring approval by the Parties; prepare and maintain minutes of meetings of the Coordination Committee; receive notices on

behalf of the Coordination Committee and call to the Coordination Committee's attention the need for responding; and provide such other assistance in coordination as may be appropriate.

b) The Secretary shall assume primary responsibility for Brown Act compliance, including without limitation, the responsibility to: prepare an agenda and notice, publicly post, and distribute agendas to all GSP Group or Subgroup Representatives, the Parties, and any other interested persons who requests, in writing, such notices. The Agenda shall be of adequate detail to inform the public and the parties of the meeting and the matters to be transacted or discussed, and shall be posted in a public location and distributed to each of the parties to this Coordination Agreement at least seventy-two (72) hours prior to every regular meeting and at least twenty-four (24) hours prior to every special meeting.

5.2.3 Plan Manager

If the SLDMWA ceases to serve as Plan Manager as agreed under Section 4.1.2 of this coordination Agreement, then the Coordination Committee shall name a successor Plan Manager, who may be a consultant hired by the Secretary pursuant to the Coordination Agreement, the representative of an entity that has been selected as Secretary, or a public agency serving as or participating in a GSA that is a Party to this Coordination Agreement, and who shall serve as the point of contact for DWR as specified by SGMA. The San Luis & Delta-Mendota Water Authority is hereby designated as the initial Plan Manager, to serve at the pleasure of the Coordination Committee.

a) The Plan Manager shall carry out the duties of a "plan manager" as provided in Title 23, division 2, Chapter 1.5, Subchapter 2, California Code of Regulations.

b) The Plan Manager has no authority to make policy decisions or represent the Coordination Committee without the specific direction of the Coordination Committee. The Plan Manager is obligated to disclose all substantive communications he/she transmits and receives in his/her capacity as Plan Manager to the Coordination Committee.

5.3 Coordination Committee Authorized Actions and Limitations

5.3.1 Authorized Actions

The Coordination Committee is authorized to act upon the following enumerated items:

a) The Coordination Committee shall review, and consistent with the requirements of SGMA, approve the Technical Memoranda described in Sections 8-12 of this Coordination Agreement.

b) Once GSP Plans have been submitted to and approved by DWR, the Coordination Committee shall be responsible for ongoing review and updating of the Technical Memoranda as needed; assuring submittal of annual reports; providing five-year assessments and recommending any needed revisions to the Coordination Agreement; and providing review and assistance with coordinated projects and programs.

c) The Coordination Committee shall review and approve work plans, and in accordance with the budgetary requirements of the respective Parties, approve annual estimates of Coordinated Plan Expenses presented by the Secretary and any updates to such estimates; provided, that such estimates or updates with supporting documentation shall be circulated to all Parties for comment at least thirty (30) days in advance of the meeting at which the Coordination Committee will consider approval of the annual estimate.

d) Pursuant to Section 13, the Coordination Committee is authorized to approve changes to Exhibit "A" to this Coordination Agreement and to recommend amendments to terms of this Coordination Agreement.

e) The Coordination Committee shall assign work to subcommittees and workgroups as needed, provide guidance and feedback and ensure that subcommittees and workgroups prepare work products in a timely manner.

f) The Coordination Committee shall direct the Plan Manager in the performance of its duties under SGMA.

g) The Coordination Committee shall provide direction to its Officers concerning other administrative and ministerial issues necessary for the fulfillment of the above-enumerated tasks.

5.3.2 Limitations

When the terms of this Coordination Agreement or applicable law require the approval of a Party, that approval shall be required and evidenced as indicated in Section 6 of this Agreement.

5.4 Subcommittees and Workgroups

The Coordination Committee may appoint subcommittees, workgroups, or otherwise direct staff made available by the Parties. Such subcommittees or workgroups may include qualified individuals possessing the knowledge and expertise to advance the goals of the Coordination

Agreement on the topics being addressed by the subcommittee, whether or not such individuals are GSP Group Representatives or Alternate Representatives.

5.4.1 Work of Subcommittees and Workgroups

Tasks assigned to subcommittees, workgroups, or staff made available by the Parties may include developing technical data, supporting information, and/or recommendations on matters including, but not limited to:

a) Developing a process to update the Coordination Committee on the activities of the respective Parties, including the development, planning, financing, environmental review, permitting, implementation, and long-term monitoring of the multiple GSPs in the Subbasin;

b) Subject to the oversight of the Coordination Committee, scheduling meetings of the subcommittee or workgroup as necessary to coordinate development and implementation of the Technical Memoranda and Coordination Agreement. Attendance at these meetings may be augmented to include staff or consultants of all Parties to ensure that the appropriate expertise is available;

c) Determining common methodologies for GSP development;

d) Developing a Subbasin-wide monitoring network;

e) Preparing a coordinated water budget;

f) Developing a coordinated data management system;

g) Providing an explanation of how the respective GSPs implemented together satisfy the requirements of SGMA and are in substantial compliance with SGMA; and

h) Such other tasks as may be referred by the Coordination Committee from time to time.

5.4.2 Subcommittee Voting

One GSP Group Representative or Alternate Representative shall vote on behalf of the GSP Group at the subcommittee level; if no GSP Group Representative or Alternate Representative is present, one individual working on a subcommittee on behalf of the Parties in a GSP Group shall vote on behalf of the GSP Group. Subcommittees shall report voting results and provide

information to the Coordination Committee but shall not be entitled to make determinations or determinations that are binding on the Parties.

5.5 Coordination Committee Meetings

5.5.1 Timing and Notice

The Chairperson of the Coordination Committee, any two GSP Group Representatives, or the Secretary may call meetings of the Coordination Committee as needed to carry out the activities described in this Coordination Agreement. The Coordination Committee may, but is not required to, set a date for regular meetings for the purposes described in this Coordination Agreement. All Coordination Committee Meetings shall be held in compliance with the Ralph M. Brown Act (Government Code Section 54950 *et seq*.).

5.5.2 Quorum

A majority of the GSP Group Representative(s) from every GSP Group listed on Exhibit "A" shall constitute a quorum of the Coordination Committee for purposes of holding a Coordination Committee meeting; provided, that the GSP Group Representative(s) from every GSP Group listed on Exhibit "A" must be present at a meeting for any Coordination Committee vote on a matter described in section 5.3.1 a) through 5.3 d) and 5.3.1 f) to take place. The GSP Group Alternate Representative(s) of each GSP Group shall be counted towards a quorum and as the voting representative(s) in the absence of the GSP Group Representative for which the GSP Group Alternate has been appointed. If less than a quorum is present, the GSP Group Representatives and Alternate Representatives may hear reports and discuss items on the agenda, but no action may be taken.

5.5.3 Open Attendance

Members of the public, stakeholders, and representatives of the Parties who are not appointed as GSP Group Representatives may attend all meetings and shall be provided with an opportunity to comment on matters on the meeting agenda, but shall have no vote.

5.5.4 Minutes

The Secretary's appointee shall keep and prepare minutes of all Coordination Committee meetings. Notes of subcommittee and workgroup meetings shall be kept by the Secretary's appointee or an assistant to the appointee. All minutes and subcommittee and workgroup meeting notes shall be maintained by the Secretary as Coordination Agreement records and shall be available to the Parties and the public upon request.

5.6 Voting by Coordination Committee

5.6.1. Each GSP Group Representative shall be entitled to one vote at the Coordination Committee. It shall be up to the Parties in each GSP Group to determine how the GSP Group vote(s) will be cast.

5.6.2 Except as set forth in Section 5.6.3, the unanimous vote of the GSP Representatives from all GSP Groups is required on all items upon which the Coordination Committee is authorized to act as identified in Section 5.3.1 a) through 5.3.1 d) and 5.3.1 f); the vote of a majority of a quorum shall be required for all other matters on which the Coordination Committee is authorized to act.

5.6.3 Voting Procedures to Address Lack of Unanimity

When it appears likely that the Coordination Committee will not be able to come to unanimous decision on any matter upon for which a unanimous decision is required, upon a majority vote of a quorum of the Coordination Committee, the matter may be subjected to the following additional procedures.

a) Straw Polls

Straw poll votes may be taken for the purpose of refining ideas and providing guidance to the Coordination Committee, subcommittees, or both.

b) Provisional Voting

Provisional votes may occur prior to final votes. This will be done when an initial vote is needed to refine a proposal but the GSP Group Representatives wish to consult with their respective GSP Group(s) before making a final vote.

c) A vote shall be delayed if any GSP Group Representative declares its intention to propose an alternative or modified recommended action, to be proposed at the next meeting, or as soon thereafter as the GSP Group Representative can obtain any further information or clarifying direction from its GSP Group or governing body, or both, as needed to proposed its alternative or modified recommended action.

d) If the process outlined in subsection 5.6.3(c) fails to result in a unanimous vote, any GSP Group Representative not voting in favor of the recommended action may request that the vote be delayed so that the Coordination Committee can obtain further information on the recommended action (for example, by directing a subcommittee established under this

Coordination Agreement), so the GSP Group Representative can obtain clarifying direction from its GSP Group or governing body, or both, as needed.

e) Each of the Parties acknowledges the limited time provided by SGMA to complete the GSP preparation process, and agrees to make its best efforts to cooperate through the Coordinating Committee in coming to require a unanimous vote.

SECTION 6 – APPROVAL BY INDIVIDUAL PARTIES

6.1 Where law or this Coordination Agreement require separate written approval by each of the Parties, such approval shall be evidenced in writing by providing the resolution, Motion, or Minutes of their respective Boards of Directors to the Secretary of the Coordination Committee.

SECTION 7 – EXCHANGE OF DATA AND INFORMATION

7.1 Exchange of Information

The Parties acknowledge and recognize pursuant to this Coordination Agreement that the Parties may need to exchange information amongst and between the Parties.

7.2 Procedure for Exchange of Information

7.2.1 The Parties shall exchange public and non-privileged information through collaboration and/or informal requests made at the Coordination Committee level or through subcommittees designated by the Coordination Committee. However, to the extent it is necessary to make a written request for information to another Party, each Party shall designate a representative to respond to information requests and provide the name and contact information of the designee to the Coordination Committee. Requests may be communicated in writing and transmitted in person or by mail, facsimile machine, or other electronic means to the appropriate representative as named in this Coordination Agreement. The designated representative shall respond in a reasonably timely manner.

7.2.2 Nothing in this Coordination Agreement shall be construed to prohibit any Party from voluntarily exchanging information with any other Party by any other mechanism separate from the Coordination Committee.

7.2.3 The Parties agree that each GSP Group shall provide the data required to develop the Subbasin-wide coordinated water budget but unless required by law, will not be required to provide individual well or parcel-level information in order to preserve

confidentiality of individuals to the extent authorized by law, including but not limited to Water Code Section 10730.8, subdivision (b).

7.2.4 To the extent that a court order, subpoena, or the California Public Records Act is applicable to a Party, such Party in responding to a request made pursuant to that Act for release of information exchanged from another Party shall notify each other Party in writing of its proposed release of information in order to provide the other Parties with the opportunity to seek a court order preventing such release of information.

SECTION 8 – METHODOLOGIES AND ASSUMPTIONS

8.1 SGMA Coordination Requirements

Pursuant to SGMA, this Coordination Agreement must ensure that the individual GSPs utilize the same data and methodologies for developing assumptions used to determine: 1) groundwater elevation; 2) groundwater extraction data; 3) surface water supply; 4) total water use; 5) changes in groundwater storage; 6) water budgets; and 7) sustainable yield.

8.2 Pre-GSP Coordination

Prior to the individual development of GSPs, the Parties agree to develop agreed-upon methodologies and assumptions for 1) groundwater elevation; 2) groundwater extraction data; 3) surface water supply; 4) total water use; 5) changes in groundwater storage; 6) water budgets; and 7) sustainable yield. This development may be facilitated through the Coordination Committee's delegation to a sub-committee or workgroup of the technical staff provided by some or all of the Parties. The basis upon which the methodologies and assumptions will be developed includes existing data/information, best management practices, and/or best modeled or projected data available and may include consultation with the DWR as appropriate.

8.3 Technical Memoranda Required

The data and methodologies for assumptions described in Water Code section 10727.6 and title 23, California Code of Regulations, section 357.4 to prepare coordinated plans shall be set forth in Technical Memoranda prepared by the Coordination Committee for each of the elements discussed in Sections 9, 10, 11, and 12 of this Coordination Agreement. The Technical Memoranda shall be subject to the unanimous approval of the Coordination Committee and once approved, shall be attached to and incorporated by reference into this Coordination Agreement without

formal amendment of the Coordination Agreement being required. The Parties agree that they shall not submit this Coordination Agreement to DWR until the Technical Memoranda described herein have been added to the Coordination Agreement. The Technical Memoranda created pursuant to this Agreement shall be utilized by the Parties during the development and implementation of their GSPs in order to assure coordination of the GSPs in compliance with SGMA.

SECTION 9 – MONITORING NETWORK

9.1 In accordance with SGMA, the Parties hereby agree to coordinate the development and maintenance of a monitoring network at a Subbasin level through the coordination of the respective monitoring networks established pursuant to the GSPs in which each of the Parties hereto are participating. The Subbasin monitoring network description shall include monitoring objectives, protocols, and data reporting requirements specific to enumerated sustainability indicators. Each GSP Group's network shall facilitate the collection of data in order to characterize groundwater and related surface water conditions in the Subbasin and evaluate changing conditions that occur from implementation of the individual GSPs. Each Party's GSP will describe the monitoring network's objectives for the Subbasin, including an explanation of network development and implementation to monitor groundwater and related surface conditions, and the interconnection of surface water and groundwater.

9.2 Each GSP Group shall provide the Coordination Committee all relevant data and information for their respective representative monitoring sites established in accordance with Title 23, California Code of Regulations, section 354.36, as amended from time to time.

SECTION 10 – COORDINATED WATER BUDGET

10.1 In accordance with SGMA, the Parties hereby agree to prepare a single coordinated water budget for the Subbasin as described in this subsection for use in the respective GSP in which each of the Parties hereto are participating. The water budget will provide an estimate of the total annual volume of groundwater and surface water entering and leaving the Subbasin, including historical, current and projected water budget conditions, and the change in the volume of water stored and the safe yield for differing aquifers.

10.2 To the extent feasible, the Parties will consider the best available information and best available science to quantify the water budget for the Subbasin in order to provide an

understanding of historical and projected hydrology, water demand, water supply, land use, population, climate change, sea level rise, groundwater and surface water interaction, and subsurface groundwater flow.

SECTION 11 – COORDINATED DATA MANAGEMENT SYSTEM

11.1 The Parties will develop and maintain a coordinated data management system that is capable of storing and reporting information relevant to the reporting requirements and/or implementation of the GSPs and monitoring network of the Subbasin.

11.2 The Parties also will develop and maintain separate data management systems. Each separate data management system developed for each GSP will store information related to implementation of each individual GSP, monitoring network data and monitoring sites requirements, and water budget data requirements. Each system will be capable of reporting all pertinent information to the Coordination Committee. After providing the Coordination Committee with data from the individual GSPs, the Coordination Committee will ensure the data is stored and managed in a coordinated manner throughout the Subbasin and reported to DWR annually as required.

SECTION 12 – ADOPTION AND USE OF THE COORDINATION AGREEMENT

12.1 Coordination of GSPs

Each Party is responsible to ensure that its own GSP complies with the statutory requirements of SGMA, including but not limited to the filing deadline. The Parties to this Coordination Agreement intend that their individual GSPs be coordinated together in order to satisfy the requirements of SGMA and to be in substantial compliance with the California Code of Regulations. The collective GSPs will satisfy the requirements of sections 10727.2 and 10727.4 of the Water Code by providing a description of the physical setting and characteristics of the separate aquifer systems within the Subbasin, the measurable objectives for each such GSP, interim milestones, and monitoring protocols that together provide a detailed description of how the Basin as a whole will be sustainably managed.

12.2 GSP and Coordination Agreement Submission

The Parties agree to submit their respective GSPs to DWR through the Coordination Committee and Plan Manager, in accordance with all applicable requirements. Subject to the subsequent attachment of the Technical Memoranda described in Sections 8-12, the Parties intend that this Coordination Agreement fulfill the requirements of providing an explanation of how the GSPs implemented together satisfy the requirements SGMA for the entire Subbasin.

SECTION 13 – MODIFICATION AND TERMINATION OF THE COORDINATION AGREEMENT

13.1 Modification or Amendment of Exhibit "A"

The Parties agree that Exhibit "A," except for the withdrawal or addition of Parties to this Agreement, may be updated by unanimous vote of the Coordination Committee from time to time. Upon such modification, the updated Exhibit "A" shall be attached to this Agreement as a replacement to the previously existing Exhibit "A." Upon such attachment, the updated "Exhibit "A" shall become a part of this Coordination Agreement without further Amendment of the Coordination Agreement being required. The Secretary shall provide notice of such change to all Group Contacts.

13.1.1 Addition of a Party

A Party may be added to this Coordination Agreement only upon its execution of a counterpart of this Agreement and its provision of any additional documentation required by Sections 3.1.2 a) through 3.1.2 d) of this Coordination Agreement. No Party may be added that is not within the Delta-Mendota Subbasin or that fails to execute an agreement to share in Coordinated Plan Expenses, unless such payment is waived by consent of all Parties.

13.2 Modification or Amendment of Coordination Agreement

Except as provided in Sections 13.1 and 13.3, the Parties hereby agree that this Coordination Agreement may be supplemented, amended, or modified only by a writing signed by all Parties.

13.3 Amendment for Compliance with Law

Should any provision of this Coordination Agreement be determined to be not in compliance with legal requirements under circumstances where amendment of the Agreement to include a provision addressing the legal requirement will cure the non-compliance, the Parties agree to promptly prepare and approve such amendment.

SECTION 14 – WITHDRAWAL, TERM, AND TERMINATION

14.1 Withdrawal

Subject to the requirements identified in SGMA and the any coordination guidelines or regulations issued by DWR, a Party may unilaterally withdraw from this Coordination Agreement without causing or requiring termination of this Coordination Agreement, effective upon thirty (30) days written notice to the Secretary and all other Parties. The Plan Coordinator shall report any such withdrawal to DWR within five (5) days of receipt of the written notice.

14.1.1 Any Party who withdraws shall remain obligated for Coordinated Plan Expenses as provided in a separate Cost Sharing Agreement. If no separate Cost Sharing Agreement is then in effect or enforceable against the withdrawing Party, the Party is obligated to pay its share of all debts, liabilities, and obligations the Party incurred or accrued under the Coordination Agreement prior to the effective date of such withdrawal, as established under its separate GSP Group agreement concerning such share of obligations.

