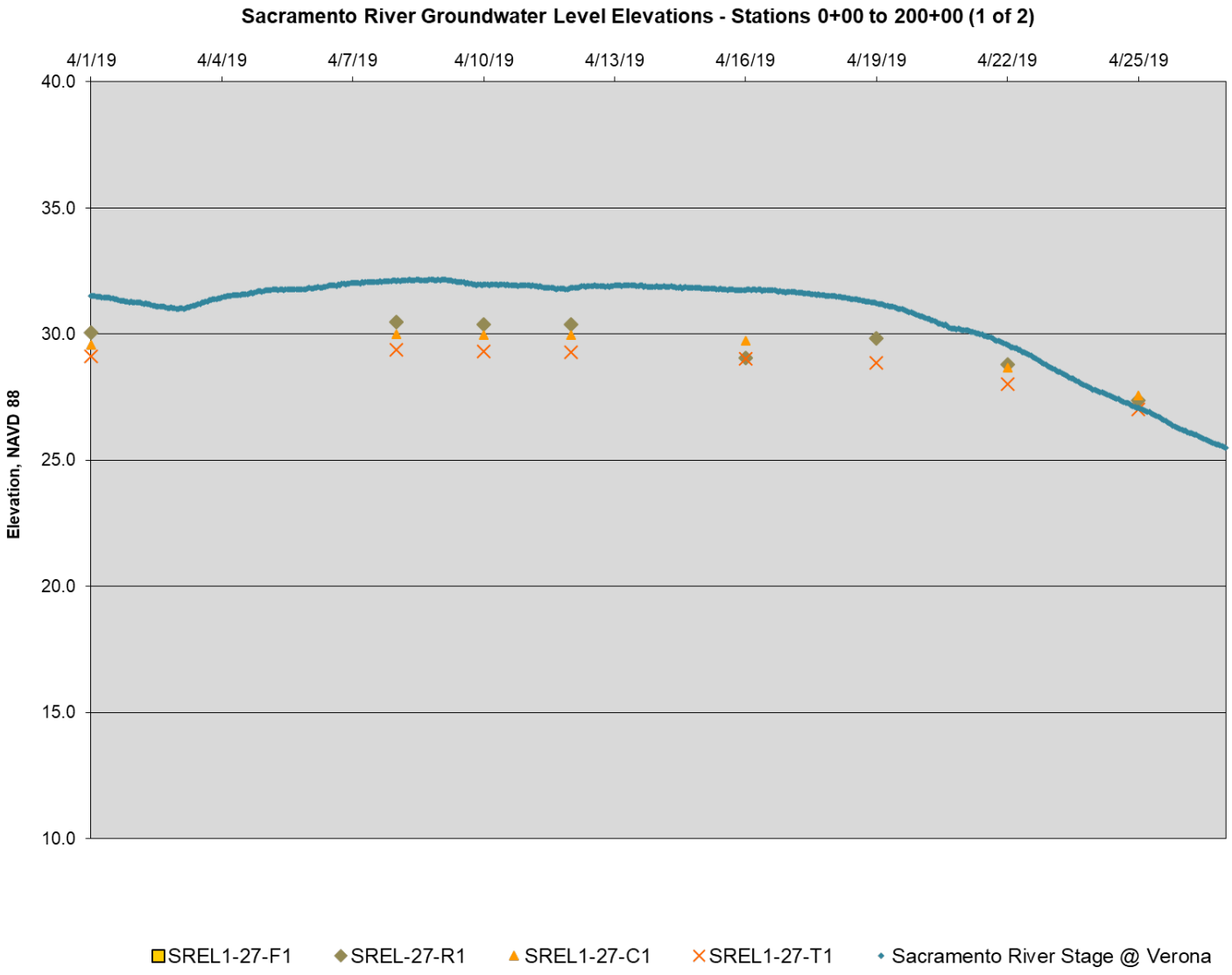
Note: Piezometers match locations on FIGURE 2-6



Levee Segment	Approximate Station	Location(s)	Elevation	Piezometer Name	Comments
SREL	27+00	Field	27.4	SREL-1-27-F1	Cutoff Wall
		Riverside	44.9	SREL-1-27-R1	
		Waterside of	48.2	SREL-1-27-C1	
		Landside of COW	48.7	SREL-1-27-C2	
		Landside Toe	32.2	SREL-1-27-T1	

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FILE NAME:	GW_Plots.pub

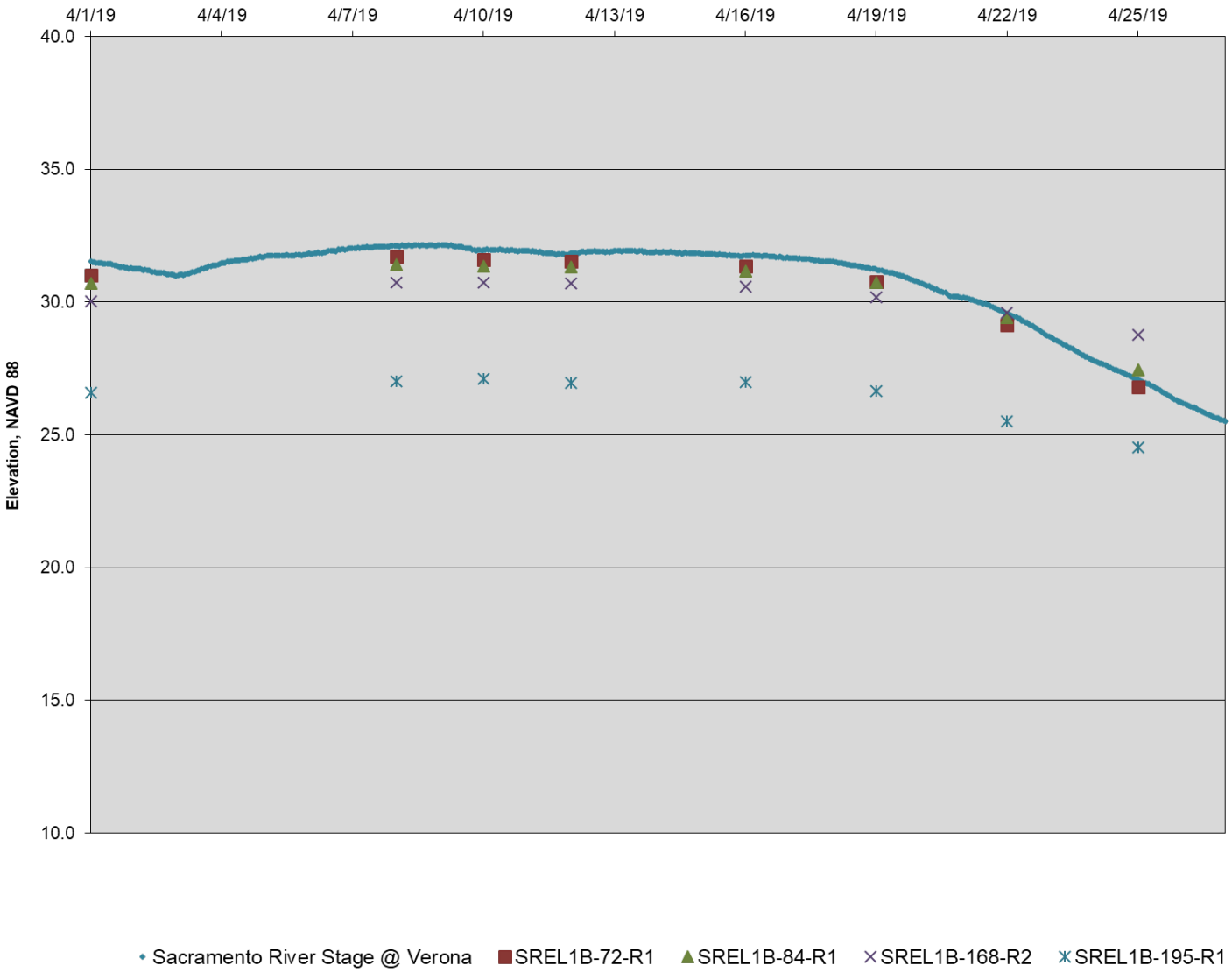
GROUNDWATER DATA
SACRAMENTO RIVER EAST LEVEE
STATIONS 0+00 TO 200+00 (1 of 2)
APRIL 2019

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL AND
SACRAMENTO AND AMERICAN RIVERS
SACRAMENTO AND SUTTER COUNTIES, CALIFORNIA

FIGURE
3-34

Note: Piezometers match locations on FIGURE 2-6

Sacramento River Groundwater Level Elevations - Stations 0+00 to 200+00 (2 of 2)



Levee Segment	Approximate Station	Location(s)	Elevation	Piezometer Name	Comments
SREL	72+00	Riverside	44.6	SREL1B-72-R1	Cutoff Wall
SREL	84+00		44.2	SREL1B-84-R1	
SREL	168+00		44.3	SREL1B-168-R2	
SREL	195+00		43	SREL1B-195-R1	

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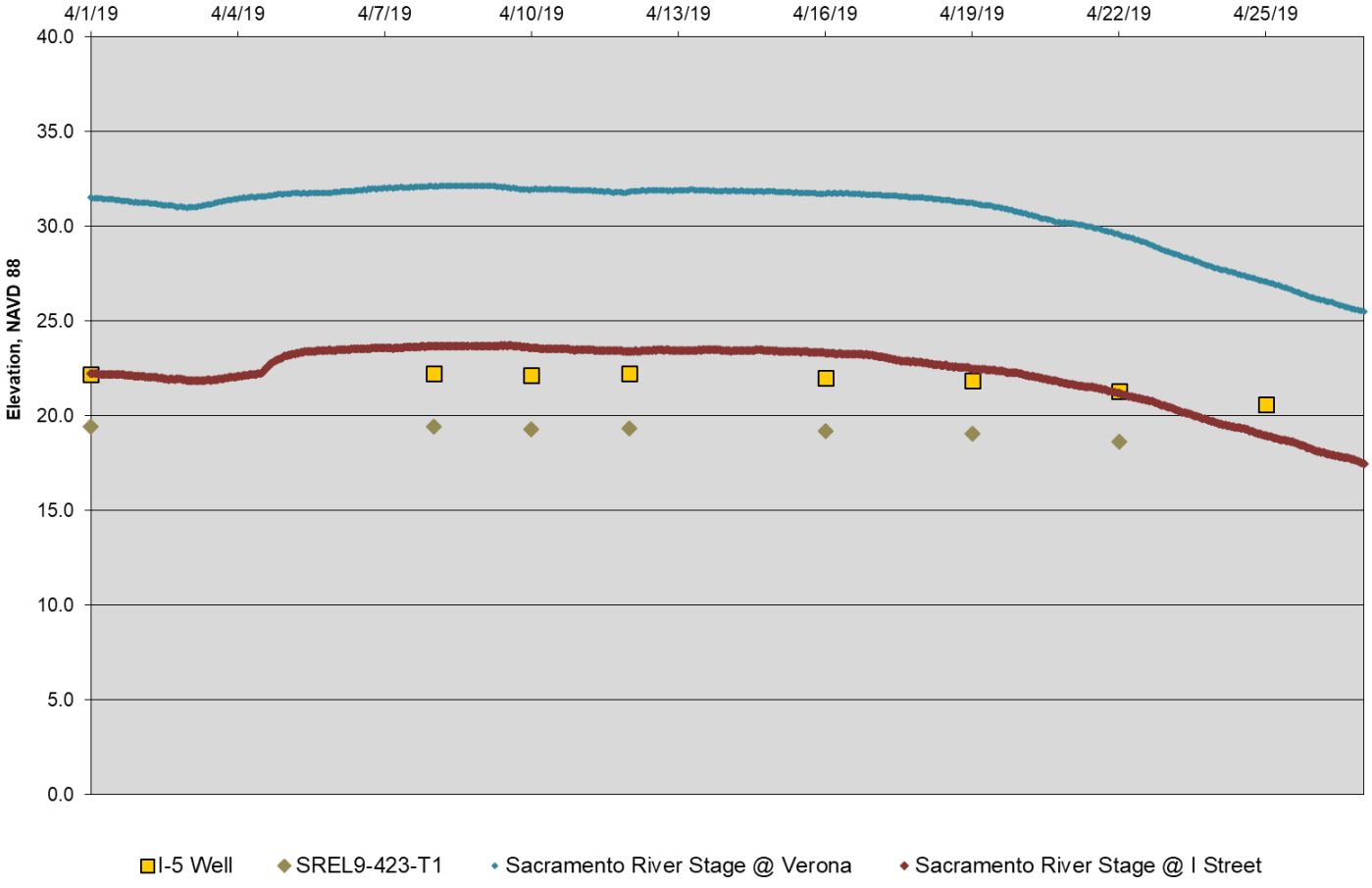
GROUNDWATER DATA
SACRAMENTO RIVER EAST LEVEE
STATIONS 0+00 TO 200+00 (2 of 2)
APRIL 2019