14.1.2 Upon withdrawal, a Party agrees that it has a continuing obligation to comply with SGMA and any coordination guidelines or regulations issued by DWR, which require a coordination agreement if there are multiple GSPs in the Subbasin. This obligation shall survive the withdrawal from this Coordination Agreement and is for the express benefit of the remaining Parties.

14.1.3 In the event any GSP Group Representative(s) prevents/prevent a required unanimous vote of the Coordination Committee after following all procedures described in 5.3.1 or Section 15 of this Agreement, the Parties in such GSP Group agree to provide notice that such GSP Group has unilaterally withdrawn from this Agreement in accordance with this Section.

14.2 Term

As modified pursuant to Section 13 and unless terminated in accordance with Section 14.2.3, this Coordination Agreement shall continue for a term that is coterminous with the requirements of SGMA for the existence of a Coordination Agreement.

14.3 Termination

This Coordination Agreement may be terminated or rescinded and the coordinated implementation of GSPs terminated by unanimous written consent of all the Parties. Nothing

in this Coordination Agreement shall prevent the Parties from entering into another coordination agreement for coordination with any other subbasin.

SECTION 15 – PROCEDURES FOR RESOLVING CONFLICTS

In the event of any dispute arising from or relating to this Agreement, the disputing Party shall, within thirty (30) calendar days of discovery of the events giving rise to the dispute, notify all Parties to this Agreement in writing of the basis for the dispute. Within thirty (30) calendar days of receipt of said notice, all interested Parties shall meet and confer in a good-faith attempt to informally resolve the dispute. All disputes that are not resolved informally shall be settled by arbitration. Within ten (10) days following the failed informal proceedings, each interested Party shall nominate and circulate to all other interested Parties the name of one arbitrator. Within ten (10) days following the nominations, the interested Parties shall rank their top three among all nominated arbitrators, awarding three points to the top choice, two points to the second choice, one point to the third choice and zero points to all others. Each interested Party shall forward its tally to the Secretary, who shall tabulate the points and notify the interested Parties of the arbitrator with the highest cumulative score, who shall be the selected arbitrator. The Secretary may also develop procedures for approval by the Parties, for selection in the case of tie votes or in order to replace the selected arbitrator in the event such arbitrator declines to act. The arbitration shall be administered in accordance with the procedures set forth in the California Code of Civil Procedure, section 1280, et seq., and of any state or local rules then in effect for arbitration pursuant to said section. Upon completion of arbitration, if the controversy has not been resolved, any Party may exercise all rights to bring a legal action relating to the controversy.

SECTION 16 – GENERAL PROVISIONS

16.1 Authority of Signers

The individuals executing this Coordination Agreement represent and warrant that they have the authority to enter into this Coordination Agreement and to legally bind the Party for whom they are signing to the terms and conditions of this Coordination Agreement.

16.2 Governing Law

The validity and interpretation of this Coordination Agreement will be governed by the laws of the State of California without giving effect to the principles of conflict of laws, with venue for all purposes to be proper only in the County of Merced, State of California.

16.3 Severability

Except as provided for cure by amendment in Section 13.3, if any term, provision, covenant, or condition of this Coordination Agreement is determined to be unenforceable by a court of competent jurisdiction, it is the Parties' intent that the remaining provisions of this Coordination Agreement will remain in full force and effect and will not be affected, impaired, or invalidated by such a determination.

16.4 Counterparts

This Coordination Agreement may be executed in any number of counterparts, each of which will be an original, but all of which will constitute one and the same agreement.

16.5 Good Faith

The Parties agree to exercise their best efforts and utmost good faith to effectuate all the terms and conditions of this Coordination Agreement and to execute such further instruments and documents as are reasonably necessary, appropriate, expedient, or proper to carry out the intent and purposes of this Coordination Agreement.

SECTION 17 – SIGNATORIES

PARTIES:

PATTERSON IRRIGATION DISTRICT GSA			
Patterson Irrigation District	**Date:** 05/22/2018		
Signature			
Name of Representative: Vince Lucchesi			
WEST STANISLAUS IRRIGATION DISTRICT GSA 1			
West Stanislaus Irrigation District	**Date:**		
Signature			
Name of Representative:			
DM II GSA			
Del Puerto Water District	**Date:**	**Oak Flat Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CITY OF PATTERSON GSA			
City of Patterson	**Date:**		
Signature			
Name of Representative:			

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SECTION 17 – SIGNATORIES

PARTIES:

PATTERSON IRRIGATION DISTRICT GSA			
Patterson Irrigation District	**Date:**		
Signature			
Name of Representative:			
WEST STANISLAUS IRRIGATION DISTRICT GSA 1			
West Stanislaus Irrigation District	**Date:** 5/16/18		
Signature Robert Pierce			
Name of Representative: Robert Pierce, General Manager			
DM II GSA			
Del Puerto Water District	**Date:**	**Oak Flat Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CITY OF PATTERSON GSA			
City of Patterson	**Date:**		
Signature			
Name of Representative:			

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Except as provided for cure by amendment in Section 13.3, if any term, provision, covenant, or condition of this Coordination Agreement is determined to be unenforceable by a court of competent jurisdiction, it is the Parties' intent that the remaining provisions of this Coordination Agreement will remain in full force and effect and will not be affected, impaired, or invalidated by such a determination.

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SECTION 17 – SIGNATORIES

PARTIES:

PATTERSON IRRIGATION DISTRICT GSA			
Patterson Irrigation District	**Date:**	**Twin Oaks Irrigation Company**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
WEST STANISLAUS IRRIGATION DISTRICT GSA 1			
West Stanislaus Irrigation District	**Date:**		
Signature			
Name of Representative:			
WEST STANISLAUS IRRIGATION DISTRICT GSA 2			
West Stanislaus Irrigation District	**Date:**		
Signature			
Name of Representative:			
DM II GSA			
Del Puerto Water District	**Date:** 8/28/18	**Oak Flat Water District**	**Date:** 8/28/18
Signature Anthea C Hansen		**Signature** Anthea C Hansen	
Name of Representative: Anthea C Hansen		**Name of Representative:** Anthea C Hansen	

16.3 Severability

Except as provided for cure by amendment in Section 13.3, if any term, provision, covenant, or condition of this Coordination Agreement is determined to be unenforceable by a court of competent jurisdiction, it is the Parties' intent that the remaining provisions of this Coordination Agreement will remain in full force and effect and will not be affected, impaired, or invalidated by such a determination.

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SECTION 17 – SIGNATORIES

PARTIES:

PATTERSON IRRIGATION DISTRICT GSA			
Patterson Irrigation District	**Date:**		
Signature			
Name of Representative:			
WEST STANISLAUS IRRIGATION DISTRICT GSA 1			
West Stanislaus Irrigation District	**Date:**		
Signature			
Name of Representative:			
DM II GSA			
Del Puerto Water District	**Date:**	**Oak Flat Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CITY OF PATTERSON GSA			
City of Patterson	**Date:** 9/20/18		
Signature			
Name of Representative: Ken Irwin			

CITY OF PATTERSON GSA			
City of Patterson	**Date:**		
Signature			
Name of Representative:			
NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:** 7/31/18	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative: Jerald R. O'Banion		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:** 7/31/18	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative: Jerald R. O'Banion		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	

CITY OF PATTERSON GSA			
City of Patterson	**Date:**		
Signature			
Name of Representative:			
NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:** 10/9/18
Signature		**Signature**	
Name of Representative:		**Jim DeMartini, Chariman:**	
APPROVED AS TO FORM John P. Doering County Counsel Stanislaus County		**BY:** Asst **County Counsel**	**Date:** 10/3/18
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	Date:	County of Stanislaus	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	Date: 8/13/18	Panoche Water District	Date:
Signature		Signature	
Name of Representative: Lon Martin		Name of Representative:	
Tranquillity Irrigation District	Date:	Fresno Slough Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Eagle Field Water District	Date:	Pacheco Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Santa Nella County Water District	Date:	Mercy Springs Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
County of Merced	Date:	County of Fresno	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	Date:		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	Date:		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	Date:	Columbia Canal Company	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Firebaugh Canal Company	Date:	San Luis Canal Company	Date:
Signature		Signature	

CITY OF PATTERSON GSA			
City of Patterson	**Date:**		
Signature			
Name of Representative:			
NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature** 07/31/18	
Name of Representative:		**Name of Representative:** John Bennett	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature** 8/2/18	
Name of Representative:		**Name of Representative:** Aaron Barcellos	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:** 7/31/18
Signature		**Signature**	
Name of Representative:		**Name of Representative:** Michael Linneman	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	

CITY OF PATTERSON GSA			
City of Patterson	**Date:**		
Signature			
Name of Representative:			
NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:** 6/20/18	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative: Jerry Salvador		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:** 8-6-18
Signature		**Signature**	
Name of Representative:		**Name of Representative:** Elizabeth Reeves	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Firebaugh Canal Company	**Date:**	**San Luis Canal Company**	**Date:**
Signature		**Signature**	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature Randall S Miles 6-27-18		**Signature**	
Name of Representative: Randall Miles		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Firebaugh Canal Company	**Date:**	**San Luis Canal Company**	**Date:**
Signature		**Signature**	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	Date:	County of Stanislaus	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	Date:	Panoche Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Tranquillity Irrigation District	Date:	Fresno Slough Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Eagle Field Water District	Date:	Pacheco Water District	Date:
Signature		Signature	
Name of Representative: Amy Montgomery		Name of Representative:	
Santa Nella County Water District	Date: 9/14/18	Mercy Springs Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
County of Merced	Date:	County of Fresno	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	Date:		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	Date:		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	Date:	Columbia Canal Company	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Firebaugh Canal Company	Date:	San Luis Canal Company	Date:
Signature		Signature	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:** 8/21/18
Signature		**Signature** Sal Quintero	
Name of Representative:		**Name of Representative:** Sal Quintero	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Firebaugh Canal Company	**Date:**	**San Luis Canal Company**	**Date:**
Signature		**Signature**	

ATTEST:
BERNICE E. SEIDEL
Clerk of the Board of Supervisors
County of Fresno, State of California
By _____ Deputy

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	Date:	County of Stanislaus	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	Date:	Panoche Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Tranquillity Irrigation District	Date:	Fresno Slough Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Eagle Field Water District	Date:	Pacheco Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Santa Nella County Water District	Date:	Mercy Springs Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
County of Merced	Date:	County of Fresno	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	Date:		
Signature			
Name of Representative: Steve Sloan			
WIDREN WATER DISTRICT GSA			
Widren Water District	Date:		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	Date:	Columbia Canal Company	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Firebaugh Canal Company	Date:	San Luis Canal Company	Date:
Signature		Signature	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	Date:	County of Stanislaus	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	Date:	Panoche Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Tranquillity Irrigation District	Date:	Fresno Slough Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Eagle Field Water District	Date:	Pacheco Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Santa Nella County Water District	Date:	Mercy Springs Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
County of Merced	Date:	County of Fresno	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	Date:		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	Date:		
Signature			
Name of Representative: Jean Sagouspe			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	Date:	Columbia Canal Company	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Firebaugh Canal Company	Date:	San Luis Canal Company	Date:
Signature		Signature	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:** 9-7-2018	**Columbia Canal Company**	**Date:**
Signature		**Signature**	
Name of Representative: James O'Banion		**Name of Representative:**	
Firebaugh Canal Company	**Date:**	**San Luis Canal Company**	**Date:**
Signature		**Signature**	
Mike Stearns		Jim Nickel	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:** Kimberly Brown	
Firebaugh Canal Company	**Date:**	**San Luis Canal Company**	**Date:**
Signature		**Signature**	

Name of Representative:	**Name of Representative:**
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	**Date:** 8/6/2018
Signature President	
Name of Representative: DONALD SKINNER, President	
CITY OF MENDOTA GSA	
City of Mendota	**Date:**
Signature	
Name of Representative:	
CITY OF FIREBAUGH GSA	
City of Firebaugh	**Date:**
Signature	
Name of Representative:	
CITY OF LOS BANOS GSA	
City of Los Banos	**Date:**
Signature	
Name of Representative:	
CITY OF DOS PALOS GSA	
City of Dos Palos	**Date:**
Signature	
Name of Representative:	
CITY OF GUSTINE GSA	
City of Gustine	**Date:**
Signature	
Name of Representative:	
CITY OF NEWMAN GSA	
City of Newman	**Date:**
Signature	
Name of Representative:	
COUNTY OF MADERA-3 GSA	
County of Madera	**Date:**
Signature	
Name of Representative:	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	**Date:**
Signature	
Name of Representative:	

Name of Representative:	**Name of Representative:**
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	**Date:**
Signature	
Name of Representative:	
CITY OF MENDOTA GSA	
City of Mendota	**Date:** 12/12/18
Signature	
Name of Representative: Cristian Gonzalez	
CITY OF FIREBAUGH GSA	
City of Firebaugh	**Date:**
Signature	
Name of Representative:	
CITY OF LOS BANOS GSA	
City of Los Banos	**Date:**
Signature	
Name of Representative:	
CITY OF DOS PALOS GSA	
City of Dos Palos	**Date:**
Signature	
Name of Representative:	
CITY OF GUSTINE GSA	
City of Gustine	**Date:**
Signature	
Name of Representative:	
CITY OF NEWMAN GSA	
City of Newman	**Date:**
Signature	
Name of Representative:	
COUNTY OF MADERA-3 GSA	
County of Madera	**Date:**
Signature	
Name of Representative:	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	**Date:**
Signature	
Name of Representative:	

Name of Representative:	**Name of Representative:**
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	**Date:**
Signature	
Name of Representative:	
CITY OF MENDOTA GSA	
City of Mendota	**Date:**
Signature	
Name of Representative:	
CITY OF FIREBAUGH GSA	
City of Firebaugh	**Date:** 9-25-18
Signature	
Name of Representative: Ben Gallegos	
CITY OF LOS BANOS GSA	
City of Los Banos	**Date:**
Signature	
Name of Representative:	
CITY OF DOS PALOS GSA	
City of Dos Palos	**Date:**
Signature	
Name of Representative:	
CITY OF GUSTINE GSA	
City of Gustine	**Date:**
Signature	
Name of Representative:	
CITY OF NEWMAN GSA	
City of Newman	**Date:**
Signature	
Name of Representative:	
COUNTY OF MADERA-3 GSA	
County of Madera	**Date:**
Signature	
Name of Representative:	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	**Date:**
Signature	
Name of Representative:	

Name of Representative:	**Name of Representative:**
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	**Date:**
Signature	
Name of Representative:	
CITY OF MENDOTA GSA	
City of Mendota	**Date:**
Signature	
Name of Representative:	
CITY OF FIREBAUGH GSA	
City of Firebaugh	**Date:**
Signature	
Name of Representative:	
CITY OF LOS BANOS GSA	
City of Los Banos	**Date:** November 14, 2018
Signature	
Name of Representative: Alex Terrazas, City Manager	
CITY OF DOS PALOS GSA	
City of Dos Palos	**Date:**
Signature	
Name of Representative:	
CITY OF GUSTINE GSA	
City of Gustine	**Date:**
Signature	
Name of Representative:	
CITY OF NEWMAN GSA	
City of Newman	**Date:**
Signature	
Name of Representative:	
COUNTY OF MADERA-3 GSA	
County of Madera	**Date:**
Signature	
Name of Representative:	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	**Date:**
Signature	
Name of Representative:	

Name of Representative:	Name of Representative:
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	Date:
Signature	
Name of Representative:	
CITY OF MENDOTA GSA	
City of Mendota	Date:
Signature	
Name of Representative:	
CITY OF FIREBAUGH GSA	
City of Firebaugh	Date:
Signature	
Name of Representative:	
CITY OF LOS BANOS GSA	
City of Los Banos	Date:
Signature	
Name of Representative:	
CITY OF DOS PALOS GSA	
City of Dos Palos	Date:
Signature 7/9/18	
Name of Representative: April Hogue	
CITY OF GUSTINE GSA	
City of Gustine	Date:
Signature	
Name of Representative:	
CITY OF NEWMAN GSA	
City of Newman	Date:
Signature	
Name of Representative:	
COUNTY OF MADERA-3 GSA	
County of Madera	Date:
Signature	
Name of Representative:	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	Date:
Signature	
Name of Representative:	

Name of Representative:	Name of Representative:
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	Date:
Signature	
Name of Representative:	
CITY OF MENDOTA GSA	
City of Mendota	Date:
Signature	
Name of Representative:	
CITY OF FIREBAUGH GSA	
City of Firebaugh	Date:
Signature	
Name of Representative:	
CITY OF LOS BANOS GSA	
City of Los Banos	Date:
Signature	
Name of Representative:	
CITY OF DOS PALOS GSA	
City of Dos Palos	Date:
Signature	
Name of Representative:	
CITY OF GUSTINE GSA	
City of Gustine	Date: September 18, 2018
Signature	
Name of Representative: Doug Dunford	
CITY OF NEWMAN GSA	
City of Newman	Date:
Signature	
Name of Representative:	
COUNTY OF MADERA-3 GSA	
County of Madera	Date:
Signature	
Name of Representative:	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	Date:
Signature	
Name of Representative:	

Name of Representative:	**Name of Representative:**
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	**Date:**
Signature	
Name of Representative:	
CITY OF MENDOTA GSA	
City of Mendota	**Date:**
Signature	
Name of Representative:	
CITY OF FIREBAUGH GSA	
City of Firebaugh	**Date:**
Signature	
Name of Representative:	
CITY OF LOS BANOS GSA	
City of Los Banos	**Date:**
Signature	
Name of Representative:	
CITY OF DOS PALOS GSA	
City of Dos Palos	**Date:**
Signature	
Name of Representative:	
CITY OF GUSTINE GSA	
City of Gustine	**Date:**
Signature	
Name of Representative:	
CITY OF NEWMAN GSA	
City of Newman	**Date:** 15 AUG 18
Signature	
Name of Representative: Michael E. Holland	
COUNTY OF MADERA-3 GSA	
County of Madera	**Date:**
Signature	
Name of Representative:	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	**Date:**

Name of Representative:	**Name of Representative:**
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	**Date:**
Signature	
Name of Representative:	
CITY OF MENDOTA GSA	
City of Mendota	**Date:**
Signature	
Name of Representative:	
CITY OF FIREBAUGH GSA	
City of Firebaugh	**Date:**
Signature	
Name of Representative:	
CITY OF LOS BANOS GSA	
City of Los Banos	**Date:**
Signature	
Name of Representative:	
CITY OF DOS PALOS GSA	
City of Dos Palos	**Date:**
Signature	
Name of Representative:	
CITY OF GUSTINE GSA	
City of Gustine	**Date:**
Signature	
Name of Representative:	
CITY OF NEWMAN GSA	
City of Newman	**Date:**
Signature	
Name of Representative:	
COUNTY OF MADERA-3 GSA	
County of Madera	**Date:** 10-02-2018
Signature	
Name of Representative: Tom Wheeler	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	**Date:**
Signature	
Name of Representative:	