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL AND
SACRAMENTO AND AMERICAN RIVERS
SACRAMENTO AND SUTTER COUNTIES, CALIFORNIA

FIGURE
3-35

Note: Piezometers match locations on FIGURE 2-7

Sacramento River Groundwater Elevation Stations - 330+00 to 450+00



Levee Segment	Approximate Station	Location(s)	Elevation	Piezometer Name	Comments
SREL	336+00	Landside Toe	34.4	SREL7-336-T1	Cutoff Wall
SREL	423+00	Landside Toe	30.1	SREL9-423-T1	
SREL	449+00	Landside Toe	26.45	I-5 Well	Window

Note:
SREL 7-336-T1 damaged.

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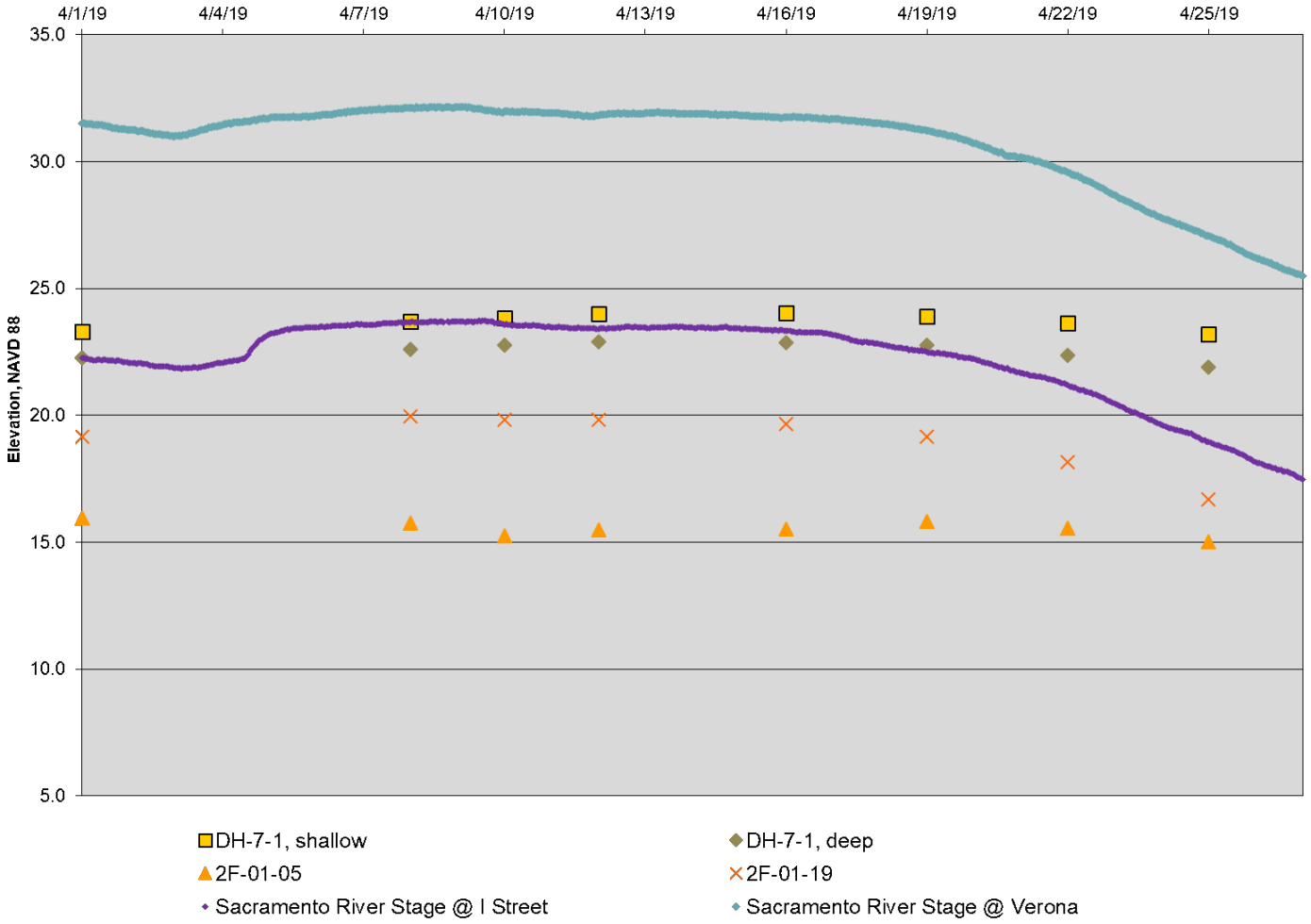
GROUNDWATER DATA
SACRAMENTO RIVER EAST LEVEE
STATIONS 330+00 TO 450+00
APRIL 2019

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL AND
SACRAMENTO AND AMERICAN RIVERS
SACRAMENTO AND SUTTER COUNTIES, CALIFORNIA

FIGURE
3-36

Note: Piezometers match locations on FIGURE 2-8

Sacramento River Groundwater Elevations - Stations 670+00 to 830+00 (1 of 2)



Levee Segment	Approximate Station	Location(s)	Elevation	Piezometer Name	Comments
SREL	678+00	Landside Toe	24.1	2F-01-05	No Improvement
	715+00	Crown	41.4	DH-7-1 (shallow), DH-7-1 (deep)	
	758+00	Landside Toe	27.5	2F-01-15	
	810+00	Field	23.0	2F-01-19	

Note:
DH-7-1 Shallow was encountered to be dry.
2F-01-15 could not be located.

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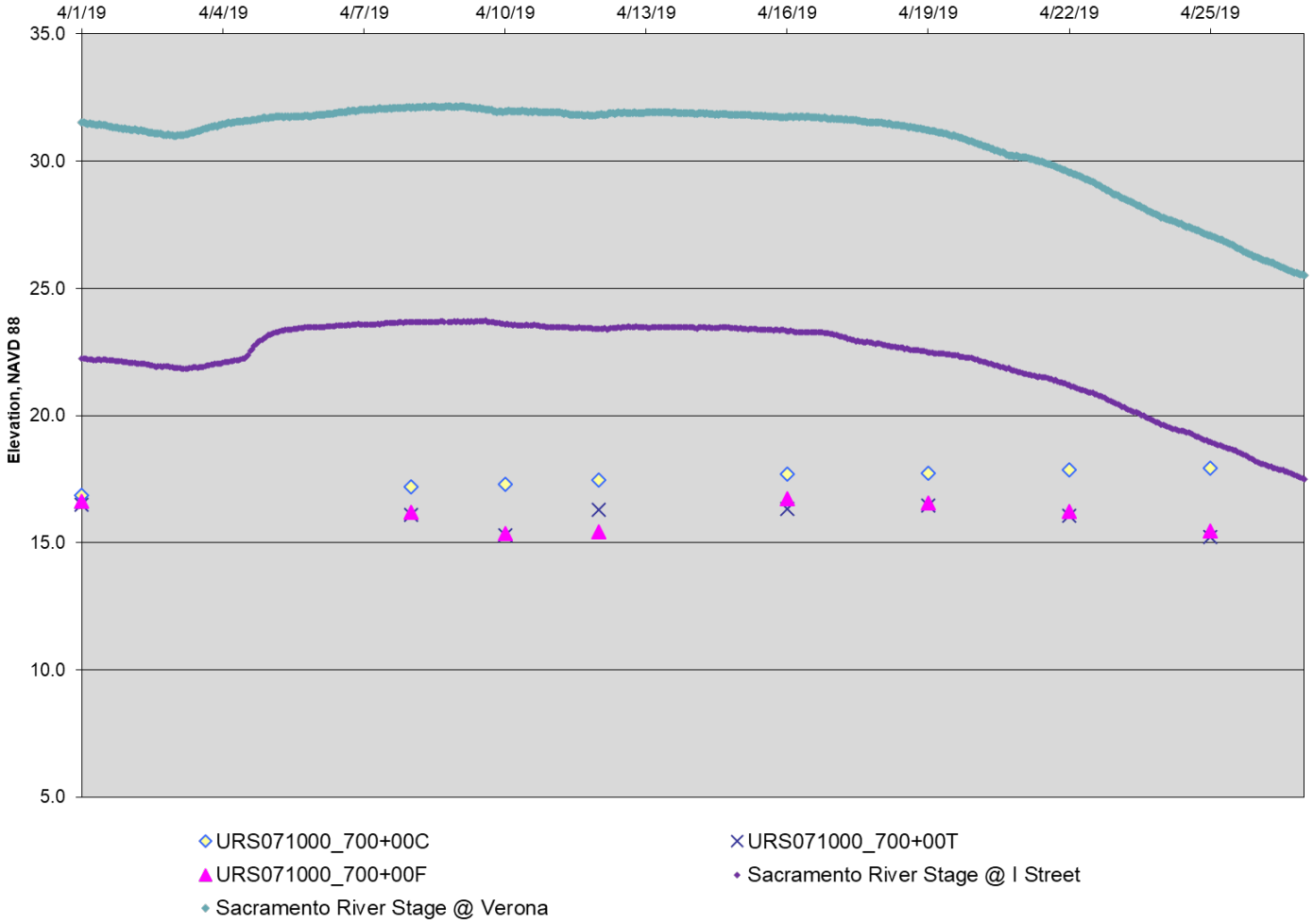
GROUNDWATER DATA
SACRAMENTO RIVER EAST LEVEE
STATIONS 670+00 TO 830+00 (1 of 2)
APRIL 2019

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL AND
SACRAMENTO AND AMERICAN RIVERS
SACRAMENTO AND SUTTER COUNTIES, CALIFORNIA

FIGURE
3-37

Note: Piezometers match locations on FIGURE 2-8

Sacramento River Groundwater Elevations - Stations 670+00 to 830+00 (2 of 2)



Levee Segment	Approximate Station	Location(s)	Elevation	Piezometer Name	Comments
SREL	700+00	Crown	41.7	URS71000_700+00C	No Improvement
		Landside Toe	26.5	URS71000_700+00T	
		Field	24.2	URS71000_700+00F	

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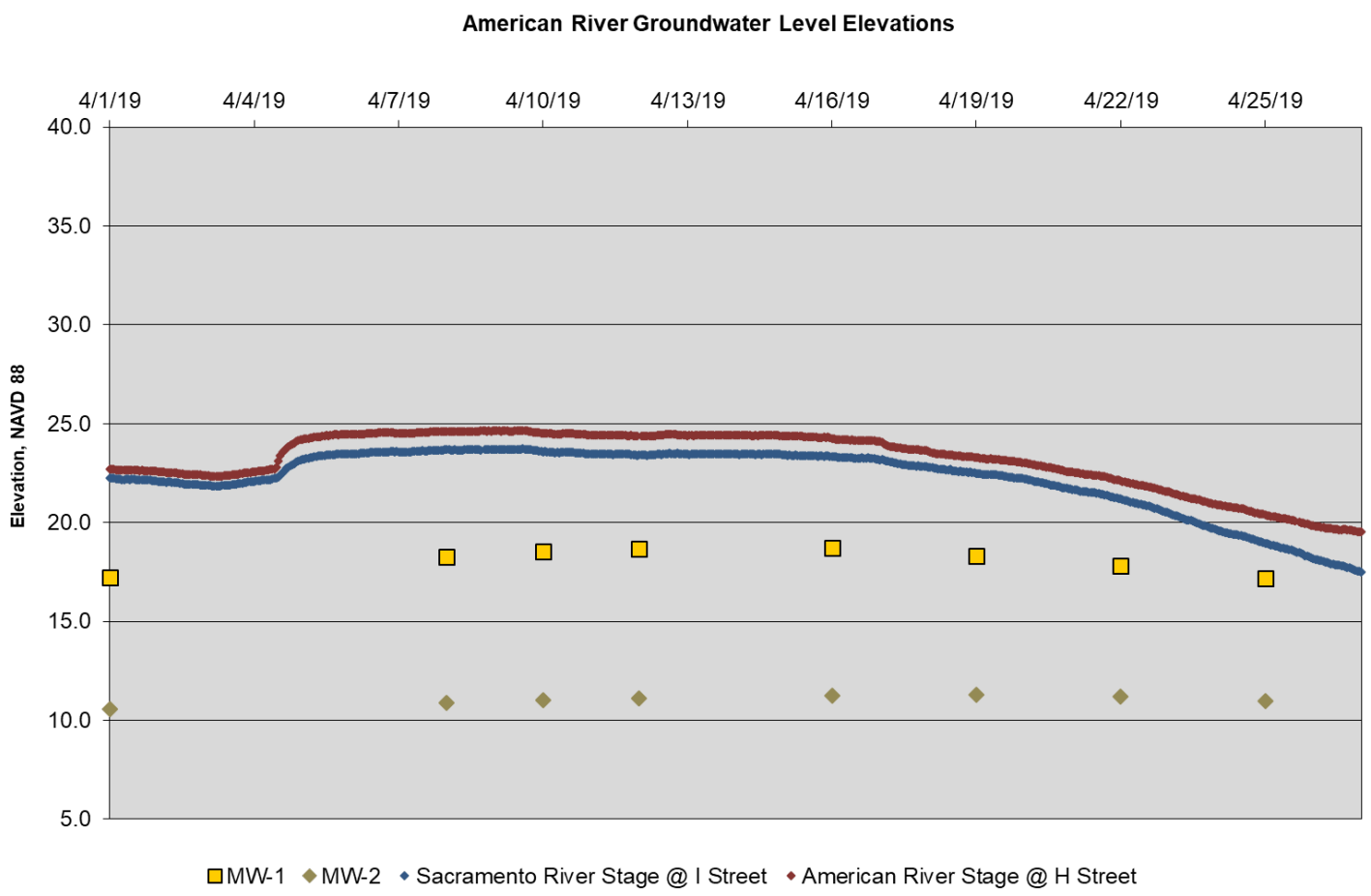
GROUNDWATER DATA
SACRAMENTO RIVER EAST LEVEE
STATIONS 670+00 TO 830+00 (2 of 2)
APRIL 2019

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL AND
SACRAMENTO AND AMERICAN RIVERS
SACRAMENTO AND SUTTER COUNTIES, CALIFORNIA

FIGURE
3-38

Note: Piezometers match locations on FIGURE 2-9



Levee Segment	Approximate Station	Location(s)	Elevation	Piezometer Name	Comments
ARNL	3339+50	Landside of COW	52.0	MW-1	Cutoff Wall
		Landside Toe	38.6	MW-2	

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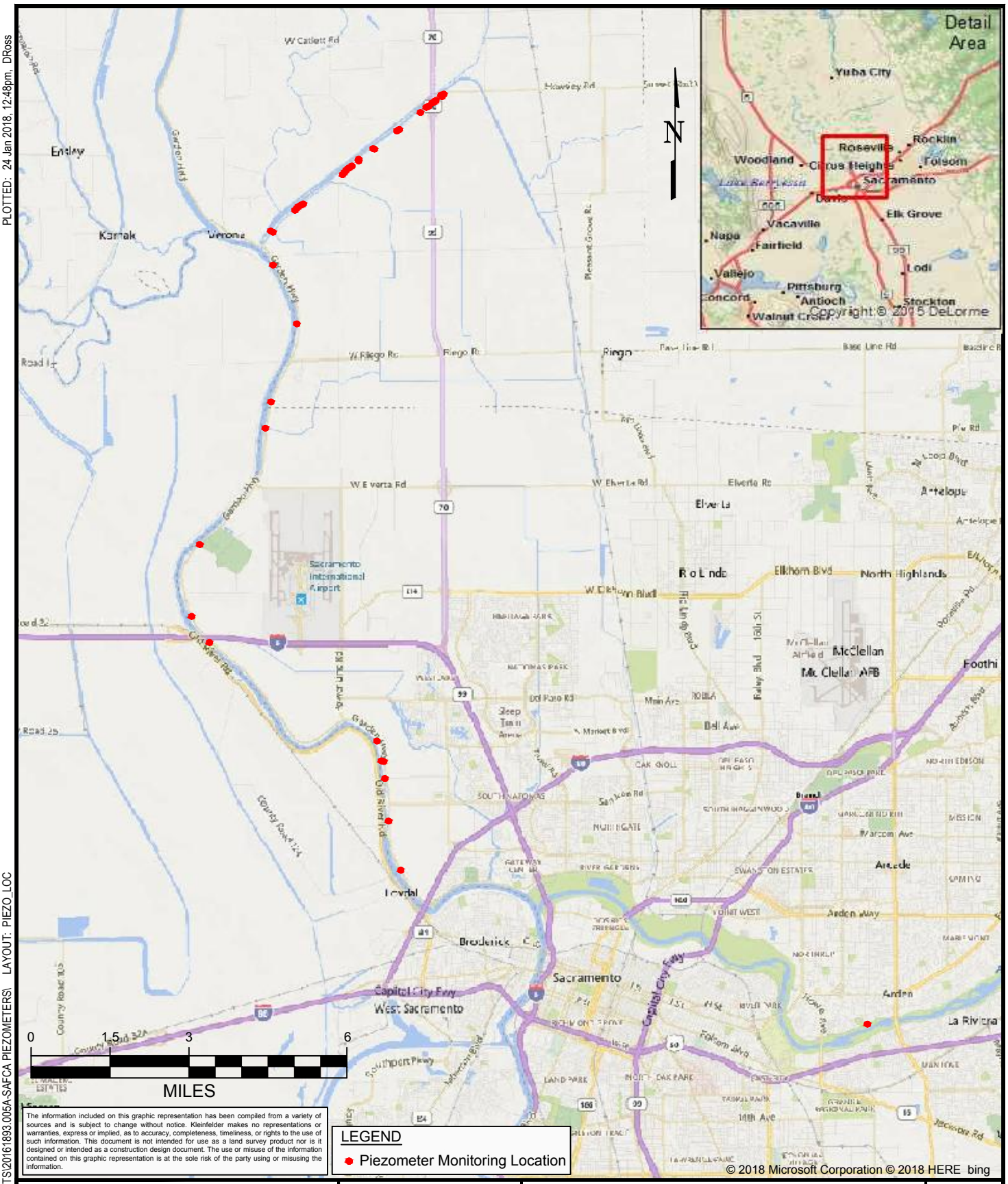
GROUNDWATER DATA
AMERICAN RIVER NORTH LEVEE
STATION 3330+00 to 3350+00
APRIL 2019

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL AND
SACRAMENTO AND AMERICAN RIVERS
SACRAMENTO AND SUTTER COUNTIES, CALIFORNIA

FIGURE
3-39



PLOTTED: 24 Jan 2018, 12:48pm, DRoss

CAD FILE: K:\2018_PROJECTS\20161893.005A-SAFCA PIEZOMETERS\ LAYOUT: PIEZO_LOC

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DRAWN:	01/23/2018
DRAWN BY:	D. Ross
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FILE NAME:	20161893_1.dwg

SITE LOCATION MAP

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL,
SACRAMENTO RIVER AND AMERICAN RIVER
SACRAMENTO AND SUTTER COUNTIES, CALIFORNIA

FIGURE
1-1

File Path: Sacramento/U/GIS/SAFCA/Piezo and Inclin Permit Maps/ Maps

0 1 2 4 6 8 Miles

Legend

Approximate Well Location — Levee Centerline

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CHECKED BY:	B. Money
FILE NAME:	Wells2016.MXD

PIEZOMETER LOCATION MAP
STATION 0+00 TO 30+00
NATOMAS CROSS CANAL
SOUTH LEVEE

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL,
SACRAMENTO RIVER AND AMERICAN RIVER
SACRAMENTO AND SUTTER COUNTY, CALIFORNIA

FIGURE
2-1

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors

0 1.25 2.5 5 7.5 10 Miles

Legend

Approximate Well Location — Levee Centerline

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CHECKED BY:	B. Money
FILE NAME:	Wells2016.MXD

PIEZOMETER LOCATION MAP STATION 30+00 TO 80+00 NATOMAS CROSS CANAL SOUTH LEVEE

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL,
SACRAMENTO RIVER AND AMERICAN RIVER
SACRAMENTO AND SUTTER COUNTY, CALIFORNIA

FIGURE **2-2**

File Path: Sacramento/U/GIS/SAFCA/Piezo and Inclin Permit Maps/ Maps

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors

0 1 2 4 6 8 Miles

Legend

Approximate Well Location — Levee Centerline

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FILE NAME:	Wells2016.MXD

PIEZOMETER LOCATION MAP
STATION 105+00 TO 160+00
NATOMAS CROSS CANAL
SOUTH LEVEE

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL,
SACRAMENTO RIVER AND AMERICAN RIVER
SACRAMENTO AND SUTTER COUNTY, CALIFORNIA

FIGURE
2-3

File Path: Sacramento/U/GIS/SAFCA/Piezo and Inclin Permit Maps/ Maps

0 1.25 2.5 5 7.5 10 Miles

Legend

Approximate Well Location

Levee Centerline

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FILE NAME:	Wells2016.MXD

PIEZOMETER LOCATION MAP STATION 180+00 TO 230+00 NATOMAS CROSS CANAL SOUTH LEVEE

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL,
SACRAMENTO RIVER AND AMERICAN RIVER
SACRAMENTO AND SUTTER COUNTY, CALIFORNIA