9-11-18

MICHAEL TURNER, DEP COUNTY COUNSEL

COUNTY OF MERCED DELTA-MENDOTA GSA			
County of Merced	Date: 7/31/18		
Signature Name of Representative: Jerald R. O'Banion			
GRASSLAND WATER DISTRICT GSA			
Grassland Water District	Date:	Grassland Resource Conservation District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
FARMERS WATER DISTRICT GSA			
Farmers Water District	Date:		
Signature			
Name of Representative:			
FRESNO COUNTY GSA			
County of Fresno	Date:		
Signature			
Name of Representative:			
ALISO WATER DISTRICT GSA			
Aliso Water District	Date:		
Signature			
Name of Representative:			

EXECUTING NOT AS A PARTY:

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY	
San Luis & Delta-Mendota Water Authority	Date:
Signature	
Name of Representative:	

GRASSLAND WATER DISTRICT GSA			
Grassland Water District	**Date:** 7-10-2018	**Grassland Resource Conservation District**	**Date:** 7-10-2018
Signature		**Signature**	
Name of Representative: Pepper Snyder		**Name of Representative:** Dennis Campini	
FARMERS WATER DISTRICT GSA			
Farmers Water District	**Date:**		
Signature			
Name of Representative:			
FRESNO COUNTY MANAGEMENT AREA A and B GSAs			
County of Fresno	**Date:**		
Signature			
Name of Representative:			
ALISO WATER DISTRICT GSA			
Aliso Water District	**Date:**		
Signature			
Name of Representative:			

EXECUTING NOT AS A PARTY:

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY	
San Luis & Delta-Mendota Water Authority	**Date:**
Signature	
Name of Representative:	

GRASSLAND WATER DISTRICT GSA			
Grassland Water District	**Date:**	**Grassland Resource Conservation District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
FARMERS WATER DISTRICT GSA			
Farmers Water District	**Date:** 9-14-18		
Signature			
Name of Representative: JIM STILWELL			
FRESNO COUNTY MANAGEMENT AREA A and B GSAs			
County of Fresno	**Date:**		
Signature			
Name of Representative:			
ALISO WATER DISTRICT GSA			
Aliso Water District	**Date:**		
Signature			
Name of Representative:			

EXECUTING NOT AS A PARTY:

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY	
San Luis & Delta-Mendota Water Authority	**Date:**
Signature	
Name of Representative:	

GRASSLAND WATER DISTRICT GSA			
Grassland Water District	**Date:**	**Grassland Resource Conservation District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	

FARMERS WATER DISTRICT GSA	
Farmers Water District	**Date:**
Signature	
Name of Representative:	

FRESNO COUNTY MANAGEMENT AREA A and B GSAs	
County of Fresno	**Date:** August 21, 2018
Signature	
Name of Representative: Sal Quintero	

ATTEST:
BERNICE E. SEIDEL
Clerk of the Board of Supervisors
County of Fresno, State of California
By _____ Deputy

ALISO WATER DISTRICT GSA	
Aliso Water District	**Date:**
Signature	
Name of Representative:	

EXECUTING NOT AS A PARTY:

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY	
San Luis & Delta-Mendota Water Authority	**Date:**
Signature	
Name of Representative:	

GRASSLAND WATER DISTRICT GSA			
Grassland Water District	**Date:**	**Grassland Resource Conservation District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
FARMERS WATER DISTRICT GSA			
Farmers Water District	**Date:**		
Signature			
Name of Representative:			
FRESNO COUNTY GSA			
County of Fresno	**Date:**		
Signature			
Name of Representative:			
ALISO WATER DISTRICT GSA			
Aliso Water District	**Date:** 10-23-18		
Signature Roy Cotanda			
Name of Representative: ROY COTANDA, BOARD PRESIDENT			

EXECUTING NOT AS A PARTY:

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY	
San Luis & Delta-Mendota Water Authority	**Date:**
Signature	
Name of Representative:	

GRASSLAND WATER DISTRICT GSA			
Grassland Water District	**Date:**	**Grassland Resource Conservation District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
FARMERS WATER DISTRICT GSA			
Farmers Water District	**Date:**		
Signature			
Name of Representative:			
FRESNO COUNTY MANAGEMENT AREA A and B GSAs			
County of Fresno	**Date:**		
Signature			
Name of Representative:			
ALISO WATER DISTRICT GSA			
Aliso Water District	**Date:**		
Signature			
Name of Representative:			

EXECUTING NOT AS A PARTY:

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY	
San Luis & Delta-Mendota Water Authority	**Date:** 8/6/18
Signature Frances C Mizuno	
Name of Representative: Frances Mizuno	

EXHIBIT "A" – Groundwater Sustainability Plan (GSP) Groups

	Groundwater Sustainability Plan Group & Representation on Coordination Committee	Group Contact Agency	Participation Percentage
1	**Northern / Central Delta-Mendota Region – 2 Representatives** Central DM Subgroup – 1 Member representing the following: Central Delta-Mendota Multi-Agency GSA Oro Loma Water District GSA Widren Water District GSA Northern DM Subgroup – 1 Member representing the following: City of Patterson GSA DM-II GSA Northwestern Delta-Mendota GSA Oak Flat Water District GSA Patterson Irrigation District GSA West Stanislaus Irrigation District GSA	West Stanislaus Irrigation District	16.7%
2	**San Joaquin River Exchange Contractors – 2 Representatives** City of Dos Palos GSA City of Firebaugh GSA City of Gustine GSA City of Los Banos GSA City of Mendota GSA City of Newman GSA Madera County GSA Merced County Delta-Mendota GSA San Joaquin River Exchange Contractors GSA Turner Island Water District-2 GSA	San Joaquin River Exchange Contractors	16.7%
3	**Farmers Water District – 1 Representative** Farmers Water District GSA	Farmers Water District	16.7%

4	**Aliso Water District – 1 Representative** Aliso Water District GSA	Aliso Water District	16.7%
5	**Grassland Water District – 1 Representative** Grassland Water District GSA Grassland WD and Grassland Resource Conservation District Merced County Delta-Mendota GSA	Grassland Water District	16.7%
6	**Fresno County Management Area A & B – -1 Representatives** Fresno County Management Area A GSA Fresno County Management Area B GSA	Fresno County	16.7%

APPENDIX – SGMA DEFINITIONS

1. "**Agency**" or "**GSA**" shall mean a groundwater sustainability agency as defined in SGMA.

2. "**Coordination Agreement**" shall mean this Coordination Agreement, unless indicated otherwise.

3. "**Annual Report**" shall mean the report required by Water Code Section 10728 and SGMA Regulations Section 356.2.

4. "**Basin**" shall mean the Delta-Mendota subbasin and defined in Bulletin 118 as Basin 5- 22.07; for purposes of the Coordination Agreement, "Basin" and "Subbasin shall have the same meaning.

5. "**Basin Setting**" shall mean the information about the physical setting, characteristics, and current conditions of the basin as described by the Agency in the hydrogeologic conceptual model, the groundwater conditions, and the water budget, pursuant to California Code of Regulations, title 23, sections 354.12-354.20.

6. "**CASGEM**" shall mean the California Statewide Groundwater Elevation Monitoring Program developed by the DWR.

7. "**DWR**" shall mean the Department of Water Resources.

8. "**Groundwater**" shall mean the water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water, but does not include water that flows in known and definite channels.

9. "**Groundwater flow**" shall mean the volume and direction of groundwater movement into, out of, or throughout a basin.

10. "**Interconnected surface water**" shall mean the surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted.

11. "**Measureable objectives**" shall mean specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted GSP to achieve the sustainability goal for the basin.

12. "**Principal Aquifers**" shall mean aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems.

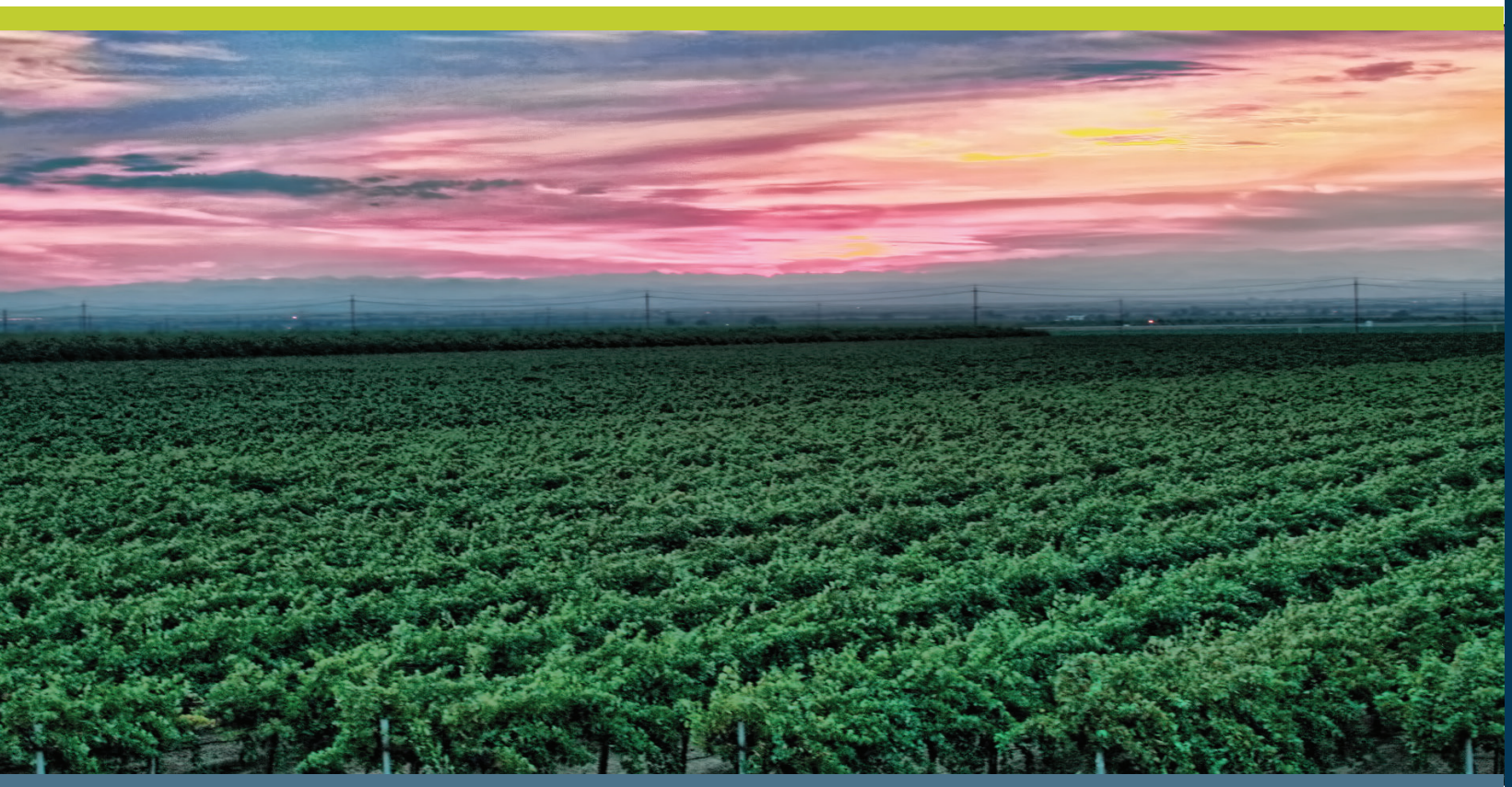
13. "**Representative Monitoring**" shall mean a monitoring site within a broader network of sites that typifies one or more conditions within the basin or an area of the basin.

14. "**Sustainability Indicator**" shall mean any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results.

15. "**Water Source Type**" shall mean the source from which water is derived to meet the applied beneficial uses, including groundwater, precipitation, recycled water, reused water, and surface water sources.

16. "**Water Use Sector**" shall mean categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation.

Appendix B - Common Technical Memoranda



TECHNICAL MEMORANDUM #1

RE: Common Datasets and Assumptions used in the Delta-Mendota Subbasin GSPs

PREPARED BY: Woodard & Curran

DATE: July 25, 2019

During development of the six coordinated Groundwater Sustainability Plans (GSPs) for the Delta-Mendota Subbasin (Subbasin), the twenty-three Groundwater Sustainability Agencies (GSAs) in the Subbasin agreed upon methodologies and assumptions for water budgets, change in storage, and sustainable yield. The common data and methodologies required in Water Code Section 10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans and utilized in preparation of the Delta-Mendota Subbasin GSPs are set forth in Technical Memoranda. Each of the individual Memoranda satisfies a requirement agreed upon in the Coordination Agreement and, collectively when combined with the Coordination Agreement, provides an explanation of how the six Subbasin GSPs implemented together satisfy the requirements of the Sustainable Groundwater Management Act (SGMA) for the entire Subbasin.

The Technical Memoranda will be utilized by the Coordination Agreement Parties (representing the twenty-three GSAs in the Subbasin) during the implementation of their GSPs in order to ensure coordination of the GSPs. The Coordination Committee is responsible for ongoing review and updating of the Technical Memoranda, as needed, during GSP implementation.

The following datasets and assumptions were used in a coordinated fashion by those preparing the six GSP for the Delta-Mendota Subbasin. These data sets and assumptions were agreed upon by the Delta-Mendota Subbasin Technical Working Group and approved by the Delta-Mendota Coordination Committee over the period extending from December 2017 through June 2019.

1. DATASETS

The technical development for the six GSPs in the Subbasin relied on the best available data for their respective Plan areas. The following outlines common datasets and instances of localized data use during the development of the GSPs.

<u>Groundwater Level Data and Contour Mapping</u>

1. Subbasin-wide groundwater level contour maps for the upper aquifer were developed for the selected historic water budget period (Spring 2003 and 2012) and current water budget period (Spring 2013 and Fall 2013). Contours were developed for the upper aquifer for the years identified. Thirty-foot contour intervals were used; individual GSAs compromised on this contour spacing following initial attempts at smaller contours due to variability in data. The lower aquifer's historic water surface elevation (WSE) data inventory was too limited to develop groundwater level contours for the entire Subbasin and is anticipated to be addressed in future GSPs and annual reports as these data gaps are addressed. Water level contour maps were composed from the following data sources:
    i. California Department of Water Resources (DWR):
        1. California Statewide Groundwater Elevation Monitoring (CASGEM) Program
        2. Water Data Library (WDL)
    ii. Water level data from local monitoring programs.

2. Subbasin-wide change in storage was evaluated for the upper aquifer using annual groundwater contour maps from Spring 2003 to Spring 2013 developed from the same datasets identified above and compared to each GSP's change in groundwater storage as calculated from historic and current water budgets for consistency. Change in storage for the lower aquifer was evaluated using specific yield and historic land subsidence provided by each GSP Group along with change in groundwater levels and storativity where lower aquifer groundwater level data were available. Datasets used to assess subsidence are discussed below.

Subsidence

3. Each GSP Group determined the historic rate of subsidence in their respective Plan area using the following data sources and period of record. The subsidence rates were combined using a 'sum-of-the-parts' methodology to develop an understanding of subsidence in the Subbasin.

    a. Aliso Water District GSP: United States Bureau of Reclamation (USBR) San Joaquin River Restoration Program (SJRRP) 2011-2017.

    b. Farmers Water District GSP: United States Geological Survey (USGS) and University-NAVSTAR Consortium (UNAVCO) 2004-2017.

    c. Fresno Management Areas A & B GSP: USGS and UNAVCO 2004-2017.

    d. Grassland GSP: USBR 2011-2017 with Ken D. Schmidt & Associates (KDSA) edits.

    e. Northern & Central Delta-Mendota GSP (without Tranquillity Irrigation District): USBR's Delta-Mendota Canal subsidence surveys interpolated from 1984 to 2014 (Pools 3 through 18) as well as the Department of Water Resources 2017 CA Aqueduct Subsidence Study.

    f. Northern & Central Delta-Mendota GSP (Tranquillity Irrigation District): Tranquillity Irrigation District's (TRID) local subsidence data from 2014 to 2018.

    g. San Joaquin River Exchange Contractors GSP: USBR's SJRRP subsidence monitoring network, USBR's Delta-Mendota Canal subsidence survey data, USGS continuous monitoring sites (including extensometers and CPGS sites), and local surveying data for years 2003-2012, 2013, and 2014-2018.

Water Budgets

4. Each GSP group developed Historic, Current, and Projected Water Budgets using the best available local and publicly available data for their respective Plan area. The six individually-developed water budgets were compared and combined for the Delta-Mendota Subbasin water budgets. Instances in which common data sources were used are as follows:

    a. The Historic, Current, and Projected Water Budgets relied on a common data source for water year type; the California Data Exchange Center (CDEC): San Joaquin River Index was used. The San Joaquin River Exchange Contractors water year type behavior is influenced by inflow to Shasta Reservoir, as does the managed wetlands in the Grassland GSP area that have federal contracts for refuge water supplies. Therefore, the Full Natural Flow (FNF) into Shasta Reservoir was considered to refine the water year type to distinguish between a critically dry year under the San Joaquin River Index and a critically dry year with reduced surface water deliveries to the San Joaquin River Exchange Contractors and the refuges due to a critical year under the Exchange Contract and refuge contracts (reduced inflows to Shasta Reservoir).

    b. The six GSP Groups also coordinated the use of DWR's 2030 and 2070 Climate Change Factors (CCF or CCFs) for the Projected Water Budget.

Groundwater Dependent Ecosystems

5. Groundwater Dependent Ecosystems (GDEs) were evaluated by each GSP Group. The Natural Communities (NC) Dataset Viewer's GDE delineations, produced by The Nature Conservancy (TNC) in partnership with the Department of Fish and Wildlife and DWR, was reviewed and vetted using the following data sources:

a. Aliso Water District GSP, Farmers Water District GSP, Fresno Management Areas A & B GSP, Northern & Central Delta-Mendota Regions GSP, and the San Joaquin River Exchange Contractors GSP used 2015 groundwater contours comprised of local and DWR's WDL depth to water data.

b. Grassland GSP used current Ducks Unlimited Wetland Inventory data for the Wetland GDE map, because the NC Dataset for wetland GDEs in this unique wetland habitat area is not accurate. The Wetland GDE map assumes that all wetlands identified by Ducks Unlimited are possible GDEs, and the Vegetative GDE map assumes that all TNC-delineated Vegetative GDEs are possible GDEs. The GSP Groups reserve the opportunity to gather more local data to refine the GDE maps in future updates.

c. Northern & Central Delta-Mendota Regions GSP used aerial satellite photos and field verification at locations with infrastructure, farms, ditches and canals, etc. to ground-truth the GDE data produced by TNC.

2. ASSUMPTIONS

Coordination and limited data required assumptions to be made to meet GSP requirements. Assumptions that affected the Delta-Mendota Subbasin's coordinated effort are outlined below along with the data and methodologies applied. The basis upon which the methodologies and assumptions were developed includes data and information provided by local agencies, State and federal data, best management practices, and/or best modeled or projected data available.

Mapping

1. Historic WSE Mapping – Assumed accurate and best available locally provided data

a. Upper Aquifer

i. Spring 2003 and Spring 2013 WSE contours were developed for the upper aquifer using datasets identified in item 1.1 above. Spring data was defined as being measured from January 1 through April 8.

ii. The groundwater levels at individual wells were plotted for both Spring 2003 and Spring 2013. Contours were refined by Luhdorff & Scalmanini, Consulting Engineers (LSCE) in the southern portion of the Subbasin and by KDSA for the entire Delta-Mendota Subbasin.

iii. The Spring 2003 and 2013 surfaces were overlaid to produce a change in groundwater level map for the historic period.

iv. The contour maps for the upper aquifer were developed on the following dates:
1. UPPER Change Spring 2003 vs. 2013 – Last edited February 7, 2019
2. UPPER Spring 2003 – Last edited February 6, 2019
3. UPPER Spring 2013 – Last edited February 6, 2019

a. Lower Aquifer

i. All available wells from the inventory identified in the datasets section above that had lower aquifer WSE readings in Spring 2013 and Fall 2013 were used to generate two maps showing lower aquifer 2003 and 2013 water levels (WSE values at individual wells). The spatial coverage was insufficient for contouring due to the distribution aligning linearly

along the Delta-Mendota Canal and the limited well count. This effort was ultimately determined to be a data gap by the Technical Working Group on January 15, 2019.

1. Spring 2013: 37 water elevation measurements
2. Fall 2013: 48 water elevation measurements
3. Final maps for depiction of the lack of coverage and to meet GSP regulations were developed on February 6, 2019. Contours were unable to be developed for reasons noted above. Data will be collected in the future allowing for the development of lower aquifer contour maps as required in future annual reports.

2. Current WSE Mapping – Assumed accurate and best available locally provided data

a. Upper Aquifer

i. The upper aquifer Spring 2013 contour map developed on February 6, 2019 was also used to meet the requirements of the Current WSE contour maps. An additional upper aquifer Fall 2013 contour map was developed on March 1, 2019 using similar methodology and data from September 1 to October 31.

b. Lower Aquifer

i. As with the determination for the historic period, the spatial coverage was insufficient, and this effort has been determined to be a data gap by the Technical Working Group on January 15, 2019.

3. Groundwater Extraction Data

Extraction data were estimated or measured by local GSAs for use in the development of individual GSPs. Groundwater extraction volumes used for the Delta-Mendota Subbasin water budgets were compiled from the six individual GSP water budgets.

4. Surface Water Supply

Surface Water Supply allocations, deliveries, imports, and projected supplies were provided or estimated by local GSAs for use in the development of individual GSPs. Applied surface water volumes used for the Delta-Mendota Subbasin water budgets were compiled from the six individual GSP water budgets.

5. Total Water Use

Total Water Use was estimated or measured by local GSAs for use in the development of individual GSPs. Total water use included in the Delta-Mendota Subbasin water budgets was compiled from the individual GSP water budgets.

6. Change in Groundwater Storage

a. Upper Aquifer

i. Upper aquifer change in groundwater storage was evaluated using annual groundwater level contours from Spring 2003 to Spring 2013 developed using the same datasets identified above and applying specific yield (defined as the volume of water released from storage by an unconfined aquifer per unit surface area of aquifer per unit decline of the water table) provided by each individual GSP Group. The Delta-Mendota Subbasin upper aquifer change in groundwater storage assessment considered a 'sum-of-the-parts' methodology, combining the change in groundwater storage for each GSP to determine the overall change in groundwater storage for the Subbasin.

b. Lower Aquifer

i. On January 15, 2019, the Technical Working Group discussed addressing the historic period change in groundwater storage in the lower aquifer. Instead of using scarce data, the change was compared against loss of storage from inelastic land subsidence as calculated using change in land surface elevation multiplied by the area and supplemented by change in groundwater levels and storativity in areas of the Subbasin where those data were available.

7. GDEs

The Natural Communities Dataset Viewer's (NC Dataset Viewer) GDE delineations, produced by The Nature Conservancy (TNC) in partnership with the Department of Fish and Wildlife and DWR, were reviewed and vetted by each GSP Group. The primary reasons for not fully utilizing the NC Dataset Viewer GDE delineations were as follows: (1) A mapping error was identified, noting the land use is incompatible with the presence of GDEs; (2) for wetlands within the Grassland GSP, a more accurate and comprehensive wetland data set was available; and (3) The depth to groundwater exceeds 30 feet. The 30-foot criterion was used with the understanding that the deepest rooting depth of a vegetative GDE identified in NC Dataset Viewer is 30 feet, and further refined using effective rooting depths published by TNC. The GDE determinations and Spring 2015 depth to groundwater contours were compiled into a Wetland GDE map and Vegetative GDE map on May 29, 2019 and approved by the Subbasin Coordination Committee

The methods for GDE determinations are as follows.

a. Aliso Water District GSP:

i. Spring 2013 and 2015 groundwater contours were assessed in Aliso Water District to evaluate areas in which the depth to water exceeded 30 feet, demonstrating unsuitable hydrologic conditions for vegetative or wetland GDEs. Aliso WD GSP's GDE determinations remained constant when using either Spring 2013 or Spring 2015 water levels for consideration.

ii. GDEs identified within a 100-foot buffer from the San Joaquin River remained "Possible GDEs," as consistent with a typical wetland setback standard used by CalTrans. (See the Aliso Water District GSP for detailed references relating to this standard.)

b. Farmers Water District GSP:

i. Using GIS, Spring 2015 groundwater elevation contours were overlain on the TNC GDE delineations identified in Farmers Water District to evaluate areas in which the depth to water exceeded 30 feet, demonstrating unsuitable hydrologic conditions for vegetative or wetland GDEs.

ii. Local understanding of recent land use was also considered when vetting the TNC GDE delineations.

c. Fresno Management Areas A & B GSP:

i. Spring 2015 groundwater contours were overlain on the TNC GDE delineations used for Fresno Management Areas A & B to evaluate areas in which the depth to water exceeded 30 feet, demonstrating unsuitable hydrologic conditions for vegetative or wetland GDEs.

ii. Local understanding of recent land use was also considered when vetting the TNC GDE delineations.

d. Grassland GSP:

   i. The Ducks Unlimited Wetland Inventory data were used in place of TNC GDE delineations for the identification of possible Wetland GDEs, with the understanding that the TNC GDE delineations for wetlands did not cover the full extent of wetlands in the Grassland Plan area. The Ducks Unlimited wetland delineations were more comprehensive and were developed with ground-truthing surveys which improved accuracy. This deviation in the use of a common dataset for the Subbasin was necessary as this GSP Plan area contains extensive acres of heavily vegetated, shallow seasonal wetlands and therefore required a supplemental approach to GDE delineation beyond the TNC GDE delineation.

   ii. All TNC Vegetative GDEs were also considered "Possible GDEs" and the Grassland GSP Group recognizes the opportunity to gather more local data to refine this position in future GSP updates, if applicable.

e. Northern & Central Delta-Mendota Regions GSP:

   i. Spring 2015 groundwater elevation contours were overlain on the TNC GDE delineations to identify areas in which the depth to water exceeded 30 feet, demonstrating unsuitable hydrologic conditions for vegetative or wetland GDEs.

   ii. GDEs identified within a 100-foot buffer from the San Joaquin River remained "Possible GDEs," as consistent with a typical wetland setback standard in California.[1,2]

   iii. Local understanding of recent land use was also considered when vetting the TNC GDEs.

f. San Joaquin River Exchange Contractors GSP:

   i. Aerial imagery was reviewed for possible mapping errors based on land use and infrastructure. Remaining potential GDE's used Spring 2015 groundwater contours to identify areas in which the groundwater level exceeded the effective rooting depth published by TNC.

8. Subsidence

a. NASA JPL and USBR subsidence maps were provided to the Technical Working Group on October 16th, 2018.
   i. These maps were used for discussion purposes.

b. Subsidence values were produced by each GSP Group, using the most temporally and spatially representative data for their respective GSP on February 7, 2019. The GSP-specific subsidence values are listed in the table below. See the individual GSPs for more detailed information as to how the GSP-specific subsidence values were derived.

GSP Region	Subsidence Rate	Units	Rate	Period of Record	Source	Additional Notes
Aliso	0.15	ft/year	Annual	2011-2017	USBR	Local Surveys and SJRRP monitoring data
Farmers	0.689	ft	Cumulative	2004-2017	USGS and UNAVCO	USGS Fordel-upper aquifer Compaction, Total = 0.031 ft P304-Total Subsidence = 0.72 ft Lower aquifer Compaction, Total = 0.689 ft
Fresno	0.689	ft	Cumulative	2004-2017	USGS and UNAVCO	USGS Fordel-upper aquifer Compaction, Total = 0.031 ft P304-Total Subsidence = 0.72 ft Lower aquifer Compaction, Total = 0.689 ft
Grassland	0.075	ft/year	Annual	2011-2017	USBR and KDSA	The estimated rate of subsidence is based on monitoring points outside of the GSA and therefore has not been verified; Initial data came from USBR, KDSA provided edits to that data.
Northern & Central	Varies by DMC Pool, ranges from 0.7 to -0.88	ft	Cumulative	2003-2013	SLDMWA	Interpolated from 1984 and 2014 Subsidence Surveys for Pools 3-18
Northern & Central	0.53	ft/year	Annual	2014-2018	TRID	Survey data
San Joaquin River Exchange Contractors	0.35	ft	Cumulative	2003-2012	Various datasets	Local surveys, CGPS/CORS/Extensometer data, SJRRP monitoring data, DMC surveys

HCM/Groundwater Conditions

1. Four distinct hydrogeologic layers were initially identified for the Hydrogeological Conceptual Model: shallow layer (0-30 ft), medium layer (30 ft – top of Corcoran Clay), Corcoran Clay, and below Corcoran Clay. However, given that some areas in the Subbasin have more complex hydrogeology than others, these layers were consolidated to three regionally-recognized hydrogeologic features with management areas used further define localized hydrogeologic complexities as needed for SGMA compliance. At the Subbasin level, the three regionally-recognized hydrogeologic features are two principle aquifers – an upper aquifer (unconfined to semi-confined above the Corcoran Clay) and a lower aquifer (confined below the Corcoran Clay), and the intervening regional aquitard known as the Corcoran Clay. This hydrogeologic conceptual model was recommended by the Technical Working Group and approved by the Coordination Committee.
2. SGMA requires a description of the definable bottom of the basin (§354.14 of the GSP Emergency Regulations). The agreed-upon definable bottom of the basin for the Delta-Mendota Subbasin is the base of fresh water consistent with the published definition of the Base of Fresh Water found in R. W. Paige (USGS, Hydrologic Investigations Atlas HA-489, 1973), defined as >3,000 micromhos/cm [µmhos/cm] at 25°C.
3. The current year (2013) seasonal high (spring) ranges from January to April, and seasonal low (fall) ranges from August to October. Data collected during these periods were used for WSE mapping.
4. Data collected during the aforementioned period (as noted in #3, above) were used to prepare water surface contour maps for the upper aquifer. No water surface elevation contour maps were prepared for the lower aquifer for 2013 Fall and Spring (as required by the GSP regulations) due to a lack of aquifer-specific data in most areas of the Subbasin. However, lower aquifer data collected during the aforementioned period were plotted on maps in lieu of the required contour maps. Woodard & Curran / Provost & Pritchard prepared 2013 Fall and Spring WSE contouring for the upper aquifer.

5. Timeframe for upper aquifer WSE mapping defined spring as January 1st to April 8th and fall as September 1st to October 31st.
6. The water year types for water year (WY) 2011 (wet water year), WY2012 (dry water year), and WY2015 (Shasta dry/critical water year) were used to compare WSE maps between GSP Plan areas.
7. Kenneth D. Schmidt & Associate's (KDSA) mapping of interconnected reaches of the San Joaquin River (SJR) based on the SJRRP was used for areas within the SJREC and Grassland GSP Plan areas. A table is included in the Common Chapter showing which SJR reaches are within each GSP Plan area and whether those reaches are gaining or losing. For other GSP Plan areas adjacent to the San Joaquin River, determinations of interconnectedness were provided by those preparing individual GSPs.

Water Budget

1. Historic Water Budget

The historic period was defined as WY2003 through WY2012 by the Technical Working Group on August 8, 2018 and confirmed by the Coordination Committee on August 13, 2018. The historic water budget period was ratified by the Coordination Committee on January 14, 2019 following the Coordination Agreement and Cost Share Agreement being finalized on December 12, 2018.

Each GSP Group determined the surface and groundwater inputs and outputs using the best available public and local data for each respective GSP Plan area. The historic water budget was split into 1) a land interactions water budget and 2) a groundwater budget. The parameters that each GSP Group evaluated were coordinated and summed to develop the Subbasin-wide water budget used to assess the change in storage in the upper aquifer for each GSP Group on February 15, 2019. For details regarding the approach to developing the Subbasin water budgets using numerical and non-numerical tools and the associated discussions with DWR staff, see Technical Memorandum #3 – Assumptions for the Historic, Current and Projected Water Budgets of the Delta-Mendota Subbasin, Change in Storage Cross-Check, and Sustainable Yield.

The change in lower aquifer groundwater storage considered the best available subsidence data per GSP Group and the respective specific yield. The lower aquifer change in storage for the Subbasin total was compiled on February 15, 2019.

2. Current Water Budget

The current Water Budget follows similar methodology to the historic water budgets for both upper and lower aquifer change in groundwater storage. The current period was defined as WY2013 by the Technical Working Group on August 8, 2018 and confirmed by the Coordination Committee on August 13, 2018. The current water budget period was formally ratified by the Coordination Committee on January 14, 2019 following the Coordination Agreement and Cost Share Agreement being finalized on December 12, 2018.

3. Projected Water Budget

Each GSP Group developed their own projected water budgets, using a similar comparison strategy to the historic and coordinated water budgets. The Subbasin-wide projected water budget was presented to the Technical Working Group and Coordination Committees on April 1, 2019. For more details regarding determinations of the projected water budget period and associated representative water years, see Technical Memorandum #3 – Assumptions for the Historic, Current and Projected Water Budgets of the Delta-Mendota Subbasin, Change in Storage Cross-Check, and Sustainable Yield.

The representative period, functioning as surrogate years, for a 50(+)-year historic period (WY2014-2070) was proposed by the Technical Working Group on January 15, 2019. Use of DWR's CCF modeling was also coordinated for changes in precipitation, evapotranspiration and streamflows.

For years 1 through 4 of the projected water budgets (WY2014 through WY2017), actual data were used and no CCF's were applied. Water year types are based on the SJR index except for Shasta Critical years. The following water year types will therefore be used: Shasta Critical, Critical, Dry, Below Normal, Above Normal, and Wet, with all designations based on the San Joaquin River Index except Shasta Critical, which is defined by Shasta indices under the Exchange Contract and refuge water supply contracts. For the projected simulation, four water year types were used for representative water years: Average (above or below normal), Dry (dry or critical), Wet and Shasta Critical.

Climate Change Factors for precipitation and evapotranspiration (ET) were applied considering representative historical water years surrogating for the future year until 2070. Fifty-three years of historical data (1965-2017) were used to model the projected water budget. However, to better match the existing hydrologic cycle, the six GSP Groups decided to begin the projected period with the representative year of 1979 for WY2018 (versus 1965 for WY2018). The coordinated representative year pattern is as follows:

- 1979 data represents WY2018
- 1980 data represents WY2019 (and so on until WY2056)

  and
- 1965 data represents WY2057
- 1966 data represents WY2058 (and so on until WY2070)

For years 38-43 (repeated WY2012-2017), the DWR model did not establish precipitation or ET CCF. The following CCFs for ET and precipitation were used:

- WY 2012 used 2001's 2070 CCF
- WY 2013 used 1992's 2070 CCF
- WY 2014 used 1976's 2070 CCF
- WY 2015 used 1977's 2070 CCF
- WY 2016 used 2002's 2070 CCF
- WY 2017 used 2011's 2070 CCF

For years 30 – 43 (repeated WY 2004-2017), the DWR modeling did not establish streamflow CCFs. For this reason, DWR suggested to use surrogate years' CCFs for the projection. The following CCFs were selected for streamflows:

- WY2004 used 2002's 2030 CCF
- WY2005 used 2002's 2030 CCF
- WY2006 used 1998's 2030 CCF
- WY2007 used 1992's 2070 CCF
- WY2008 used 1992's 2070 CCF
- WY2009 used 2002's 2070 CCF
- WY2010 used 2003's 2070 CCF
- WY2011 used 1997's 2070 CCF
- WY2012 used 1992's 2070 CCF
- WY2013 used 1992's 2070 CCF
- WY2014 used 1976's 2070 CCF
- WY2015 used 1977's 2070 CCF
- WY2016 used 2002's 2070 CCF
- WY2017 used 1998's 2070 CCF

9. Sustainable Yield

Methodologies for calculating upper aquifer sustainable yield were discussed by both the Coordination Committee and the Technical Working Group. After reviewing several options for this calculation, the Coordination Committee requested that the Technical Working Group further discuss potential options and provide a recommendation back to the Coordination Committee for adoption. On April 16, 2019, a joint workshop of the Coordination Committee and the Technical Working Group was held to discuss options for upper aquifer sustainable yield estimation and to identify a recommendation.

During the April workshop, several basic concepts and principles were discussed to calculate the upper aquifer sustainable yield value. Consideration was given to several potential options with increasing detail, including some combination of the following: total Subbasin upper aquifer pumping volumes, total Subbasin upper aquifer change in storage (which includes the effects of precipitation, evapotranspiration, and deep percolation), and Subbasin upper aquifer subsurface inflows and outflows. Inflow from certain neighboring subbasins, based on groundwater flow direction, as well as subsurface inflow from the Coast Range at existing gradients (as part of the inflow to the Northern & Central Delta-Mendota GSP area) was considered. Outflow to neighboring subbasins at existing gradients was also considered in certain applicable areas along the Delta-Mendota Subbasin boundary based on groundwater flow characteristics. Outflow from the Aliso GSP area, which lies east of the San Joaquin River, was not considered as outflow for purposes of developing these principles.