FIGURE
2-4

File Path: Sacramento/U/GIS/SAFCA/Piezo and Inclin Permit Maps/ Maps

File Path: Sacramento/U/GIS/SAFCA/Piezo and Inclin Permit Maps/ Maps

0 1.25 2.5 5 7.5 10 Miles

Legend

Approximate Well Location

Levee Centerline

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FILE NAME:	Wells2016.MXD

PIEZOMETER LOCATION MAP
STATION 230+00 TO 240+00
NATOMAS CROSS CANAL
SOUTH LEVEE

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL,
SACRAMENTO RIVER AND AMERICAN RIVER
SACRAMENTO AND SUTTER COUNTY, CALIFORNIA

FIGURE
2-5

Miles
0 1.25 2.5 5 7.5 10

Legend

Approximate Well Location — Levee Centerline

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FILE NAME:	Wells2016.MXD

PIEZOMETER LOCATION MAP
STATION 0+00 TO 200+00
SACRAMENTO RIVER
EAST LEVEE

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL,
SACRAMENTO RIVER AND AMERICAN RIVER
SACRAMENTO AND SUTTER COUNTY, CALIFORNIA

FIGURE
2-6

File Path: Sacramento/U/GIS/SAFCA/Piezo and Inclin Permit Maps/ Maps

File Path: Sacramento/U/GIS/SAFCA/Piezo and Inclin Permit Maps/ Maps

0 1.5 3 6 9 12 Miles

Legend

Approximate Well Location

Levee Centerline

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FILE NAME:	Wells2016.MXD

PIEZOMETER LOCATION MAP STATION 330+00 TO 450+00 SACRAMENTO RIVER EAST LEVEE

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL,
SACRAMENTO RIVER AND AMERICAN RIVER
SACRAMENTO AND SUTTER COUNTY, CALIFORNIA

FIGURE
2-7

0 1.25 2.5 5 7.5 10 Miles

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Legend

Approximate Well Location — Levee Centerline

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CHECKED BY:	B. Money
FILE NAME:	Wells2016.MXD

PIEZOMETER LOCATION MAP
STATION 630+00 TO 830+00
SACRAMENTO RIVER
EAST LEVEE

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL,
SACRAMENTO RIVER AND AMERICAN RIVER
SACRAMENTO AND SUTTER COUNTY, CALIFORNIA

FIGURE
2-8

File Path: Sacramento/U/GIS/SAFCA/Piezo and Inclin Permit Maps/ Maps

0 0.75 1.5 3 4.5 6 Miles

Legend

Approximate Well Location — Levee Centerline

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DRAWN BY:	M. Beswick
CHECKED BY:	B. Money
FILE NAME:	Wells2016.MXD

PIEZOMETER LOCATION MAP
STATION 3330+00 TO 3350+00
AMERICAN RIVER
NORTH LEVEE

GROUNDWATER LEVEL DATA REPORT
NATOMAS CROSS CANAL,
SACRAMENTO RIVER AND AMERICAN RIVER
SACRAMENTO AND SUTTER COUNTY, CALIFORNIA

FIGURE
2-9

File Path: Sacramento/U/GIS/SAFCA/Piezo and Inclin Permit Maps/ Maps

Appendix O: GDE Analysis

NORTH AMERICAN SUBBASIN GROUNDWATER SUSTAINABILITY PLAN

APPENDIX O
Groundwater Dependent Ecosystems Analysis

December 2021

APPENDIX O –GROUNDWATER DEPENDENT ECOSYSTEMS ANALYSIS

This section provides a description of the approach used to refine potential groundwater dependent ecosystems (GDEs) in the North American Subbasin (Subbasin) based on depth to groundwater, groundwater dependent vegetation and potential presence of critical fauna (endangered or threatened species). Using this approach potential GDEs initially identified in the Natural Communities Commonly Associated with Groundwater (NCCAG) database were classified as "Likely", "Less Likely" or "Not Likely".

1.0 Evaluation of Plant Species and Rooting Zone Depths

An evaluation was performed to assess the types of potential groundwater dependent vegetation (vegetation) in the Subbasin to identify their rooting zone depths and where groundwater levels in the principal aquifer could be shallow enough to support them. The Natural Communities Commonly Associated with Groundwater (NCCAG) database (https://gis.water.ca.gov/app/NCDatasetViewer/) was reviewed to identify the types of native plant communities that may be considered to be groundwater dependent in the Subbasin for each section referenced in the Public Land Survey System (PLSS) (https://gis.conservation.ca.gov/server/rest/services/Base/BASE_PLSS/MapServer/1. **Table O-1**, located at the end of this document, provides the details of the types of native plant communities by township, range and section for the entire Subbasin.

Each plant species shown on the NCCAG database was compared to those listed on the Plant Rooting Depth database, developed by The Nature Conservancy (TNC), that includes spreadsheets with California Phreatophyte Rooting information and a Comprehensive Root Depth List. These two spreadsheets provided rooting depth references for many of the species listed in the NCCAG database. The following species were identified in the NCCAG database as being present in the Subbasin and were included in the TNC California Phreatophyte Rooting list database:

Scientific Name	Common Name	Max Rooting Depth (feet)
Acer negundo	Box-elder	13.12
Alnus rhombifolia	White Alder	Not cited
Plantanus racemosa	California Sycamore	Not cited
Populus fremontii	Fremont Cottonwood	6.89
Quercus lobata	Valley Oak	(1)
Salix exigua	Narrowleaf Willow	Not cited
Salix gooddingii	Goodding's Willow	6.89
Salix lasiolepis	Arroyo Willow	Not cited
Sambucus nigra	Common Elderberry	Not cited

(1) While some Valley Oak (Quercus lobata) has been noted at rooting depths of up to 80 feet, the optimal depth is more in the vicinity of 33 feet (Howard, 1992).

The following species were identified on the NCCAG database, but not included on the California Phreatophyte Rooting list, but were included on the TNC Comprehensive Root Depth List:

Scientific Name	Common Name	Max Rooting Depth (feet)
Juglans hindsii	Northern California Black Walnut	Not cited
Fraximus latifolia	Oregon Ash	Not cited
Typha augustifolia	Narrowleaf Cattail	Not cited
Schoenoplectus acutus	Hardstem Bulrush	1.97
Vitus californica	California Grape	Not cited
Persicaria lapathifolia	Curly-topped knotweed	Not cited

Arundo donax (Giant Reed) was identified on NCCAG database, but not included on the Plant Rooting Depth database.

The average depth of California phreatophytes is about 30 feet. Therefore, the depth to groundwater of less than 30 feet below ground surface groundwater was assumed to potentially being capable of supporting dependent ecosystems.

1.1 Identification of Critical Species

Using the California Department of Fish and Wildlife RareFind5 database (https://wildlife.ca.gov/Data/CNDDB/Maps-and-Data), an evaluation of aquatic critical fauna that may be present in the Subbasin was conducted to determine location of species by section using the PLSS. A query using RareFind5 included species that are "endangered", "threatened" or "candidate" under the Federal Listing Status or "endangered", "threatened", "rare", "candidate threatened" or "candidate endangered" under the California State Listing Status. The following species within these categories were identified within the NASb:

Scientific Name	Common Name
Riparia riparia	Bank Swallow
Laterallus jamaicensis coturniculus	California Black Rail
Branchinecta conservatio	Conservation Fairy Shrimp
Thamnophis gigas	Giant Gartersnake
Buteo Swainsoni	Swainson's Hawk
Agelaius tricolor	Tricolored Blackbird
Desmocerus californicus dimorphus	Valley Elderberry Longhorned Beetle
Branchinecta lynchi	Vernal Pool Fairy Shrimp
Lepidurus packardi	Vernal Pool Tadpole Shrimp
Coccyzus americanus	Yellow Billed Cuckoo
Onocorhynchus mykissirideus	Steelhead
Oncorhynchus tshawytscha	Chinook Salmon

1.2 Depth to Groundwater

Groundwater contours were developed using 61 wells and groundwater level measurements from Spring 2020. Spring 2020 was selected as having the most complete set of measurements, that include measurements from four new shallow monitoring wells (RDMW-101 through RDMW-104) constructed along the Bear and Feather Rivers early 2020 along with additional monitoring wells from various sources. Monitoring wells selected for contouring had screen intervals between 20 and 300 feet below ground surface (bgs), with only one exception, to represent the water table surface that could be accessed by vegetation. Deeper wells were incorporated into the contouring in the Central area where a large pumping depression has lowered the groundwater surface to more than 150 bgs. **Table O-2** provides the list of wells and their total depths and screen intervals. **Figure O-1** shows the location of the wells and the groundwater elevation contours.

Invert elevations within rivers and canals were obtained from the Central Valley Floodplain Evaluation and Delineation Program. Feather River, Bear River, Yankee Slough and Natomas Cross Canal were based on minimum values from selected cross section surveys. Sacramento River and American River values were derived from Urban Levee Evaluation Program multibeam SONAR surveys at approximately 1mile intervals within survey extents.

Ground surface elevations from National Elevation Dataset (NED) 1/3 arc-second (approximately 10 meter) elevation grids were obtained from United States Geological Survey via the National Map.

Water surface elevations were then subtracted from ground surface elevations to obtain the depth to water throughout the Subbasin. **Figure O-2** shows the depth to groundwater contours along with potential GDEs. **Figure O-3** highlights the areas where groundwater levels are less than 30 feet bgs.

1.3 GDE Classification

GDEs were prioritized by assigning a point system based on depth to groundwater using 2019 depth to groundwater contours for the Subbasin, vegetation diversity (NCCAG database) and the potential presence of critical species (RareFind5) for each section in the PLSS:

Criteria	Assigned Points
Depth to groundwater less than 30 ft bgs	2
Critical species identified	1
Diverse vegetation (3 or more plant species identified by NCCAG)	1
Depth to groundwater greater than or equal to 30 ft bgs	0
Lack of diverse vegetation (less than 3 plant species identified by NCCAG)	0
No vegetation identified (NCCAG)	-1
Diverse vegetation with rooting depths less than depth to water	0

The scoring system was used to simplify classification of GDEs as "Likely", "Less Likely" or "Not Likely" as follows:

Priority	Points Assigned
Likely GDE	3-4
Less Likely GDE	2
Not Likely GDE	0-1

Figure O-4 provides the priority classification of potential GDEs by section. **Figure O-5** provides a simplified summary of the results for the potential GDEs using this approach. Additional details describing the approach are provided below.

Figure O-6 provides the additional details for those Likely and Less Likely GDEs, by illustrating:

- high priority areas, where diverse and critical species are present,
- those areas where just diverse vegetation is present, and
- those areas where just critical species are present
- low priority areas, where depth to groundwater is less than 30 feet bgs but diverse vegetation or critical species are not present

Prioritizing GDEs by these criteria was performed to assist in selection of representative groundwater monitoring wells and identification of data gaps in the monitoring network. This approach will help to prioritize limited funding to fill monitoring gaps.

1.4.1 Likely GDEs

Sections that had depth to groundwater of less than 30 feet bgs, diverse vegetation and critical species identified received as score of 4. Sections that had depth to groundwater of less than 30 feet bgs, diverse vegetation, but no critical species received as score of 3. Likewise, sections with depth to groundwater of less than 30 feet bgs, critical species identified, but no diverse vegetation also received a score of 3. Sections with scores of 3 or 4 were considered "Likely" GDEs. Likely GDEs consisted of approximately 14% of all sections evaluated.