The formula for determining upper aquifer sustainable yield was applied to rolled-up Delta-Mendota Subbasin projected water budgets (WY2014-2070) in two categories:

- *Projected Baseline values with Climate Change Factors*
- *Projected Baseline values with Climate Change Factors and Projects and Management Actions*

If the projected baseline values for the Subbasin are expected to have undesirable results, the GSAs are required to implement projects or management actions that will offset the overdraft and result in a sustainable condition. The Technical Working Group recommended calculation of both a projected baseline for sustainable yield with applied climate change factors and a projected baseline for sustainable yield with climate change factors plus planned projects and management actions. Staff completed preliminary calculations for both baselines using average annual values from the Subbasin projected water budgets and following the formula below:

Upper Aquifer Sustainable Yield = Pumping + Change in Storage + (Outflow– Inflow)

The Technical Working Group determined that a +/- 10% factor should be applied to determine a range for the upper aquifer sustainable yield value. The +/- 10% factor is applied based on the percentage difference between the values from change in storage contour mapping (prepared by Provost & Pritchard) and reported changes in storage from the Subbasin consolidated historic water budgets (WY2003-2012) for the upper aquifer.

In summary, the most detailed range for the upper aquifer sustainable yield is calculated using the above formula for both categories of water budgets: projected baseline with climate change factors and projected baseline with climate change factors plus projects and management actions. The 10% factor is applied to the results for both categories. This range aims to demonstrate the Subbasin's upper aquifer sustainable yield without implementing any projects and management actions (low end of range) and how the Subbasin's upper aquifer sustainable yield will be impacted by implementing planned projects and management actions (high end of range).

Within the Delta-Mendota Subbasin, the distribution of known lower aquifer water level data and extraction volume data are limited and not sufficient to allow for a calculation of lower aquifer sustainable yield. The Technical Working Group therefore look to studies and/or analysis conducted in adjoining subbasins with similar hydrogeologic conditions for consideration in developing a preliminary sustainable yield estimate. A recent study conducted in the adjoining Westside Subbasin was identified and selected for use in developing this preliminary estimate.

The Westlands Water District GSA completed a recent study using groundwater modeling, in conjunction with the Westside Subbasin GSP development, to estimate sustainable yield for that subbasin. An analysis of their data reflected an initial assumption of lower aquifer sustainable yield equivalent to approximately 0.35 acre-feet per acre within the Westside Subbasin (Westlands Water District GSA, *Groundwater Management Strategy Concepts* presentation to the WWD Board on October 16, 2018). Using this analysis, a slightly lower (and therefore more conservative) sustainable yield value for the lower aquifer was selected (0.33 acre-feet per acre), amounting to approximately 250,000 acre-feet per year over the approximately 750,000-acre Delta-Mendota Subbasin.

The lower criteria for a lower aquifer sustainable yield estimation compared to that considered by Westlands Water District reflects DWR's classification of the Delta-Mendota Subbasin as critically overdrafted due to the subsidence issues and was therefore considered to be more protective against the potential for future inelastic land subsidence. After more data are obtained in future years, the lower aquifer sustainable yield value may undergo revisions.

For both the upper and lower aquifer sustainable yield, the Delta-Mendota Coordination Committee acknowledges that sustainable management criteria will be the primary indicator for managing lower aquifer extractions.

10. Boundary Flows

Boundary flows were evaluated by comparing inflows and outflows assessed by each GSP Group's water budget analyses and associated data, as well as groundwater flow trends from groundwater contours and hydrogeologist input. Each set of neighboring GSP Groups had independent meetings to coordinate and compare their respective contributions to inflows and outflows, and the results were provided and discussed by the Delta-Mendota Subbasin's Technical Working Group and Coordination Committee. More details on the applicable datasets can be found in the water budgets and groundwater contours sections of this Technical Memo.

DELTA-MENDOTA SGMA

TECHNICAL MEMORANDUM #2

RE: Assumptions for Hydrogeological Conceptual Model of the Delta-Mendota Subbasin

PREPARED BY: Woodard & Curran

DATE: July 25, 2019

During development of the six coordinated Groundwater Sustainability Plans (GSPs) for the Delta-Mendota Subbasin (Subbasin), the twenty-three Groundwater Sustainability Agencies (GSAs) in the Subbasin agreed upon methodologies and assumptions for water budgets, change in storage, and sustainable yield. The common data and methodologies required in Water Code Section 10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans and utilized in preparation of the Delta-Mendota Subbasin GSPs are set forth in Technical Memoranda. Each of the individual Memoranda satisfies a requirement agreed upon in the Coordination Agreement and, collectively when combined with the Coordination Agreement, provides an explanation of how the six Subbasin GSPs implemented together satisfy the requirements of the Sustainable Groundwater Management Act (SGMA) for the entire Subbasin.

The Technical Memoranda will be utilized by the Coordination Agreement Parties (representing the twenty-three GSAs in the Subbasin) during the implementation of their GSPs in order to ensure coordination of the GSPs. The Coordination Committee is responsible for ongoing review and updating of the Technical Memoranda, as needed, during GSP implementation.

The following common assumptions for the Delta-Mendota Hydrogeological Conceptual Model were agreed upon by the Delta-Mendota Subbasin Technical Working Group and approved by the Delta-Mendota Coordination Committee over the period extending from December 2017 through April 2019.

1. Four distinct hydrogeologic layers were initially identified for the Hydrogeological Conceptual Model: shallow layer (0-30 ft), medium layer (30 ft – top of Corcoran Clay), Corcoran Clay, and below Corcoran Clay. However, given that some areas in the Subbasin have more complex hydrogeology than others, these layers were consolidated to three regionally-recognized hydrogeologic features with management areas used further define localized hydrogeologic complexities as needed for SGMA compliance. At the Subbasin level, the three regionally-recognized hydrogeologic features are two principle aquifers – an upper aquifer (unconfined to semi-confined above the Corcoran Clay) and a lower aquifer (confined below the Corcoran Clay), and the intervening regional aquitard known as the Corcoran Clay. This hydrogeologic conceptual model was recommended by the Technical Working Group and approved by the Coordination Committee.
2. SGMA requires a description of the definable bottom of the basin (§354.14 of the GSP Emergency Regulations). The agreed-upon definable bottom of the basin for the Delta-Mendota Subbasin is the base of fresh water consistent with the published definition of the Base of Fresh Water found in R. W. Paige (USGS, Hydrologic Investigations Atlas HA-489, 1973), defined as >3,000 micromhos/cm [µmhos/cm] at 25°C.
3. For the required water surface elevation mapping for the defined current year (WY2013), data from January to April were used for the seasonal high (spring) mapping, and data from August to October were used for the seasonal low (fall) mapping to provide sufficient spatial distribution of data for mapping (recommended by the Technical Working Group during the period from March 2018 through August 2018).
4. Data collected during the aforementioned period (as noted in #3, above) were used to prepare water surface contour maps for the upper aquifer. No water surface elevation contour maps were prepared for the lower aquifer for 2013 Fall and Spring (as required by the GSP regulations) due to a lack of aquifer-specific data in most areas of the Subbasin. However, lower aquifer data collected during the aforementioned period were plotted on maps in lieu of the required contour maps.

5. The Technical Working Group used WY2011 (wet water year), WY2012 (dry water year), and WY2015 (Shasta critical water year) to compare groundwater elevation mapping prepared by the various GSP Groups for their respective GSP Plan areas.
6. Kenneth D. Schmidt & Associates mapping of interconnected reaches of the San Joaquin River based on the San Joaquin River Restoration Program was used for areas within the SJREC and Grassland GSP Plan areas. For other GSP Plan areas adjacent to the San Joaquin River, determinations of interconnectedness were provided by those preparing individual GSPs. A table will be provided showing which San Joaquin River reaches are within each GSP Plan area and whether those reaches are interconnected. If necessary to implement the sustainability goal of the Subbasin, the GSAs will coordinate estimating volumes of gains and losses at these reaches of the San Joaquin River.

TECHNICAL MEMORANDUM #3

RE: Assumptions for the Historic, Current and Projected Water Budgets of the Delta-Mendota Subbasin, Change in Storage Cross-Check and Sustainable Yield

PREPARED BY: Woodard & Curran

DATE: July 25, 2019

During development of the six coordinated Groundwater Sustainability Plans (GSPs) for the Delta-Mendota Subbasin (Subbasin), the twenty-three Groundwater Sustainability Agencies (GSAs) in the Subbasin agreed upon methodologies and assumptions for water budgets, change in storage, and sustainable yield. The common data and methodologies required in Water Code Section 10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans and utilized in preparation of the Delta-Mendota Subbasin GSPs are set forth in Technical Memoranda. Each of the individual Memoranda satisfies a requirement agreed upon in the Coordination Agreement and, collectively when combined with the Coordination Agreement, provides an explanation of how the six Subbasin GSPs implemented together satisfy the requirements of the Sustainable Groundwater Management Act (SGMA) for the entire Subbasin.

The Technical Memoranda will be utilized by the Coordination Agreement Parties (representing the twenty-three GSAs in the Subbasin) during the implementation of their GSPs in order to ensure coordination of the GSPs. The Coordination Committee is responsible for ongoing review and updating of the Technical Memoranda, as needed, during GSP implementation.

The following common assumptions were utilized by each GSP Group in the Subbasin in developing the historic and projected water budgets for their respective GSP Plan areas. These GSP-specific water budgets were then compiled (rolled-up) to the Subbasin level for inclusion in the Common Chapter. Also included herein are the assumptions used in developing Subbasin-level sustainable yield estimates for each principal aquifer. These assumptions were recommended by the Delta-Mendota Subbasin Technical Working Group and approved by the Delta-Mendota Coordination Committee.

1. Water Budgets

On September 25, 2017, the Delta-Mendota Subbasin Technical Working Group met with Trevor Joseph (Senior Engineering Geologist) and Mark Nordberg (Senior Engineering Geologist) from the California Department of Water Resources (DWR) to discuss how the development of six GSPs for the Subbasin will be coordinated to implement the best available science while also coordinating to use the same data and methodologies. DWR expressed concerns regarding coordination between those GSPs using a numerical model and those using a non-numerical (spreadsheet) model. Mr. Joseph advised that SGMA requires sustainability for the entire subbasin and was concerned about coordinating a subbasin water budget. The SJREC have experience sustainably managing groundwater using a non-numerical model. A follow-up meeting took place on November 17, 2017 with DWR representatives Trevor Joseph, Tyler Hatch (Senior Engineer) and Amanda Peisch-Derby (Regional SGMA Coordinator) to showcase how this spreadsheet model has been used. It was further discussed that the hydrogeologic principles and equations used for both types of modeling in the Delta-Mendota Subbasin are the same. DWR agreed that coordination amongst the GSP Groups, ensuring use of the same data and methodologies, can be achieved for SGMA modeling purposes in the Subbasin.

Historic Water Budget

The historic period adopted by the Subbasin Coordination Committee was defined as Water Year (WY) 2003 through WY2012. A water year is the period beginning October 1st and ending on September 30th of the subsequent year. The historic water budget period was ratified by the Coordination Committee on January 14, 2019.

Each GSP Group in the Delta-Mendota Subbasin developed land surface water budgets and groundwater budgets for the historic period using the best available public and local data for each respective GSP Plan area. The parameters (specific inputs and outputs) that each GSP Group evaluated were coordinated and summed to develop the Subbasin-wide water budget and to estimate the change in groundwater storage in the upper aquifer in each GSP Plan area. Parameters included pumping/tile drainage, subsurface inflows/outflows, and deep percolation of precipitation and applied surface water. Estimates of changes in groundwater levels in the upper aquifer over the historic water budget period were also utilized to estimate change in groundwater storage. The estimated change in groundwater storage for the upper aquifer from the compiled water budgets was compared to that estimated from changes in groundwater level. For purposes of developing a change in groundwater storage in the upper aquifer over the historic water budget period, the estimates developed from the water budget methodology were used for the Subbasin.

Development of the change in lower aquifer storage value was limited as a result of a lack of available aquifer-specific groundwater level data in most areas of the Subbasin. As a result, a methodology for estimating change in lower aquifer storage from subsidence, along with changes in potentiometric head (where groundwater level data were available), was used. For GSP Plan areas where groundwater level data were not available to support calculations of change in lower aquifer storage, change in land surface elevations was used as a proxy for estimates of change in lower aquifer storage. The best available subsidence data by GSP Group and representative specific yield values (defined as the volume of water released from storage by an unconfined aquifer per unit surface area of aquifer per unit decline of the water table) were used to estimate change in lower aquifer storage from subsidence.

Change in Storage Cross-Check

Groundwater elevation contour maps were developed for the upper aquifer for Spring 2003 and Spring 2013 to assess changes in groundwater storage during the historic and current water budget periods. The contour maps were used to estimate upper aquifer change in storage during the historic and current period by subtracting the Spring 2013 contours from the Spring 2003 contours and multiplying the change in groundwater elevations by GSP Plan area and specific yield of the aquifer. Estimates were made for each GSP Plan area and compared to the overall change in storage estimated in the individual GSP historic and current groundwater budgets. The results of the two methodologies were comparable (within 20%).

Change in land surface elevation is used as a proxy for lower aquifer change in storage using a similar methodology, multiplying the change in land surface elevation between 2003 and 2013 by the area covered by individual GSP Plan areas to estimate the change in lower aquifer storage.

Current Water Budget

The current year for the associated water budget was set as WY2013 by the Delta-Mendota Technical Working Group on August 8, 2018 and confirmed by the Delta-Mendota Coordination Committee on August 13, 2018. The current water budget and associated changes in storage (by principal aquifer) were calculated in the same manner as the historic water budgets. The current water budget period was ratified by the Coordination Committee.

Projected Water Budget

Each GSP Group developed their own GSP-specific projected water budgets using a similar methodology to the historic and current water budgets. GSP-specific water budgets were compiled at the Subbasin level, and the Subbasin projected water budget was recommended and approved at a joint meeting of the Delta-Mendota Technical Working Group and Coordination Committee.

Per SGMA and the GSP regulations, the projected water budget period begins with the year subsequent to the current water budget year and extends for a projection period of at least 50 years to WY2070 for application of the required climate change factors. For the Delta-Mendota Subbasin, the current water budget is WY2013, and the projected water budget period is WY2014 through WY2070.

As future hydrology (e.g. precipitation totals) is not known, historic hydrology is used to simulate projected future hydrology. As a result, each year in the projected water budget is assigned a representative water year from the historic period. For example, WY2018 is assumed to have hydrology similar to that of WY1979; WY2019 is assumed to have hydrology similar to that of WY1980; and so forth. The pattern of historic hydrology used to simulate future hydrology is established based on actual hydrology from WY2014 - WY2017 (known water year types at the start of the projected water budget period). This resulted in the following projected hydrologic pattern.

For the first four years of the projected water budget (WY2014 through WY2017), actual data are used and no climate change factor is applied. For WY2018 through WY2070, the following representative water year sequencing is used:

- WY2018 is equivalent to WY1979.
- Each subsequent projected water year (WY2019 through WY2056) will follow the equivalent subsequent historic water year (e.g. WY2019 is equivalent to WY1980; WY2020 is equivalent to WY1981, and so forth, with WY2056 being equivalent to WY2017).
- WY2057 is equivalent to WY1965 with each subsequent water year (WY2058 through WY2070) equivalent to the subsequent historic water year (with WY2070 being equivalent to WY1978).

Representative water years used the associated historic water year types for assumptions relative to projected hydrology (precipitation, stream flows, and evapotranspiration [ET]). Water year types were based on the San Joaquin River Index except for Shasta Critical Years, which required simulation of the SJREC and wildlife refuge surface water deliveries. Therefore, in summary, the following water year types were assigned to projected water years based on the associated representative water year type: Shasta Critical, Critical, Dry, Below Normal, Above Normal, and Wet, with all designations based on the San Joaquin River Index, except Shasta Critical defined by Shasta index (as recommended by the Technical Working Group). For projected simulations, water year types were 'lumped' into four categories as follows: wet, average (above and below normal), dry (dry and critical) and Shasta critical (as recommended by the Technical Working Group).

As agreed, upon, Climate Change Factors (CCFs) for precipitation and ET were applied considering representative historical year types surrogating for future years through WY2070. For projected years WY2038 through WY2043 (repeated WY2012 through WY2017), DWR did not establish precipitation or ET CCFs. Based on conversations with DWR, the following CCFs for precipitation and ET were used for this intervening period:

- WY 2012 used the 2001 2070 CCF
- WY 2013 used the 1992 2070 CCF
- WY 2014 used the 1976 2070 CCF
- WY 2015 used the 1977 2070 CCF
- WY 2016 used the 2002 2070 CCF
- WY 2017 used the 2011 2070 CCF

For projected years WY2030 - WY2043 (repeated WY2004 - WY2017), DWR did not establish streamflow CCFs. For this reason, DWR suggested to use surrogate years' CCFs for the projected period. The following CCFs were selected for streamflows:

- WY 2004 used the 2002 2030 CCF
- WY 2005 used the 2002 2030 CCF
- WY 2006 used the 1998 2030 CCF
- WY 2007 used the 1992 2070 CCF
- WY 2008 used the 1992 2070 CCF
- WY 2009 used the 2002 2070 CCF
- WY 2010 used the 2003 2070 CCF
- WY 2011 used the 1997 2070 CCF
- WY 2012 used the 1992 2070 CCF
- WY 2013 used the 1992 2070 CCF
- WY 2014 used the 1976 2070 CCF
- WY 2015 used the 1977 2070 CCF
- WY 2016 used the 2002 2070 CCF
- WY 2017 used the 1998 2070 CCF

The projected water budget period and associated representative water years were recommended by the Technical Working Group. Use of DWR's CCFs was also coordinated, and it was agreed that CCFs will only be applied to hydrology.

2. Sustainable Yield

The following methodologies were recommended by the Delta-Mendota Technical Working Group and approved by the Coordination Committee for establishing the required sustainable yield estimate for each principal aquifer:

Upper Aquifer Sustainable Yield

The following formula was agreed upon for the calculation of the sustainable yield of the upper aquifer:

Sustainable Yield = (Pumping + Change in Storage) + (Outflow – Inflow)

Data used in the calculation are from the Delta-Mendota Subbasin compiled projected water budget with Climate Change Factors and Projects/Management Actions, as well as Baseline Projected Water Budget with Climate Change Factors. A ± 10% factor was applied to the resulting sustainable yield estimate; this factor was estimated based on the percent difference in the WY2003-2012 upper aquifer change in storage calculations between the compiled historic water budget and the estimate of change in storage utilizing change in groundwater level contours cross-check analysis (see above). Data incorporated into the equation are the average annual values from the indicated projected water budgets (WY2014 - WY2070) using only upper aquifer values.

Sustainable management criteria (Minimum Thresholds and Measurable Objectives) will be the primary indicator governing upper aquifer extractions. The sustainable yield estimates will be updated as part of the five-year GSP review.

Lower Aquifer Sustainable Yield

Within the Delta-Mendota Subbasin, the distribution of known lower aquifer water level data and extraction volume data are limited and not sufficient to allow for a calculation of lower aquifer sustainable yield. A Northern & Central Delta-Mendota Region Management Committee memo dated April 10, 2019 outlined the alternative method used to estimate sustainable yield method for the lower aquifer and is summarized below.

The Westlands Water District GSA has completed a recent study using groundwater modeling, in conjunction with the Westside Subbasin GSP development, to estimate sustainable yield for that subbasin. Based on an analysis of their data and reflected an initial assumption of lower aquifer sustainable yield equivalent to approximately 0.35 acre-feet per acre within the Westside Subbasin (Westlands Water District GSA, Groundwater Management Strategy Concepts presentation to the WWD Board on October 16, 2018). Using this analysis, a slightly lower sustainable yield value for the lower aquifer was selected (0.33 acre-feet per acre), amounting to approximately 250,000 acre-feet per year over the approximately 750,000-acre Delta-Mendota Subbasin.

The lower criteria for a lower aquifer sustainable yield estimation compared to that considered by Westlands Water District reflects DWR's classification of the Delta-Mendota Subbasin as critically-overdrafted due to the subsidence issues. After more data are obtained in future years, the lower aquifer sustainable yield value may undergo revisions.

3. Other

The Technical Working Group of the Subbasin Coordination Committee discussed that not-yet implemented plans or programs (e.g. Delta conveyance, Updates to the Bay-Delta Water Quality Control Plan/SED, proposed large storage projects, etc.) would not be incorporated into the current GSPs. However, projects or programs may be qualitatively incorporated or described in individual GSPs, and such programs will be monitored during the next five years and incorporated into the GSPs in future updates as appropriate.

TECHNICAL MEMORANDUM #4

RE: Assumptions for Delta-Mendota Subbasin Management Areas, Sustainability Management Criteria

PREPARED BY: Woodard & Curran

DATE: July 25, 2019

During development of the six coordinated Groundwater Sustainability Plans (GSPs) for the Delta-Mendota Subbasin (Subbasin), the twenty-three Groundwater Sustainability Agencies (GSAs) in the Subbasin agreed upon methodologies and assumptions for water budgets, change in storage, and sustainable yield. The common data and methodologies required in Water Code Section 10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans and utilized in preparation of the Delta-Mendota Subbasin GSPs are set forth in Technical Memoranda. Each of the individual Memoranda satisfies a requirement agreed upon in the Coordination Agreement and, collectively when combined with the Coordination Agreement, provides an explanation of how the six Subbasin GSPs implemented together satisfy the requirements of the Sustainable Groundwater Management Act (SGMA) for the entire Subbasin.

The Technical Memoranda will be utilized by the Coordination Agreement Parties (representing the twenty-three GSAs in the Subbasin) during the implementation of their GSPs in order to ensure coordination of the GSPs. The Coordination Committee is responsible for ongoing review and updating of the Technical Memoranda, as needed, during GSP implementation.

The following common assumptions were utilized by each GSP Group in the Subbasin for preparing a subbasin-level description of management areas and sustainable management criteria.

1. Management Areas

The Coordination Committee left management areas and management of their respective GSPs to the six GSP Groups. Management areas were determined individually by each GSP Group with Woodard & Curran preparing a map showing all management areas ('sum of the parts' approach).

2. Sustainable Management Criteria

Per the GSP Regulations, definitions of undesirable results must be provided at the Subbasin level. The Technical Working Group defined these as follows:

- Chronic Lowering of Groundwater Levels: Significant and unreasonable chronic change in water levels, as defined by each GSP Group, that has an impact on the beneficial users of groundwater in the Subbasin through either intra- and/or inter-basin actions.
- Long-term Reduction of Groundwater Storage: Significant and unreasonable chronic decrease in groundwater storage, as defined by each GSP Group, that has an impact on the beneficial users of groundwater in the Subbasin through either intra- and/or inter-basin actions.
- Degraded Water Quality: Significant and unreasonable degradation of groundwater quality, as defined by each GSP Group, that has an impact on the beneficial users of groundwater in the Subbasin through either intra- and/or inter-basin actions and/or activities.
- Depletions of Interconnected Surface Water: Depletions of interconnected surface water, as defined by each GSP Group, that have significant and unreasonable adverse impacts on the beneficial uses of surface water

- Land Subsidence: Changes in ground surface elevation that cause damage to critical infrastructure that would cause significant and unreasonable reductions of conveyance capacity, damage to personal property, impacts to natural resources or create conditions that threaten public health and safety.
- Seawater Intrusion: The Coordination Committee recognized that the Subbasin is not in a coastal location and therefore seawater intrusion is unable to occur and therefore a definition of an undesirable result is not necessary.

Each GSP Group individually defined significant and unreasonable for each sustainability indicator, as well as established sustainability goals, interim milestones, minimum thresholds and measurable objectives. This process was discussed during the February 2019 meetings of the Technical Working Group, and ultimately recommended and approved by the Coordination Committee.

TECHNICAL MEMORANDUM #5

RE: Assumptions for Delta-Mendota Subbasin Monitoring Network

PREPARED BY: Woodard & Curran

DATE: July 25, 2019

During development of the six coordinated Groundwater Sustainability Plans (GSPs) for the Delta-Mendota Subbasin (Subbasin), the twenty-three Groundwater Sustainability Agencies (GSAs) in the Subbasin agreed upon methodologies and assumptions for water budgets, change in storage, and sustainable yield. The common data and methodologies required in Water Code Section 10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans and utilized in preparation of the Delta-Mendota Subbasin GSPs are set forth in Technical Memoranda. Each of the individual Memoranda satisfies a requirement agreed upon in the Coordination Agreement and, collectively when combined with the Coordination Agreement, provides an explanation of how the six Subbasin GSPs implemented together satisfy the requirements of the Sustainable Groundwater Management Act (SGMA) for the entire Subbasin.

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The following common assumptions and approaches were utilized in developing the required Subbasin monitoring network for sustainability indicators:

- The required Subbasin-level monitoring networks will be a compilation of networks developed by each individual GSP Group.
- The compilation of the individual GSP monitoring networks will provide sufficient data in order to develop required water surface elevation contouring for each principal aquifer in the Subbasin, if applicable.
- The GSP groups will use CASGEM monitoring network data for 2018 and 2019 data collection and will supplement with locally collected data where available.
- Each monitoring location or point within the GSP network will be monitored, at a minimum, at the agreed upon frequency for each of the data types.
- Field Collection will follow agreed-upon protocols which may be the same as, or equal to, data collection protocols (i.e. industry standards and best management practices).
- For non-monitored data to be reported as part of the annual reports (e.g. groundwater extractions, surface water deliveries), actual metered data will be used where such data exists, and when direct data do not exist, estimated quantities will be calculated based on existing indirect data (e.g. electrical usage, crop demand, ET) and/or other industry best practices.
- Seasonal high groundwater elevation data will be collected between February and April, and seasonal low groundwater elevation data will be collected between September and October.
- Each GSP Group may use supplemental data in addition to the SGMA-required monitoring network documented in their GSP in order to comply with these requirements and those set forth in the Coordination Agreement.

- Individual data gaps in the monitoring networks and monitoring data identified in the GSPs will progressively be addressed by the applicable GSA or GSP Group during the 20-year GSP implementation timeframe (2020 to 2040).

TECHNICAL MEMORANDUM #6

RE: Coordination of the Delta-Mendota Subbasin Data Management System

PREPARED BY: Woodard & Curran

DATE: July 25, 2019

During development of the six coordinated Groundwater Sustainability Plans (GSPs) for the Delta-Mendota Subbasin (Subbasin), the twenty-three Groundwater Sustainability Agencies (GSAs) in the Subbasin agreed upon methodologies and assumptions for water budgets, change in storage, and sustainable yield. The common data and methodologies required in Water Code Section 10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans and utilized in preparation of the Delta-Mendota Subbasin GSPs are set forth in Technical Memoranda. Each of the individual Memoranda satisfies a requirement agreed upon in the Coordination Agreement and, collectively when combined with the Coordination Agreement, provides an explanation of how the six Subbasin GSPs implemented together satisfy the requirements of the Sustainable Groundwater Management Act (SGMA) for the entire Subbasin.

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Coordinated Data Management System

As required in Section 352.6, Data Management System, of the GSP regulations, the Delta-Mendota Subbasin GSAs will develop and maintain a data management system that is capable of storing and reporting information relevant to the reporting requirements, implementation of the GSPs, and the monitoring networks of the Subbasin. Additionally, per Section 354.4, Reporting Monitoring Data to the California Department of Water Resources (DWR), all monitoring data are to be stored in a DMS with copies of the monitoring data included in the annual report and submitted electronically on forms provided by DWR. Recognizing that GSP implementation, including annual reporting, will require some efforts at the subbasin level, the 23 GSAs overlying the Delta-Mendota Subbasin have chosen to develop a coordinated DMS that can be utilized by each GSP Group for management of their data but which will allow for the required compilation of data sets for preparation of Subbasin annual reports. The coordinated DMS, once developed, will provide a generic framework that can be used by any GSP Group or GSA in the Subbasin for individual data management while allowing for consistent formatting and the simplified uploading of compiled datasets into the Subbasin-wide coordinated DMS.

The Parties have also developed and will maintain separate data storage processes or Data Management Systems. Each separate DMS developed for each GSP will store information related to implementation of each individual GSP, monitoring network data and monitoring sites requirements, and water budget data requirements. Each system will be capable of reporting all pertinent information to the respective GSA and/or GSP Group, and ultimately to the Coordination Committee. After providing the Coordination Committee with data from the individual GSPs, the Subbasin Plan Manager and Coordination Committee will ensure the data are stored and managed in a coordinated manner throughout the Subbasin and reported to DWR on an annual basis.

Leading up to the development of the DMS, the Subbasin used an *ad hoc* DMS working group and survey to develop a conceptual design for the software requirements. This was followed by the software vendor creating wireframes to communicate the functionality of the DMS. This *ad hoc* working group developed data standards for each data type to make the aggregation feasible at a subbasin level and established weekly calls to develop import wizards, attribute

tables, interpretations of reporting requirements, and an annual report format. Data provided by Santa Nella County Water District were used to beta-test the completed DMS prior to release as a generic system for Subbasin-wide use.

The DMS includes permissions and business rules so each GSP can only upload data for their GSP based upon usernames and roles. GSP Groups, or GSAs within a GSP Group, are also not allowed to see other GSP Groups' data until all annual reporting has been completed and accepted by the Plan Manager. DMS development is ongoing, with development concurrent with final GSP development, and has been designed to support the needs of the severely disadvantaged communities, disadvantaged communities, and GSAs within the Subbasin. The DMS is scheduled to be completed for use in developing annual reports by January 2020.

The DMS constructed for the Delta-Mendota Subbasin is a secured web-based application hosted on Amazon Web Services (AWS). The DMS focuses on five core business requirements including: centralized data warehouse, security of data, permissioned based access, data visualization and reporting. Other goals of the DMS focus around improving data collection/aggregation processes, creating data standards, gaining efficiencies in reporting and improving data sharing with stakeholders. The DMS is designed to aggregate data through import processes by GSP to support data visualization and annual report generation.

Underlying the web application is a relationship database used to store the information aggregated from GSPs across primary data types identified to support monitoring and Annual Report development. Those data types include groundwater extractions, surface water deliveries, groundwater storage, groundwater elevations, groundwater quality, interconnected surface water and land subsidence. The web application functionality includes an embedded GIS viewer, screens to view tables of time series data, and charting capabilities for hydrographs. The embedded GIS viewer contains functionality to store map layers such as reference data, GSA/GSP boundaries and derived information such as water level contours.

In order to facilitate data synthesis, the GSP Groups agreed on the following frequencies for monitoring data collection:

- Groundwater elevations – twice a year (seasonal high and seasonal low)
- Interconnected surface water – twice a year (seasonal high and seasonal low)
- Groundwater quality – once a year
- Land subsidence – continuous monitoring sites or by Management Area

These datasets will be augmented with other data collection required for annual report preparation, including estimates of groundwater extractions and surface water diversions.

Additionally, the GSP Groups agreed to utilize the same general monitoring protocols or similar industry standards to ensure that the data were collected in a consistent and coordinated fashion. All monitoring locations in the Delta-Mendota Subbasin were assigned a unique identifier in the DMS. The number system is in a format of ##-####, where the first two digits indicates which GSA the monitoring location is associated with, and the subsequent four digits indicate the specific monitoring location in that GSA area. The general methodology agreed upon for data import and management is as follows:

- Each GSA collects their respective data per agreed-upon protocols and transmits it to the GSA representative.
- Each GSA representative then compiles the data and conducts a quality control check.
- The GSA representative transmits the compiled data set to the GSP Lead or Representative, who then aggregates the data from all GSAs and conducts a second quality control check.
- The GSP Lead or Representative uploads the data set into the DMS using import wizards designed specifically for this process.

- The Subbasin Plan Manager then uses the data in the DMS to compile information as required for the annual report.

Compiled data sets from the DMS will be augmented with required maps generated externally to produce the required annual report. Mapping prepared outside the DMS will be subsequently imported into the DMS as GIS files to ensure all data are kept in one place.

The DMS will be maintained by the San Luis & Delta-Mendota Water Authority, while acting as the Plan Manager, with a contract with the software vendor for hosting, maintenance and future updates. Each GSP will pay a maintenance fee for the continued hosting and support of the Subbasin coordinated DMS.

The Subbasin-level DMS, as described herein, may be supplemented by additional DMSs developed and maintained by each GSP Group or GSA in the Subbasin. The reader is referred to each of the six Subbasin GSPs for specific information relative to data collection and management in each GSP Plan area.

TECHNICAL MEMORANDUM #7

RE: Adoption and Use of the Subbasin Coordination Agreement

PREPARED BY: Woodard & Curran

DATE: July 25, 2019

During development of the six coordinated Groundwater Sustainability Plans (GSPs) for the Delta-Mendota Subbasin (Subbasin), the twenty-three Groundwater Sustainability Agencies (GSAs) in the Subbasin agreed upon methodologies and assumptions for water budgets, change in storage, and sustainable yield. The common data and methodologies required in Water Code Section 10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans and utilized in preparation of the Delta-Mendota Subbasin GSPs are set forth in Technical Memoranda. Each of the individual Memoranda satisfies a requirement agreed upon in the Coordination Agreement and, collectively when combined with the Coordination Agreement, provides an explanation of how the six Subbasin GSPs implemented together satisfy the requirements of the Sustainable Groundwater Management Act (SGMA) for the entire Subbasin.

This Technical Memorandum describes the Delta-Mendota Subbasin governance structure, participating parties, the Delta-Mendota Subbasin Coordination Agreement (Coordination Agreement), and details of this Coordination Agreement. Each GSA in the Subbasin is included in this memorandum. Additional details of the organization, management structure, and legal authority of each GSA and their associated GSPs, and accompanying GSA boundary maps, are described in the Delta-Mendota Subbasin Common Chapter (Common Chapter). Descriptions of intrabasin and interbasin coordination agreements in place for the development and implementation of the GSPs overlying the Subbasin are also referenced.

1. GSP and Coordination Agreement Submission

A Delta-Mendota Subbasin Common Chapter has been developed to "knit" the six Delta-Mendota GSPs together for cohesive implementation. The Common Chapter includes a separate signature page that contains a disclosure statement and professional stamp for the consultant charged with compiling the chapter (Woodard & Curran), as agreed upon by the Technical Working Group on April 17, 2018 and January 15, 2019. Each Subbasin GSP is stamped and signed by the professional overseeing their preparation. The Common Chapter was developed as part of a collaborative process, with input from the various GSAs, technical consultants, and stakeholders. The Coordination Agreement, Common Chapter, and Technical Memoranda collectively serve as the mechanism through which the GSAs and individual GSPs are coordinated during implementation.

The GSAs have agreed to submit their respective GSPs to the California Department of Water Resources (DWR) through the Delta-Mendota Subbasin Coordination Committee (Coordination Committee) and the Plan Manager, along with all developed Common Chapter and Technical Memoranda, by January 31, 2020. When submitted to DWR, the collective documents will be available for public review and comment as part of the 60-day public comment period per SGMA regulations.

2. GSP Groups and GSAs in the Delta-Mendota Subbasin

Below is a summary of the six GSP Groups and twenty-three GSAs (and their respective signatories) to the Coordination Agreement. Some signatories (also referred to as parties) are participating in multiple GSAs and/or GSPs.

Northern & Central Delta-Mendota Region GSP

- Patterson Irrigation District GSA
  - Patterson Irrigation District, Twin Oaks Irrigation District
- West Stanislaus Irrigation District GSA
  - West Stanislaus Irrigation District
- DM-II GSA
  - Del Puerto Water District, Oak Flat Water District
- City of Patterson GSA
  - City of Patterson
- Northwestern Delta-Mendota GSA
  - Merced County, Stanislaus County
- Central Delta-Mendota GSA
  - San Luis Water District, Santa Nella County Water District, Panoche Water District, Mercy Springs Water District, Tranquillity Irrigation District, Merced County, Fresno Slough Water District, Fresno County, Eagle Field Water District, Pacheco Water District
- Widren Water District GSA
  - Widren Water District
- Oro Loma Water District GSA
  - Oro Loma Water District

San Joaquin River Exchange Contractors (SJREC) GSP

- San Joaquin River Exchange Contractors Water Authority GSA
  - Central California Irrigation District, Columbia Canal Company, Firebaugh Canal Water District, San Luis Canal Company
- Turner Island Water District-2 GSA
  - Turner Island Water District
- City of Mendota GSA
  - City of Mendota
- City of Firebaugh GSA
  - City of Firebaugh
- City of Los Banos GSA
  - City of Los Banos
- City of Dos Palos GSA
  - City of Dos Palos
- City of Gustine GSA
  - City of Gustine
- City of Newman GSA
  - City of Newman
- Madera County GSA
  - Madera County
- Portion of Fresno County Management Area B GSA
  - Fresno County
- Portion of Merced County – Delta-Mendota GSA
  - Merced County

Grassland GSP

- Grassland GSA
  - Grassland Water District, Grassland Resource Conservation District
- Portion of Merced County GSA
  - Merced County

Farmers Water District GSP

- Farmers Water District GSA
  - Farmers Water District

Fresno County GSP

- Fresno County Management Area A GSA
  - Fresno County
- Fresno County Management Area B GSA
  - Fresno County

Aliso Water District GSP

- Aliso Water District GSA
  - Aliso Water District

With respect to the San Benito County portion of the Delta-Mendota Subbasin, this area will be included in the Central Delta-Mendota GSA of the Northern & Central Delta-Mendota Region GSP. In 2017, the San Benito County Water District Groundwater Sustainability Agency indicated its intent to act as the GSA for certain areas within its jurisdiction, but not for the unmanaged *de minimis* area in the most southwest portion of the Delta-Mendota Subbasin. For purposes of assuring that all land within the Subbasin is part of a GSP as required by DWR regulations, the Central Delta-Mendota GSA entered into a Memorandum of Understanding with San Benito County to include the unmanaged *de minimis* area in the Northern & Central Delta-Mendota Region GSP.