Exceptions occurred where land uses were identified based on historical aerial photos that showed that these vegetative species did not exist at these locations in the past, but do presently due to artificial sources of surface water, for example an NCCAG identified at a golf course that did not exist prior to the course being constructed.

1.4.2 Less Likely GDEs

Sections that had depth to groundwater of less than 30 feet bgs, critical species identified, but no groundwater dependent vegetation received a score of 2. Sections that had depth to groundwater of less than 30 feet bgs, vegetation identified, but no critical species identified also received a score of 2. Sections with scores of 2 were considered "Less Likely" GDEs. "Less likely" GDEs consisted of approximately 15 percent of the sections evaluated.

1.4.3 Not Likely GDEs

Sections that were classified as "Not Likely" GDEs generally had depth to groundwater equal to or greater than 30 feet bgs. If no critical species were identified a score of 0 was assigned. If critical species were identified, a score of 1 was assigned. Diverse vegetation was noted, but because groundwater dependent species in the Subbasin have rooting depths of less than 30 feet it was not considered in scoring.

There were "Not Likely" GDEs identified in sections that had depth to groundwater less than 30 feet bgs. These sections lacked the presence of critical species and there was no groundwater dependent vegetation identified. These received a score of 1. "Not Likely" GDEs consisted of 71 percent of all sections evaluated.

Further evaluation of some of the potential GDE areas with depths to groundwater greater than 30 feet bgs was performed to assess why the potential GDEs were present and their source of water. Most of the potential GDEs were present along creeks in these areas. Sources of surface water to portions of Dry, Raccoon, and Pleasant Grove Creeks and Auburn Ravines are from wastewater treatment plants both in the Subbasin and in watershed. Water in the creeks is also present due to releases from Nevada Irrigation District (NID) and Placer County Water Agency (PCWA) canals to Doty Ravine, Raccoon Creek, Antelope Creek and Miners Ravine. The amount of surface water in these waterways can be influenced by return flows from customer purchases, leakage, and end of canal losses, but cannot be quantified and is highly variable. Another waterway that benefits from return flows is Markham Ravine but NID does not currently use it for conveyance. Historically, NID had

supplied South Sutter Water District (SSWD) through Auburn Ravine but SSWD has not purchased water for a number of years. Currently, PCWA supplies surface water to a few agricultural customers in the Subbasin along Auburn Ravine. SSWD also uses the creeks and ravines within its boundaries for conveyance and to receive return water. Water in these creeks and ravines from these sources are not mandated, except for Dry Creek where 10,000 AFY is required to be released from Roseville's Dry Creek treatment plant, and may vary from year to year and may be reduced in the future due to recycling of treated water for use for irrigation and other uses.

It is important to note that many of the areas retained as Likely and Less Likely GDEs in Sutter County are supported through surface water, regardless of whether they or not they are groundwater-dependent. SSWD delivers surface water into several channels from April into October each year. From north to south, SSWD has documented deliveries into the following: Yankee Slough, Raccoon Creek, Bunkham Slough, Markham Ravine, Auburn Ravine, King Slough, and Pleasant Grove Creek. Deliveries to the East Side Canal are also documented. Also, conservation and preserves with potential GDEs, in areas with depth to groundwater less than 30 feet bgs, were also retained as Likely or Less Likely even though some of these areas are being supported by groundwater from wells.

Perched water is present beneath and adjacent to several creeks in the eastern portion of the Subbasin where potential GDEs were identified by NCCAG, even within areas designated as being less than 30 feet depth to groundwater. These perched water areas cannot be managed and are not part of the principal aquifer as illustrated below.

- Some of the potential GDEs along Markham Ravine in the area where the depth to groundwater is greater than 30 feet bgs, may be supported by perched groundwater which cannot be managed and is not part of the principal aquifer. Perched water was encounter during construction of monitoring well 90, located on the north side of the creek in Placer County. Perched water was encountered at a depth of about 5 feet below ground surface while the monitoring well shows the depth to water in the principal aquifer is over 40 feet bgs (see **Appendix H**).
- Studies along the foothills, northeast of Lincoln and east of Highway 65, along Raccoon Creek and Doty Ravine have shown groundwater is perched in thin alluvium resting on the low permeability sediments of the marine Ione Formation. **Figures O-7 through O-10** and provide a location map and geologic profiles (cross sections) showing the types of sediments in the subsurface. All three profiles paint a consistent picture that the Ione Formation is present at or near the ground surface east of the old Highway 65 and that thin alluvium rests on top of the Ione Formation where groundwater may be perched. The principal aquifer in the Subbasin starts to the west of old Highway 65 where the sediments are thicker.
- A fairly large area of perched water is present near the upper reaches of Dry Creek where potential GDEs were identified by NCCAG. Case files for releases of contaminants to the environment (leaky underground storage tanks, Roseville Railyard) were reviewed for groundwater levels and plotted with groundwater levels from dedicated groundwater monitoring wells. **Figure O-11** shows the locations of

the monitoring wells from these contaminant evaluation studies, dedicated monitoring wells, and cross sections drawn to illustrate the perched water occurrences and the potential path of the water to the saturated zone. **Figures O-12 through O-14** cross sections show groundwater levels and sediment types. **Figure O-12** was drawn generally parallel to Dry Creek and shows the principal aquifer (saturated zone) groundwater levels and other groundwater occurrences (inverted triangles) of groundwater levels from the various monitoring wells. There are four wells along this section that have perched groundwater levels up to 100 feet above the saturated zone. **Figure O-13** shows the same occurrences. The hydrograph for monitoring well 35 (see **Appendix H**) illustrates the long-term groundwater level occurrences along Dry Creek just north of the railyards and that even seasonal highs in the principal aquifer do rise high enough to connect with the perched water. These multiple perched groundwater levels extend north of the railyards to the Placer County Fair Grounds and south of Highway 80. **Figure O-14**, close to the foothills, does not show perched water but a continuous saturated interval with the principal aquifer.

- Areas around Auburn Ravine also have documented perched water but the extent is unknown. Evidence to support that the groundwater levels in this area are perched is because groundwater levels are higher (by about 20 feet) than in underlying principal aquifer and that the groundwater levels in the principal aquifer never rise to the levels of the perched water, showing they are disconnected. Monitoring well 65 (see **Appendix I**) illustrates the long-term groundwater level occurrences along Auburn Ravine and the perched water.

Potential GDEs along these creeks and in areas with depths to groundwater greater than 30 feet were removed as likely GDEs.

1.5 Summary of NCCAG Dataset Review

The NCCAG vegetation dataset covers 9,197 acres in the NASb. Of that amount, only 4,229 acres (46 percent) were present in areas with a depth to groundwater of 30 feet or less. Of the 4,229 acres, 1,679 acres (40 percent) was excluded as having no vegetation capable of being supported by groundwater at 30 feet bgs (e.g., Valley Oak), having no critical species, or having man-made features (e.g., irrigated golf course). The remaining 2,550 acres that remain as likely GDEs can be classified as follows:

Vegetation Priority	Acres	Percent of Area
High Priority	1,334	52
Critical Species	524	21
Diverse Vegetation	305	12
Low Priority	387	15
Total	2,550	100

The NCCAG dataset also has identified wetlands. Some of these are coincident with mapped vegetation areas, so the total acres of vegetation and wetlands are not additive. The NCCAG dataset identifies 3,298 acre in the NASb. Of that amount, 2,133 acres (65 percent) are in areas where the depth to groundwater 30 feet or less. Of the 2,133 acres, 686 acres (32 percent) were excluded based on supporting no species or being man-made features. The remaining 1,447 acres that remain as likely GDEs can be classified as follows:

Wetlands Priority	Acres	Percent of Area
High Priority	656	45
Critical Species	520	36
Diverse Vegetation	50	4
Low Priority	221	15
Total	1,447	100

1.6 Effects of Sustainable Management Criteria on GDEs

The NASb sustainable management criteria (SMC) were developed based on modeling of future demand projections with climate change and a limited urban area expanded conjunctive use program. This modeling produced estimated future Spring groundwater levels resulting from a 50-year simulation period. The future projected water levels were used to create a future conditions Spring groundwater elevation map. The projected Spring water levels were intersected with the NASb NCCAG vegetation and wetlands dataset in the same manner as was done for the Spring 2020 groundwater levels as described in Section 1.2 above. This had only a limited effect on the likely GDE areas as shown below:

Vegetation Priority	Spring 2020 Acres	Future Projected Spring Acres	Percent Reduction
High Priority	1,334	1,327	0.5
Critical Species	524	521	0.6
Diverse Vegetation	305	300	1.6
Low Priority	387	346	10.6
Total	2,550	2,496	2

Wetlands Priority	Spring 2020 Acres	Future Projected Spring Acres	Percent Reduction
High Priority	656	656	0
Critical Species	520	520	0
Diverse Vegetation	50	50	0
Low Priority	221	208	5.9
Total	1,447	1,434	0.9

The table above shows that only about 54 acres of vegetation GDE could be lost under the NASb SMC, which is only 2 percent of the area. Of the 54 acre reduction, nearly all can be

accounted for by low priority GDEs. For the wetlands areas, only a 13 acre reduction is projected. The entire reduced area is within wetlands that are classified as low priority based on having no critical species and lacking diverse vegetation.

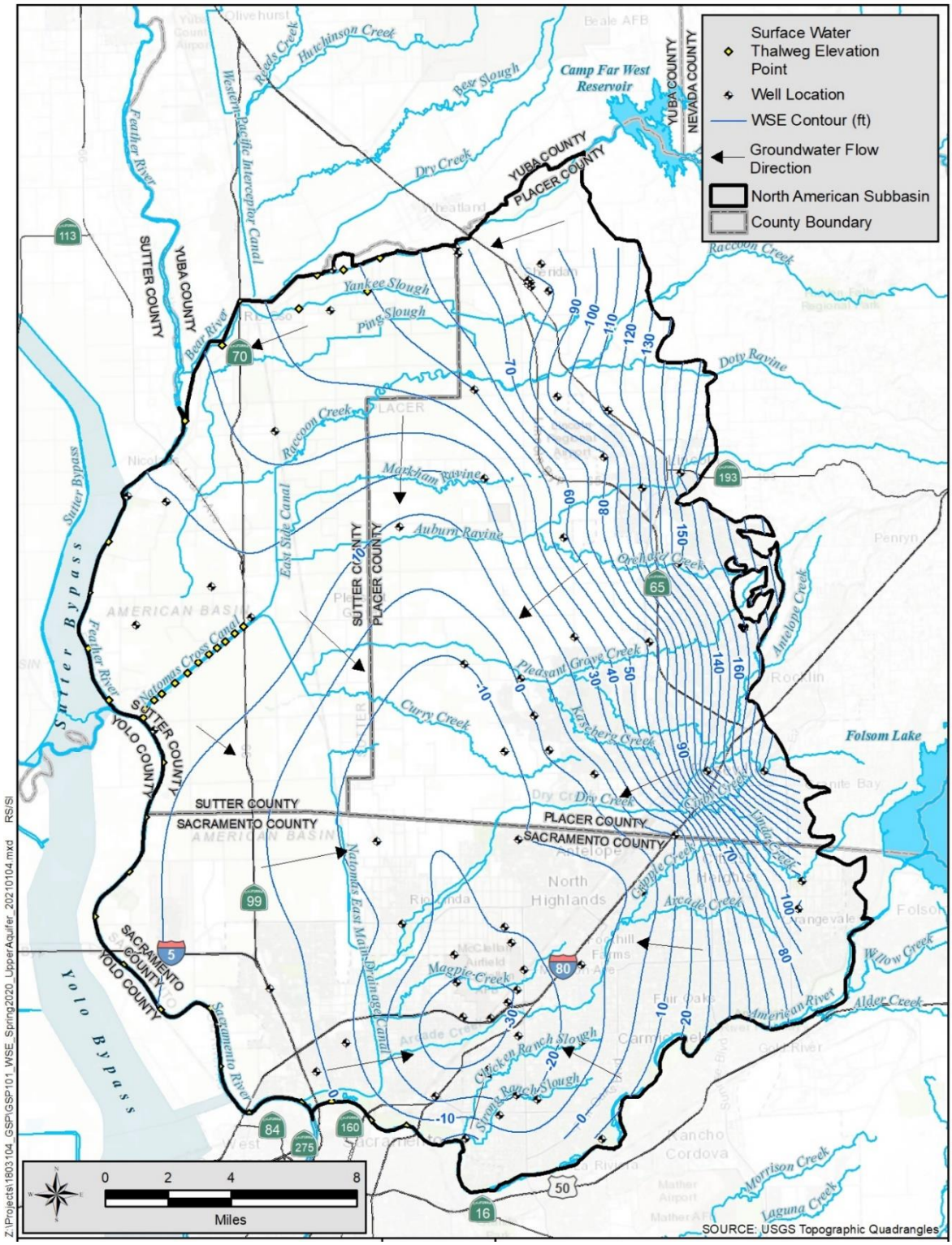

Figure O-1 Regional Groundwater Contours – Spring 2020

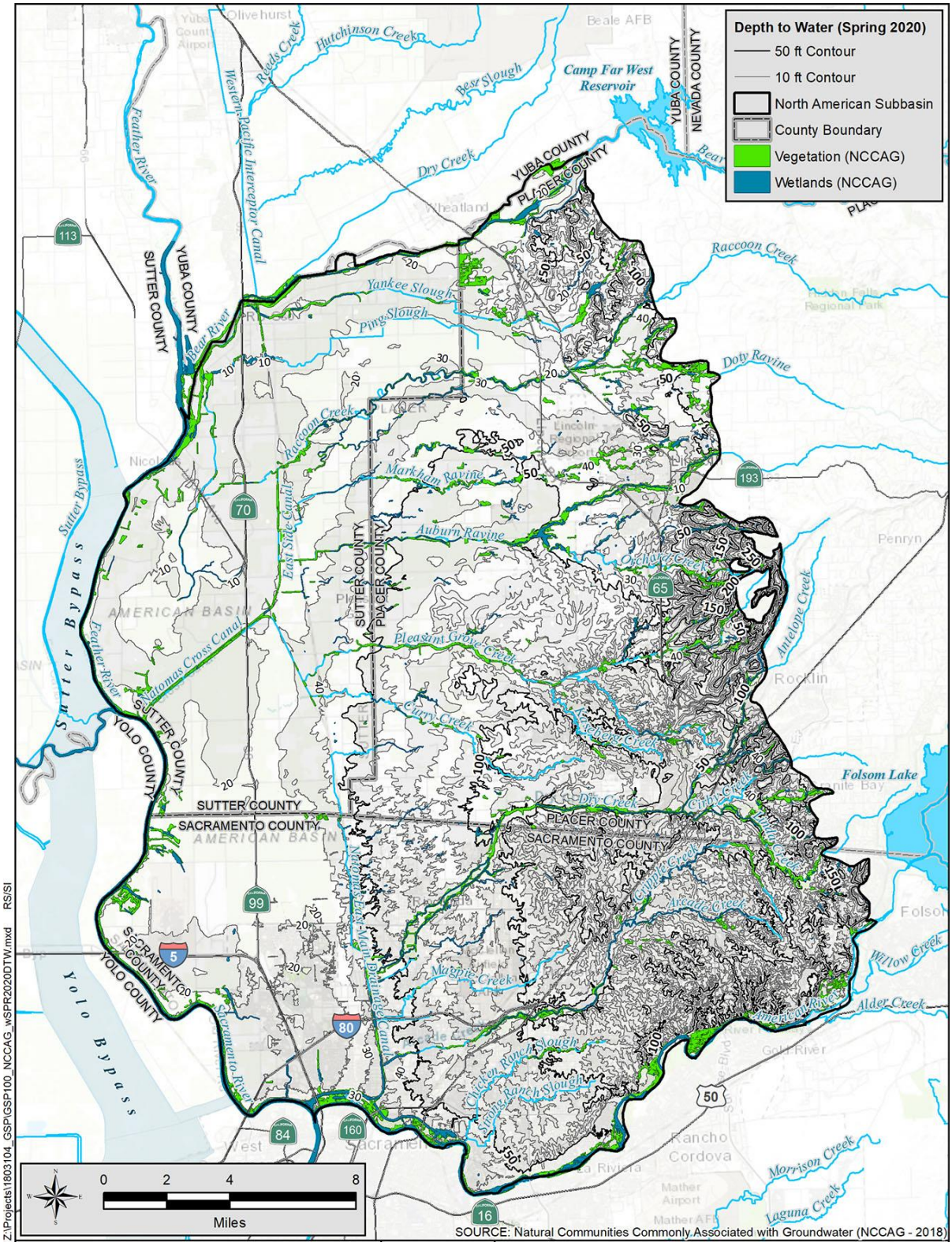

Figure O-2 Depth to Groundwater – Spring 2020

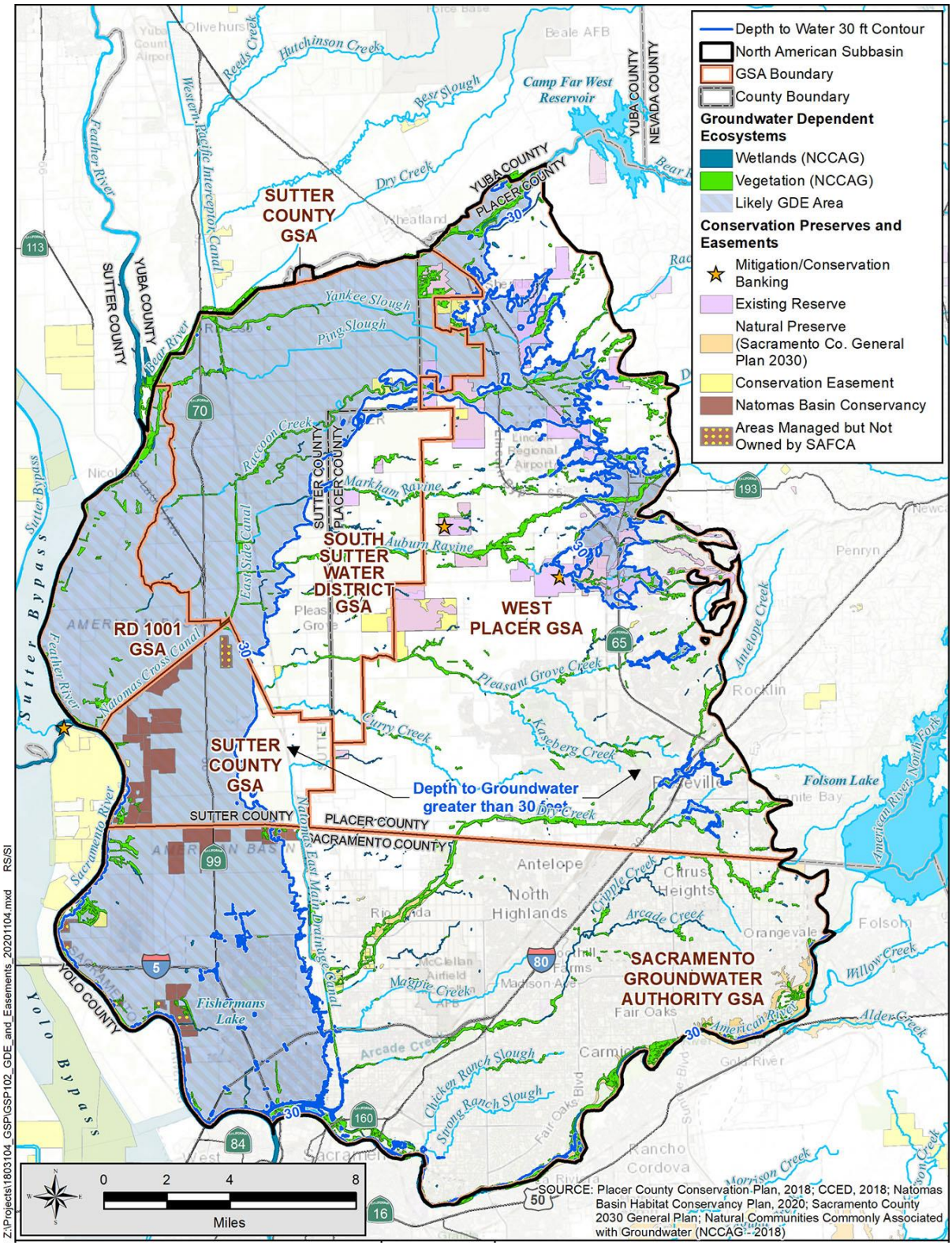

Figure O-3 Areas with Likely GDEs – Groundwater Less Than 30 Feet

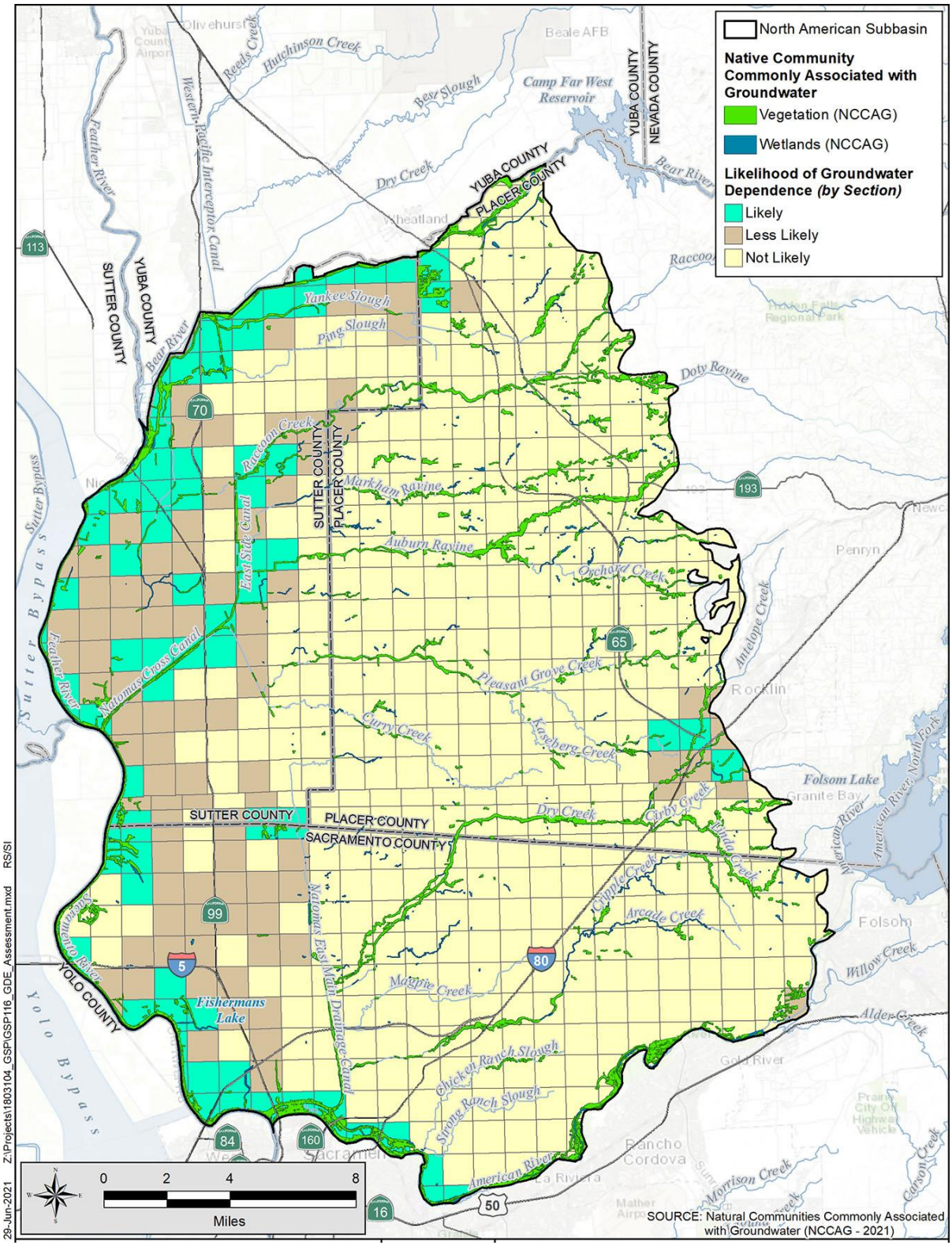

Figure O-4 Characterization of GDEs by Section

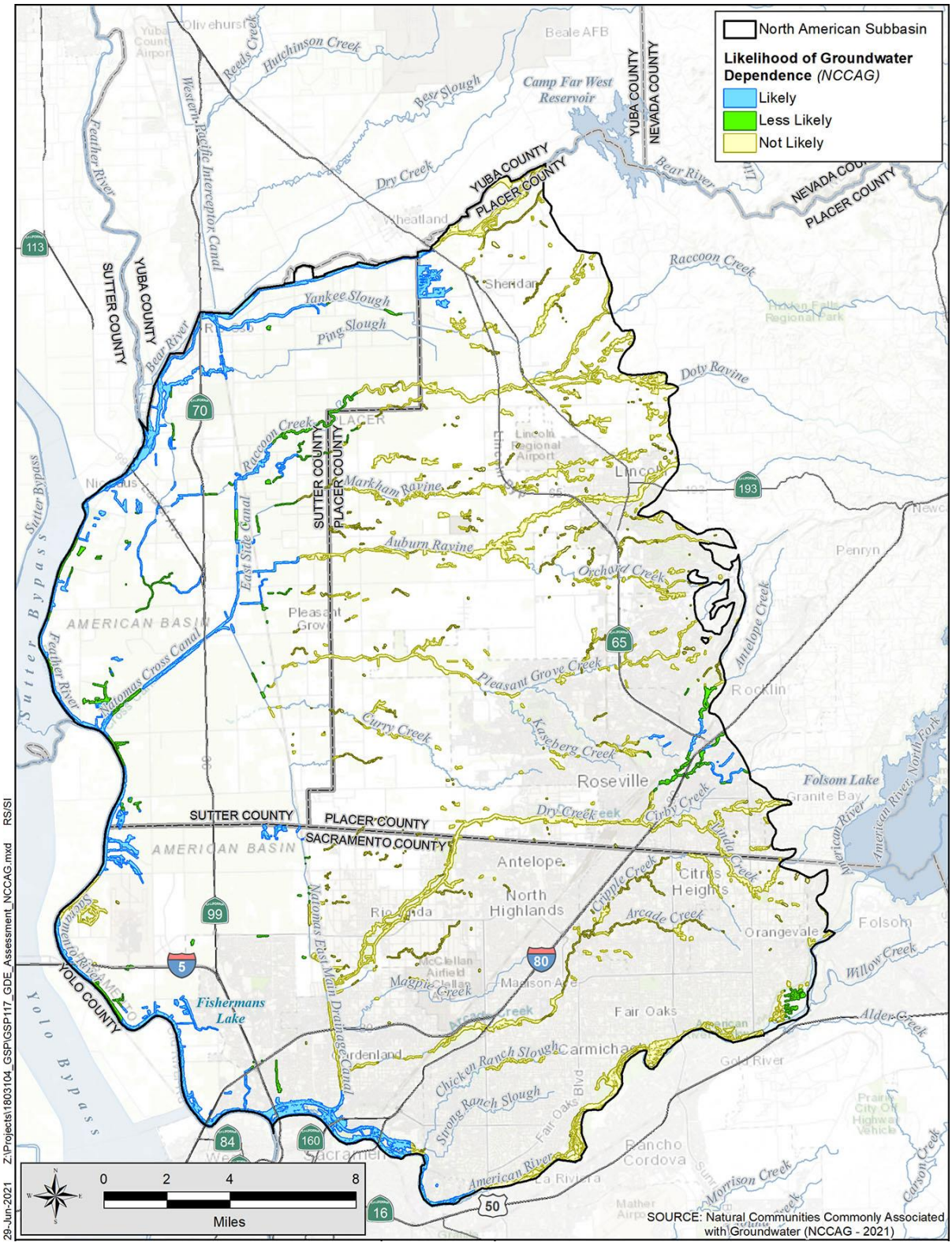

Figure O-5 Classification of Potential GDEs

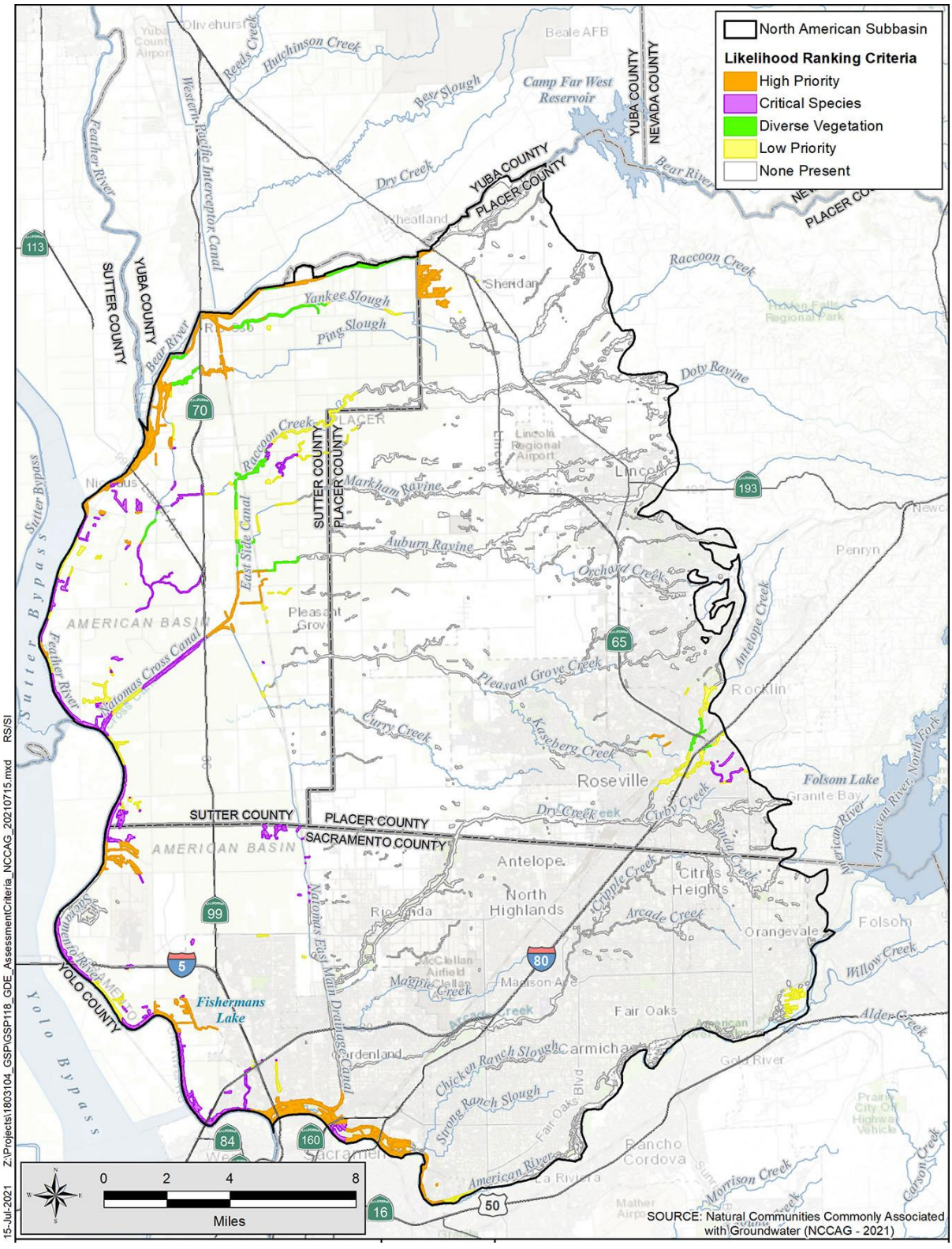

Figure O-6 Rankings of Likely and Less Likely GDE Areas

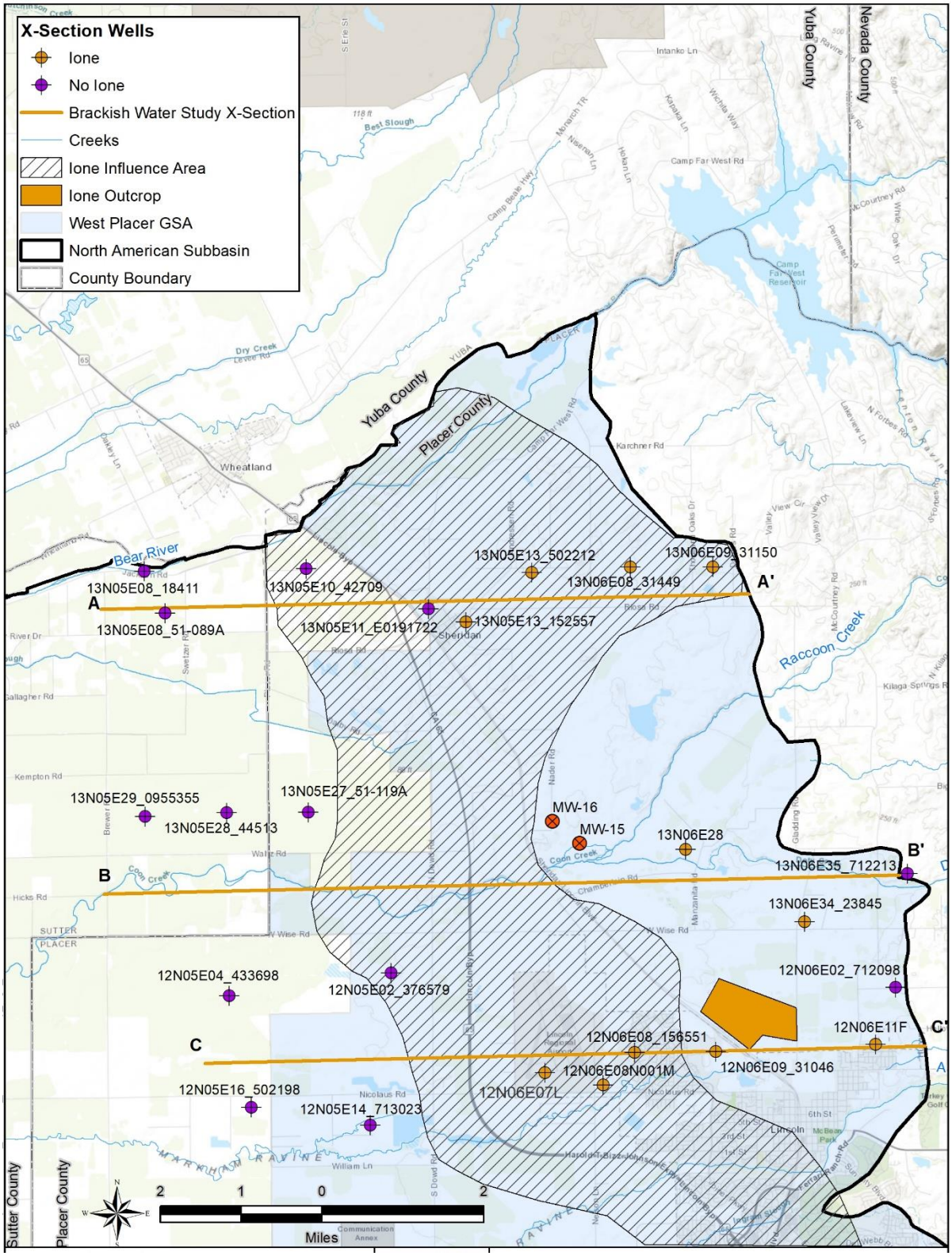