3. Delta-Mendota Subbasin Intrabasin Coordination Agreement

The aforementioned GSAs are coordinating development and implementation of the six GSPs under the Delta-Mendota Subbasin Coordination Agreement. All GSAs within the Subbasin agree to work collaboratively to meet the objectives of SGMA and the Coordination Agreement. Each GSA acknowledges that it is bound by the terms of this Coordination Agreement.

The Coordination Agreement for the Delta-Mendota Subbasin covers the following topics:

1. Purpose of the Agreement, including:
   a. Compliance with SGMA and
   b. Description of Criteria and Function;
2. Definitions
3. General Guidelines, including:
   a. Responsibilities of the Parties and
   b. Adjudicated or Alternative Plans in the Subbasin;
4. Role of San Luis & Delta-Mendota Water Authority (SLDMWA), including:
   a. Agreement to Serve,
   b. Reimbursement of SLDMWA, and
   c. Termination of SLDMWA's Services;

5. Responsibilities for Key Functions, including:
    a. Coordination Committee,
    b. Coordination Committee Officers,
    c. Coordination Committee Authorized Action and Limitations,
    d. Subcommittees and Workgroups,
    e. Coordination Committee Meetings, and
    f. Voting by Coordination Committee;
6. Approval by Individual Parties;
7. Exchange of Data and Information, including:
    a. Exchange of Information and
    b. Procedure for Exchange of Information;
8. Methodologies and Assumptions, including:
    a. SGMA Coordination Agreements,
    b. Pre-GSP Coordination, and
    c. Technical Memoranda Required;
9. Monitoring Network
10. Coordinated Water Budget
11. Coordinated Data Management System
12. Adoption and Use of the Coordination Agreement, including:
    a. Coordination of GSPs and
    b. GSP and Coordination Agreement Submission;
13. Modification and Termination of the Coordination Agreement, including:
    a. Modification or Amendment of Exhibit "A" (Groundwater Sustainability Plan Groups including Participation Percentages),
    b. Modification or Amendment of Coordination Agreement, and
    c. Amendment for Compliance with Law;
14. Withdrawal, Term, and Termination;
15. Procedures for Resolving Conflicts;
16. General Provisions, including:
    a. Authority of Signers,
    b. Governing Law,
    c. Severability,
    d. Counterparts, and
    e. Good Faith; and
17. Signatories of all Parties

The Coordination Agreement, effective as of December 12, 2018, has been signed by all thirty-six parties in the Delta-Mendota Subbasin. These signatories to the Coordination Agreement have formed a total of 23 GSAs in the Subbasin. A key goal of basin-wide coordination is to ensure that the Subbasin GSPs utilize the same data and methodologies during their plan development and that the elements of the Plans necessary to achieve the sustainability goal for the Subbasin are based upon consistent interpretations of the basin setting, as required by SGMA and associated regulations. It is the intent that the Coordination Agreement become part of each individual GSP within the Delta-Mendota Subbasin.

Delta-Mendota Subbasin Coordination Committee

The Delta-Mendota Subbasin Coordination Agreement establishes the Delta-Mendota Subbasin Coordination Committee (Coordination Committee), which provides representation from each of the six GSP groups. The Coordination Committee complies with requirements of the Brown Act. The Coordination Agreement describes the Coordination Committee's requirements for meeting noticing, attendance, voting, data sharing, governance of subcommittees and working groups, and approval of Subbasin documents.

The Coordination Agreement allows for development of individual subcommittees or working groups to support the development of the Technical Memorandums and to coordinated data, methodologies, and assumptions. For this purpose, the Coordination Committee recommended formation of an ad hoc Technical Working Group, Communications Working Group, and Data Management System Working Group.

The Coordination Committee provides specific direction to the Plan Manager. The initial Plan Manager for the six coordinated GSPs is Andrew Garcia, Senior Civil Engineer for San Luis & Delta-Mendota Water Authority (SLDMWA); however, the Coordination Committee and Coordination Agreement allow for a consultant of the SLDMWA to act as Plan Manager, if necessary. If the SLDMWA ceases to serve as Plan Manager, the Coordination Committee can name a successor per the Coordination Agreement. In the meantime, Mr. Garcia's contact information is included below:

Mr. Andrew Garcia, Plan Manager
San Luis & Delta-Mendota Water Authority
842 6th Street
Los Banos, CA 93635
Phone: (209)-832-6200 / Fax (209)-833-1034
andrew.garcia@sldmwa.org

Contact information for each GSP plan administrator is included in the respective GSPs.

Technical Memoranda

The Coordination Agreement describes the development of Technical Memoranda. These memoranda collectively explain the data, methodologies, and assumptions approved and used by the six GSP Groups within the Subbasin. The Coordination Agreement specifically referenced four Technical Memoranda; the Technical Working Group of the Coordination Committee subsequently recommended development of additional Technical Memoranda during the GSP development efforts. The Technical Memoranda are subject to the Coordination Committee's review and unanimous approval and will be submitted along with the Coordination Agreement to DWR. The Technical Memoranda will be used throughout GSP implementation to ensure continued coordination and compliance with SGMA.

The Technical Memoranda include:

1. Common Datasets Used in the Delta-Mendota Subbasin GSPs
2. Assumptions for Hydrogeological Conceptual Model of the Delta-Mendota Subbasin
3. Assumptions for the Historic, Current and Projected Water Budgets of the Delta-Mendota Subbasin, Change in Storage Cross-Check and Sustainable Yield
4. Assumptions for Delta-Mendota Subbasin Management Areas, Sustainability Management Criteria
5. Assumptions for Delta-Mendota Subbasin Monitoring Network
6. Coordination of the Delta-Mendota Subbasin Data Management System
7. Adoption and Use of the Subbasin Coordination Agreement
8. Coordinated Noticing, Communication, and Outreach Activities in the Delta-Mendota Subbasin

Interbasin Coordination

The Delta-Mendota Subbasin adjoins nine neighboring subbasins. These subbasins range in basin condition as determined by DWR, so some subbasins are also on the January 31, 2020 GSP submission deadline, while others have a 2022 deadline. With this multitude of neighbors and variety of timelines, the Delta-Mendota Subbasin has initiated interbasin coordination efforts with all of the adjoining subbasins. The SLDMWA, on behalf of the Northern and Central Delta-Mendota Regions, executed an interbasin data sharing agreement with Westlands Water District, the coordinating agency for the Westside Subbasin. The agreement establishes common assumptions for groundwater conditions as well as a process for continued data sharing for data located within five miles of the boundary between Westside Subbasin and the Delta-Mendota Subbasin.

Additional interbasin coordination efforts have been initiated with other adjoining subbasins. No other agreements have been formalized at the time of the Delta-Mendota Subbasin's GSP submissions, but may be developed later. The Delta-Mendota Subbasin intends to coordinate with neighboring subbasins to develop shared understandings of data and technical approaches.

DELTA-MENDOTA SGMA

TECHNICAL MEMORANDUM #8

RE: Coordinated Noticing, Communication, and Outreach Activities in the Delta-Mendota Subbasin

PREPARED BY: Stantec

DATE: July 25, 2019

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1. Introduction

The Sustainable Groundwater Management Act of 2014 (SGMA) and subsequent Emergency Regulations developed by the California Department of Water Resources (DWR) in May 2016 identified a number of requirements for public notice and communication related to Groundwater Sustainability Agency (GSA) formation and Groundwater Sustainability Plan (GSP) development. California Code of Regulations §354.10 identifies the requirements for notice and communication information in a GSP:

> "Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:
>
> (a) A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties.
>
> (b) A list of public meetings at which the Plan was discussed or considered by the Agency.
>
> (c) Comments regarding the Plan received by the Agency and a summary of any responses by the Agency.
>
> (d) A communication section of the Plan that includes the following:
>
> (1) An explanation of the Agency's decision-making process.
>
> (2) Identification of opportunities for public engagement and a discussion of how public input and response will be used.
>
> (3) A description of how the Agency encourages the active involvement of diverse social, cultural and economic elements of the population within the basin.
>
> (4) The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions."

Pursuant to these requirements, GSAs in the Delta-Mendota Subbasin (Subbasin) conducted a number of activities to engage beneficial users of groundwater, interested parties, and the general public in the development of the six Subbasin GSPs. Each GSA was responsible for conducting outreach and engagement related to SGMA within its service area; however, recognizing efficiencies in pooling resources and the importance of consistent messaging, the GSAs also conducted a series of coordinated activities aimed at engaging stakeholders across the Subbasin. This document describes the coordinated tools, methods, and activities the GSAs used to inform and engage stakeholders in development of the Subbasin GSPs.

2. Situation Assessment and Communications Plan

To assist in GSA formation and GSP development, agencies in the Subbasin sought and received Facilitation Support Services funding from DWR in August 2016. Under this funding, a neutral, third-party facilitation team conducted a situation assessment on behalf of the Subbasin GSAs. The purpose of the assessment was to

understand how stakeholders perceived the status of the Subbasin's groundwater resources and identify potential barriers to the successful development of the GSPs.

The facilitation team, with input from local agencies, identified 30 stakeholders representing diverse interests and beneficial users in the Subbasin, together with disadvantaged communities, agricultural well owners, government and land use agencies, and environmental and ecosystem interests. From February 2017 to May 2017, the facilitators conducted over 30 phone and in-person interviews with stakeholders. The facilitators recorded the interview responses and summarized the results in a presentation made to the GSA representatives.

The assessment results were used to inform the development of the Delta-Mendota Subbasin Sustainable Groundwater Management Act Communications Plan (Communications Plan), which is provided with this document as **Attachment A**. The Communications Plan identifies near- and long-term outreach and engagement strategies, tactics, and tools for stakeholder engagement in GSP development and implementation. The Subbasin GSAs used the Communications Plan as a framework for conducting the stakeholder outreach and engagement activities described in this document.

3. Public Noticing and Information

Legal Requirements:

> **§354.10 (d):** A communication section of the Plan that includes the following:
> (3) A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of population within the basin.

The Subbasin GSAs developed and used several tools to inform members of the public about GSP development activities and promote opportunities for public engagement. These tools are described below.

- Website: The Subbasin website – www.deltamendota.org – is the primary location for information related to SGMA implementation in the Subbasin. Information provided on the website includes: an overview of SGMA, a description of each of the GSP groups, contact information for each of the GSAs, and upcoming workshops and public meetings. The website also serves as a repository for outreach collateral, workshop materials, and meeting packets and minutes for the Delta-Mendota Subbasin Coordination Committee, Technical Working Group, and Communications Working Group (described below).

- Delta-Mendota Subbasin Newsletter: The Delta-Mendota Subbasin Newsletter is distributed on a monthly basis and serves as an informational tool to keep interested parties, beneficial users, and members of the general public informed about the development and status of the GSPs. Newsletter topics include Subbasin-wide activities, general announcements, upcoming meetings and workshops, and past and upcoming GSP development activities. Copies of the newsletters are archived on the Subbasin website.

- Informational Materials: GSAs in the Subbasin developed a suite of materials in English and Spanish to educate and inform members of the public about SGMA and topics covered in the GSP. These materials include bilingual presentations, fact sheets, handouts, frequently asked questions, and videos. Copies of the materials are available on the Subbasin website. GSA representatives distributed these materials during meetings, workshops, and other outreach activities.

4. Public Engagement in GSP Development

Legal Requirements:

> **§354.10(b): A list of public meetings at which the Plan was discussed or considered by the Agency;**
>
> **§354.10 (d): A communication section of the Plan that includes the following:**
> **(2) Identification of opportunities for public engagement and a discussion of how public input and response will be used.**
> **(3) A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of population within the basin.**

This section describes outreach activities coordinated among the Subbasin GSAs to inform, engage, and consult stakeholders in GSP development. Coordinated outreach activities fell into two main categories: general public outreach and targeted outreach. General public outreach activities primarily consisted of committee and working group meetings, and coordinated workshops aimed at informing and receiving public input on the content of the GSPs. The GSAs also conducted outreach activities targeted at hard-to-reach communities and beneficial users, including agricultural interests, school districts, and disadvantaged communities.

General Public Engagement Activities

There were two primary opportunities for members of the public to engage in development of the Subbasin GSPs: Coordination Committee and working group meetings and coordinated public workshops. These activities are further described below. In addition, the GSAs also informed and engaged members of the public by posting information on the Subbasin and member-agency websites, distributing the monthly newsletter, disseminating bilingual informational materials, and tabling at public events.

Committee Meetings

Comprised of members representing the entities preparing the Subbasin GSPs, the Coordination Committee was formed to provide overall guidance and resolve conflicts among the GSAs to ensure that the GSPs were coordinated as required by SGMA. The Technical Working Group and Communications Working Group were formed under the Coordination Committee to specifically coordinate technical and communication activities, respectively. Public meetings of the Coordination Committee and working groups served as key opportunities for stakeholders to engage and consult in development of the GSPs. Public comments were recorded in the meeting minutes, posted on the Subbasin website, and considered during development of the GSPs.

Coordinated Public Workshops

The Subbasin GSAs planned and held a series of public workshops from May 2018 – May 2019 aimed at educating and soliciting input from the public about topics covered in the GSPs. Table 1 identifies the workshop dates, locations, and topics. At these workshops, GSA representatives and their technical consultants presented information on each GSP development phase. Presentations were followed by an open house period to allow participants to talk directly with their GSA representatives. Bilingual interpreters were present at all workshops to provide interpretation services. All workshop materials, in both English and Spanish, are available on the Subbasin website.

Questions, comments, and input from workshop participants were recorded by facilitation staff and summarized the workshop summaries, provided with this document as **Attachment B**. All public comments were taken in consideration by GSAs and technical consultants during development of the GSPs.

The GSAs used a variety of methods to promote the workshops. These methods included distribution of bilingual flyers and utility bill inserts, email notifications, social media posts, website posts, newspaper notices, and press releases. **Attachment C** includes example workshop promotion activities. GSA representatives also directly contacted local organizations throughout the Subbasin. A list of organizations contacted is provided with this document as **Attachment D**.

Table 1. Coordinated Public Workshops

Date	Location, Venue	Topic
Spring 2018 Workshop		
May 14, 2018	Los Baños, San Luis & Delta-Mendota Water Authority	• Sustainable Groundwater Management Act overview • Delta-Mendota Subbasin overview • Opportunities for engagement
May 16, 2018	Patterson, Hammon Senior Center	
May 17, 2018	Mendota, Mendota Library	
Fall 2018 Workshops		
October 22, 2018	Firebaugh, Firebaugh Middle School	• GSP development and implementation process • Data collection • Hydrogeologic Conceptual Model • Numerical & Analytical Models • Water budgets
October 24, 2018	Los Baños, College Greens Building	
October 25, 2018	Patterson, Patterson Senior Center	
Winter 2019 Workshops		
February 19, 2019	Los Baños, College Greens Building	• Historic and current water budgets • Sustainability criteria • Undesirable results • Projects and management actions
February 20, 2019	Patterson, Patterson City Hall	
March 4, 2019	Santa Nella, Romero Elementary School	
Spring 2019 Workshops		
May 20, 2019	Patterson, Patterson City Hall	• Projected water budgets • Sustainable yield • Groundwater monitoring networks • Projects and management actions
May 21, 2019	Los Baños, College Greens Building	
May 22, 2019	Santa Nella, Romero Elementary School	
May 23, 2019	Mendota, Mendota Library	

Targeted Stakeholder Engagement

The Subbasin GSAs also conducted targeted outreach and engagement to hard-to-reach communities, interested parties, and stakeholders that were previously underrepresented in other engagement activities. This included outreach to the following stakeholder types:

- *Agricultural Interests:* Agricultural stakeholders in the Subbasin include agricultural well operators, growers, ranchers, farmworkers, and agricultural landowners. Strong agricultural representation exists within the leadership of the GSAs. To augment direct outreach being conducted by individuals GSAs, Subbasin representatives also coordinated closely with local county farm bureaus to disseminate information related to GSP development and public workshops.

- *School Districts:* Schools districts are considered for both beneficial users of groundwater (for drinking water), as well communication channels to disseminate information about SGMA and GSP development. GSA representatives directly contacted local school districts to notify them of the public workshops. Some schools also help distributed informational materials and workshop flyers to their students and parents.

- *Disadvantaged Communities:* The GSAs followed best practices identified in Collaborating for Success: Stakeholder Engagement for Sustainable Groundwater Management Act Implementation (Community Water Center, 2015) and other guidance documents to engage disadvantaged and severely disadvantaged communities. This included holding meetings in disadvantaged communities; holding meetings in the evening at known local venues, such as schools, civic centers, and community centers; translating fact sheets, meeting materials, and presentations into other languages; and providing interpreting services at all public workshops.

5. GSP Implementation

Legal Requirements:

> **§ 354.10(b)(4): The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions.**

Each GSA will utilize its own methods to inform the public about progress implementing its GSP and the status of any projects and management actions. The Subbasin website will continue to be the main source of information for Subbasin- wide announcements, public meetings, workshops, and informational materials. In addition, the GSAs will continue to coordinate public outreach and stakeholder engagement activities related to GSP implementation as-needed.

Attachments: Attachment A - Delta-Mendota Subbasin Sustainable Groundwater Management Act Communications Plan Attachment B – Coordinated Public Workshop Summaries
Attachment C – Example Public Workshop Promotion Materials
Attachment D – Stakeholder and Community Organizations Contacted Regarding Coordinated SGMA Workshops

ATTACHMENT A. DELTA-MENDOTA SUBBASIN SUSTAINABLE GROUNDWATER MANAGEMENT ACT COMMUNICATIONS PLAN

Delta Mendota Subbasin Groundwater Management

Sustainable Groundwater Management Act Communications Plan

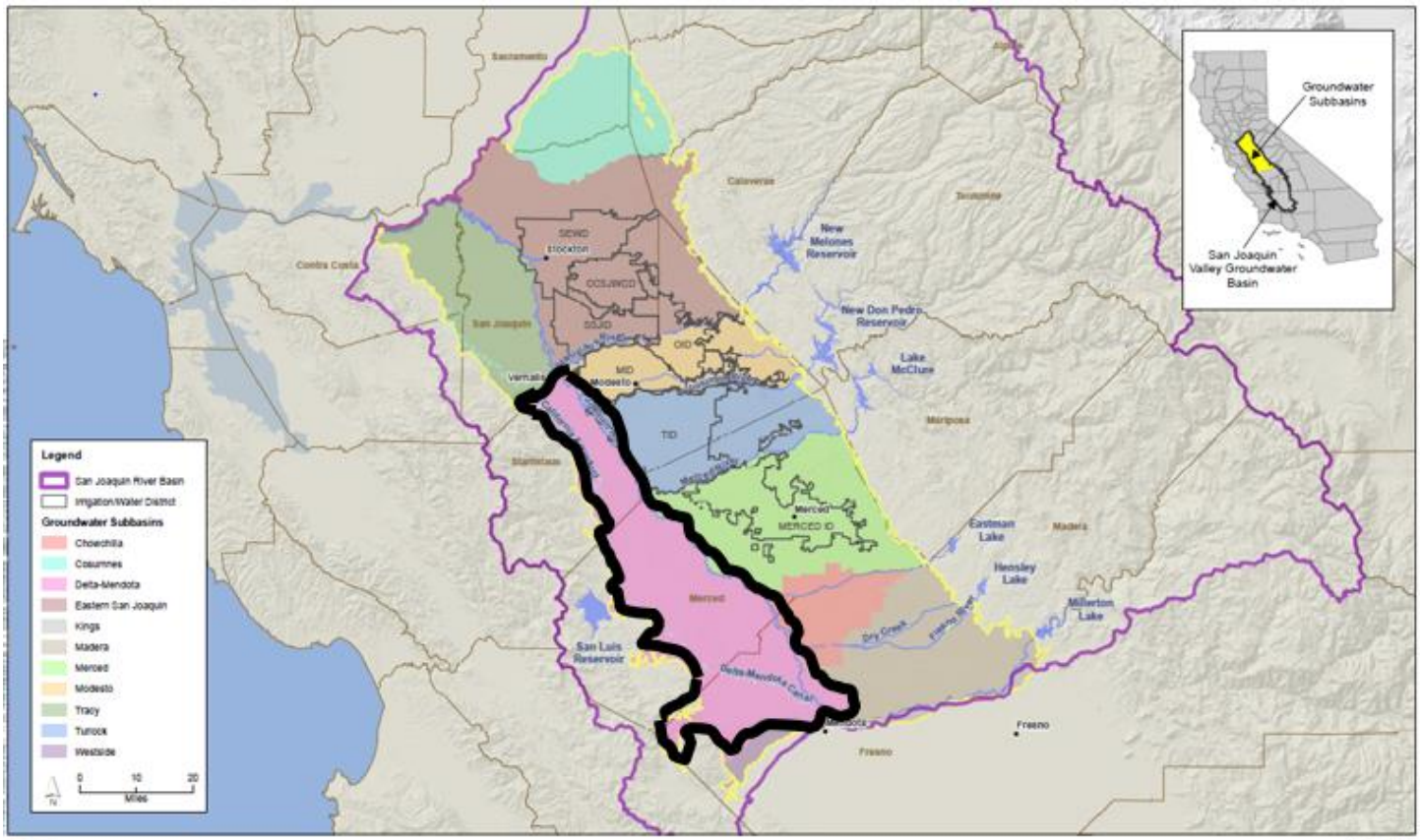

Figure 9-1
Vicinity Map of Groundwater Subbasins

Prepared by:
Lisa Beutler, MWH/Stantec,
Via CA Dept. of Water Resources,
Facilitation Services Technical Assistance

June 2017

Forward: How to use this Plan

This Communication Plan provides a high-level overview of near and long-term outreach and engagement strategies, tactics and tools. Its purpose is to assist the Groundwater Sustainability Agencies (GSAs) of the Delta Mendota Subbasin with stakeholder outreach and other related actions as required by the Sustainable Groundwater Management Act (SGMA) of 2014. It is presented as a working public draft, and should be considered a living document that is continuously refined and updated as circumstances suggest.

Chapter 1*: Introduction and Background* provides text and information about SGMA and the Delta Mendota Subbasin that can be repurposed directly into websites or printed materials by agencies and/or entities with an interest in SGMA and how it will affect the subbasin. This section also describes the communications activities mandated by SGMA.

Chapter 2: *Communications Plan Overview* provides communications planning goals and objectives as well as the scope. This section can be used in support of project management activities.

Chapter 3: *Situation Assessment* provides some of the context for communications activities. This section can be used in developing required assessments of stakeholder issues and interests. It also informs project management activities.

Chapter 4: *Audiences and Messages* identifies key subbasin audiences and message points for specific audience segments. The goal of this chapter is to provide information that can be used by the subbasin GSAs in preparing to work with key stakeholders.

Chapter 5: *Risk Management* is the summary of a communications risk assessment that considers subbasin communications strengths and weakness and proposes on-going adjustments based on best communication management practices. This section informs project management activities and provides a context for some of the recommended communications tactics.

Chapter 6: *Tactical Approaches* offers a communications to do list with specific communications activities relevant for project phases and subbasin audiences.

Chapter 7: *Measurements and Evaluation* outlines methods to determine the effectiveness of outreach and engagement.

Chapter 8: *Roles and Responsibilities* provides a sample list of tasks and illustrates the types of communications roles and responsibilities which might be assigned. This section should be incorporated into project management plans.

Subbasin GSAs should feel free to repurpose any or all parts of the document that will assist them in meeting SGMA requirements.

This document was developed with technical support provided by the California Department of Water Resources' (DWR) SGMA Facilitation Support Services Program and completed by the Communication and Engagement Group of MWH/Stantec.

Delta Mendota Subbasin
Sustainable Groundwater Management Act
Communications Plan
Working Draft

Contents

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List of Acronyms and Abbreviations

Item	Description
Basin	Groundwater Basin or Subbasin
Coms Plan	Delta Mendota Subbasin, Sustainable Groundwater Management Act, Working Draft Communications Plan
CSD	Community Service District(s):
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
DAC	Disadvantaged Communities
DMC	Delta-Mendota Canal
DWR	California Department of Water Resources
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
IRWMP	Integrated Resource Water Management Plan
PDF	Portable Document Format
RCD	Resource Conservation District(s)
SGMA	Sustainable Groundwater Management Act
SLDMWA	San Luis Delta- Mendota Water Authority
State Board	State Water Resources Control Board

Item	Description
SA	Situation Assessment
USGS	United States Geological Survey

Revision History

Table 1. Revision History

Revision History			
Revision/Dock Title #	Date of Release	Author	Summary of Changes

INTRODUCTION AND BACKGROUND

The purpose of this Communication Plan is to assist the Groundwater Sustainability Agencies (GSAs) of the Delta Mendota Subbasin with stakeholder outreach and other related actions as required by the Sustainable Groundwater Management Act (SGMA) of 2014. Its chapters identify key stakeholders and provide a high-level overview of near and long-term outreach and engagement strategies, tactics and tools. The plan was developed with technical support provided by the California Department of Water Resources' (DWR) SGMA Facilitation Support Services Program.

1.1. SGMA Basics[1]

After decades of debate, in 2014 California lawmakers adopted SGMA. This far-reaching law seeks to bring the State's critically important groundwater basins into a sustainable regime of pumping and recharge. The change in water management laws has created new obligations for residents and water managers in the Delta-Mendota Groundwater Subbasin. The San Luis Delta- Mendota Water Authority (SLDMWA) is assisting its members in implementation of this law.

SGMA requires, **by June 30, 2017**, the formation of locally-controlled GSAs in many of the State's groundwater basins and subbasins (basins). A GSA is responsible for developing and implementing a **groundwater sustainability plan** (GSP). These plans assist the basins in meeting sustainability goals. The primary goal is to maintain sustainable yields without causing undesirable results.

1.1.1. GSAs & GSPs

Any local public agency that has water supply, water management, or land use responsibilities in a basin can decide to become a GSA. A single local agency can decide to become a GSA, or a combination of local agencies can decide to form a GSA by using either a Joint Power Authority (JPA), a memorandum of agreement (MOA), or other legal agreement. If no agency assumes this role the GSA responsibility defaults to the County; however, the County may decline.

A GSP may be any of the following *(Water Code § 10727(b)):*

- A single plan covering the entire basin developed and implemented by one GSA.
- A single plan covering the entire basin developed and implemented by multiple GSAs.

[1] Sections on SGMA are largely drawn, in whole or in part, from publicly available materials from the Department of Water Resources. For more see: http://www.water.ca.gov/groundwater/sgm

- Subject to Water Code Section 10727.6, multiple plans implemented by multiple GSAs and coordinated pursuant to a single coordination agreement that covers the entire basin.

If local agencies are unable to form an approved GSA and/or prepare an approved GSP in the required timeframe, then the basin or subbasin would be considered unmanaged. Unmanaged groundwater basins and subbasins are subject to State Water Resources Control Board (State Board) oversight. This is true even if the vast majority of the subbasin is covered by a plan. Should intervention occur, the State Board is authorized to recover its costs from the GSAs.

1.2. SGMA Communications and Engagement Requirements

SGMA includes specific requirements for communications and engagement by each planning phase. **Figure 1** (next page) illustrates the requirements and provides water code references. The GSP submittal guidelines also describe the outreach and engagement documentation to be submitted with the plan. **Table 2** describes the submittal requirements. A full list of codes and requirements is also provided in **Appendix 1**.

Table 2. GSP Submittal Requirements[2]

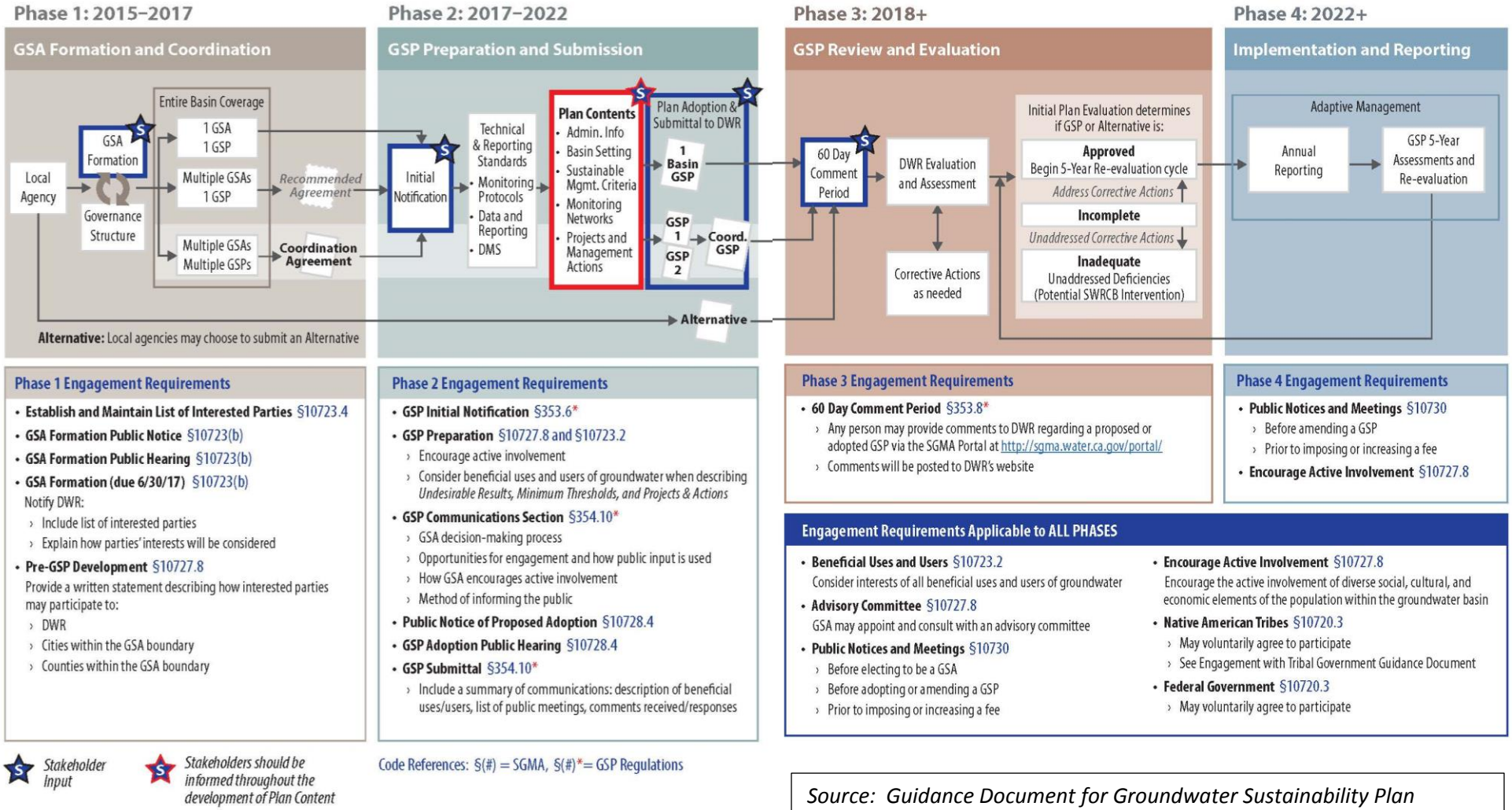
GSP Regulations Section	Requirement	Description
Article 5. Plan Contents, Sub-article 1. Administrative Information		
354.10	Notice and Communication	• Description of beneficial uses and users • List of public meetings with dates • GSP comments and responses • Decision-making process • Public engagement process • Method(s) to encouraging active involvement • Steps to inform the public on GSP implementation progress

1.3. Planning Approach

While the SLDMWA is assisting with the coordination of GSP(s) development, this Communications Plan (Coms Plan) is offered for the voluntary use of all of the GSAs of the Delta-Mendota Subbasin. A full Coms Plan schedule should be developed in conjunction with the overall GSP(s) development schedule. One additional option is for the Coordination Committee of GSAs to provide overall communications guidance. This could potentially be included in a section of the Coordination Agreement.

[2] Guidance Document for the Sustainable Management of Groundwater, Preparation Checklist for GSP Submittal, Department of Water Resources, December 2016

Figure 1. Stakeholder Engagement Requirements



Source: Guidance Document for Groundwater Sustainability Plan Stakeholder Communication and Engagement Department of Water Resources, June 2017

An important additional step will be establishing, in conjunction with the multiple GSAs, the roles and responsibilities for implementing the Coms Plan.

1.4. SGMA and the Delta Mendota Subbasin[3]

The Delta-Mendota Subbasin of the San Joaquin Valley Groundwater Basin is a long, relatively narrow groundwater basin that covers portions of five counties, from north to south, San Joaquin, Stanislaus, Merced, Madera and Fresno Counties (see **Figure 2**). The Delta-Mendota sub-basin is bounded on the west by the Tertiary and older marine sediments of the Coast Ranges. The northern boundary (from west to east) begins on the west by following the Stanislaus/San Joaquin County line, then deviates to the north to encapsulate all of the Del Puerto Water District before returning back to the Stanislaus/San Joaquin County line. The boundary continues east then deviates north again to encapsulate all of the West Stanislaus Irrigation District before returning back to the Stanislaus/San Joaquin County line. The boundary continues to follow the Stanislaus/San Joaquin County line east until it intersects with the San Joaquin River.

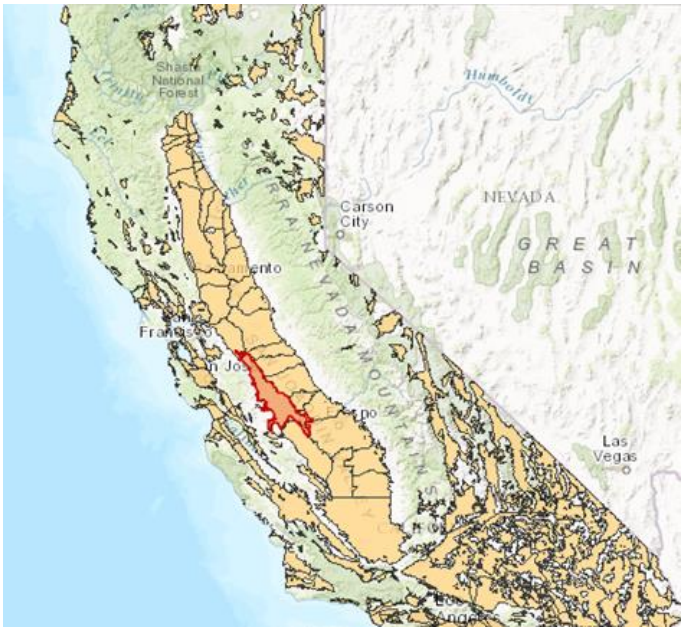


Figure 2. Delta Mendota Subbasin

The eastern boundary (from north to south) follows the San Joaquin River to within Township 11S, where it jogs eastward along the northern boundary of Columbia Canal Company and then follows the eastern boundary of Columbia Canal company until intersecting the northern boundary of the Aliso Water District. The boundary then heads east following the northern and then eastern boundary of the Aliso Water District until intersecting the Madera/Fresno County line. The boundary then heads westerly following the Madera/Fresno County line to the eastern boundary of the Farmers Water District. The boundary then heads southerly along the eastern boundary of the Farmers Water District, and continues southerly along the section line to the intersection with the northern right-of-way of the railroad. The boundary then heads east along the northern right-of-way of the railroad until intersecting with the western boundary of the Mid-Valley Water District. The boundary then heads south along the western boundary of the Mid-Valley Water District to the intersection with the northern boundary of Reclamation District 1606. The boundary then heads west and then south following the boundary of Reclamation District 1606 and James Irrigation District until its intersection with the Westlands Water District boundary.

The southern boundary (from east to west) matches the northerly boundaries of Westlands Water District legal jurisdictional boundary last revised in 2006. The boundary then

[3] Information related to the Delta Mendota subbasin is drawn directly from http://sgma.water.ca.gov/basinmod/basinrequest/preview/23.