Figure O-7 Locations of Geologic Sections North of Lincoln

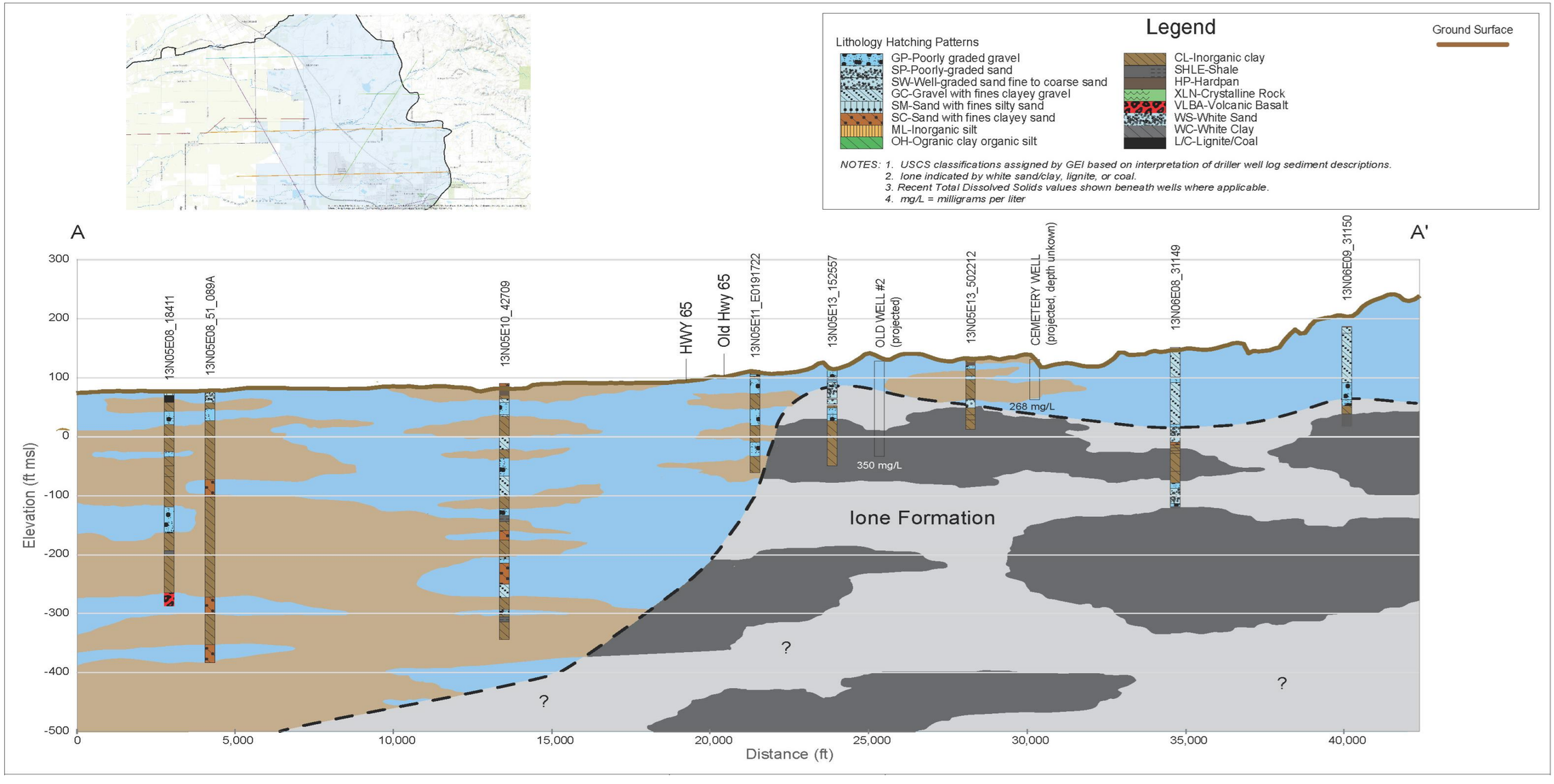

Figure O-8 Geologic Sections A-A' North of Lincoln

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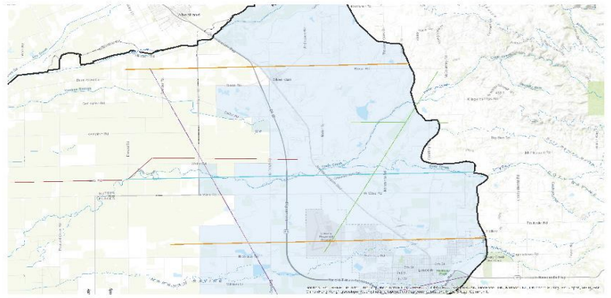

Legend

Ground Surface

Lithology Hatching Patterns

- GP-Poorly graded gravel
- SP-Poorly-graded sand
- SW-Well-graded sand fine to coarse sand
- GC-Gravel with fines clayey gravel
- SM-Sand with fines silty sand
- SC-Sand with fines clayey sand
- ML-Inorganic silt
- OH-Ogranic clay organic silt
- CL-Inorganic clay
- SHLE-Shale
- HP-Hardpan
- XLN-Crystalline Rock
- VLBA-Volcanic Basalt
- WS-White Sand
- WC-White Clay
- L/C-Lignite/Coal

NOTES: 1. USCS classifications assigned by GEI based on interpretation of driller well log sediment descriptions.
2. Ione indicated by white sand/clay, lignite, or coal.
3. Recent Total Dissolved Solids values shown beneath wells where applicable.
4. mg/L = milligrams per liter

Figure O-9 Geologic Section B-B'

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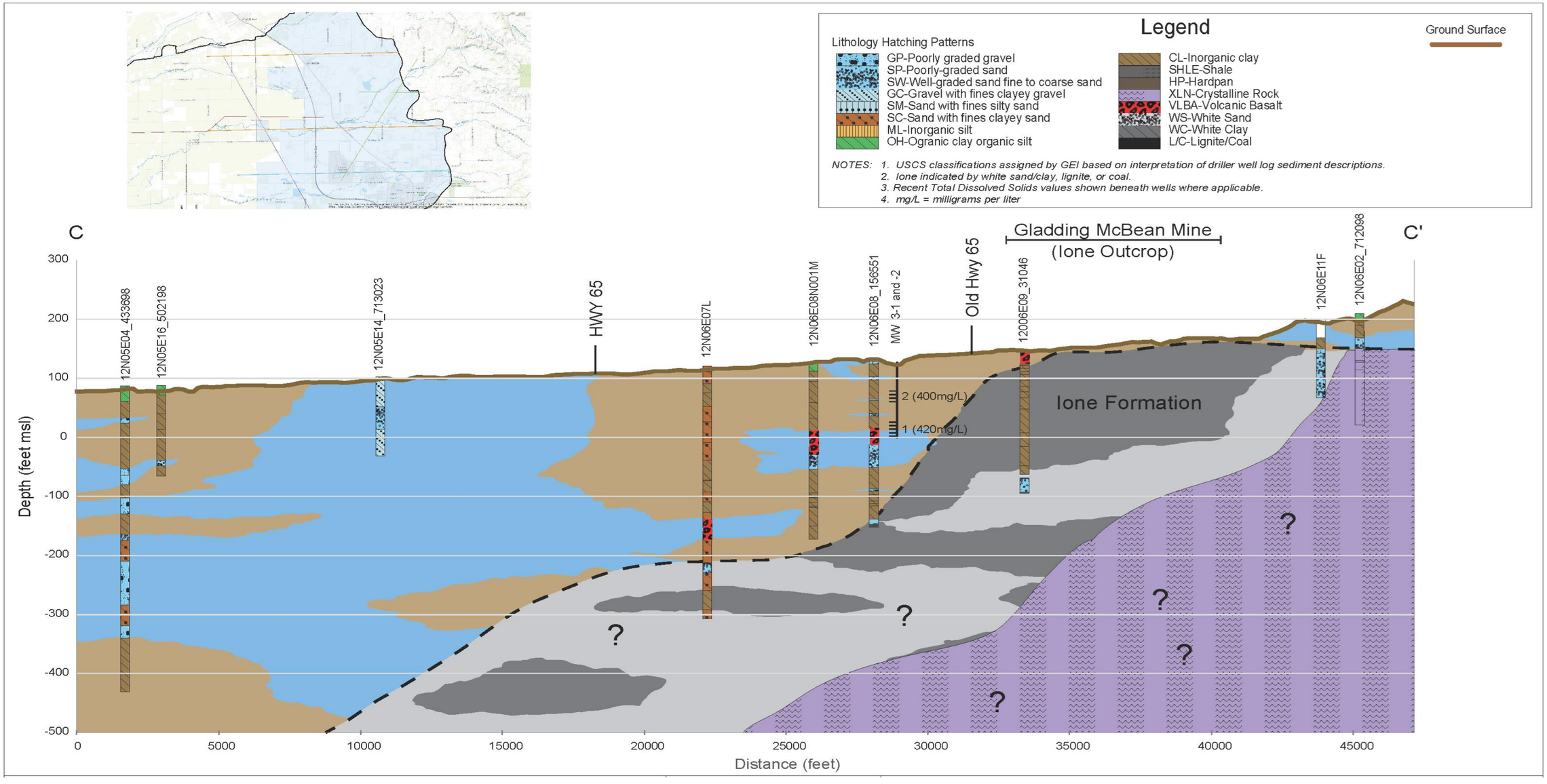

Figure O-10 Geologic Section C-C' North of Lincoln

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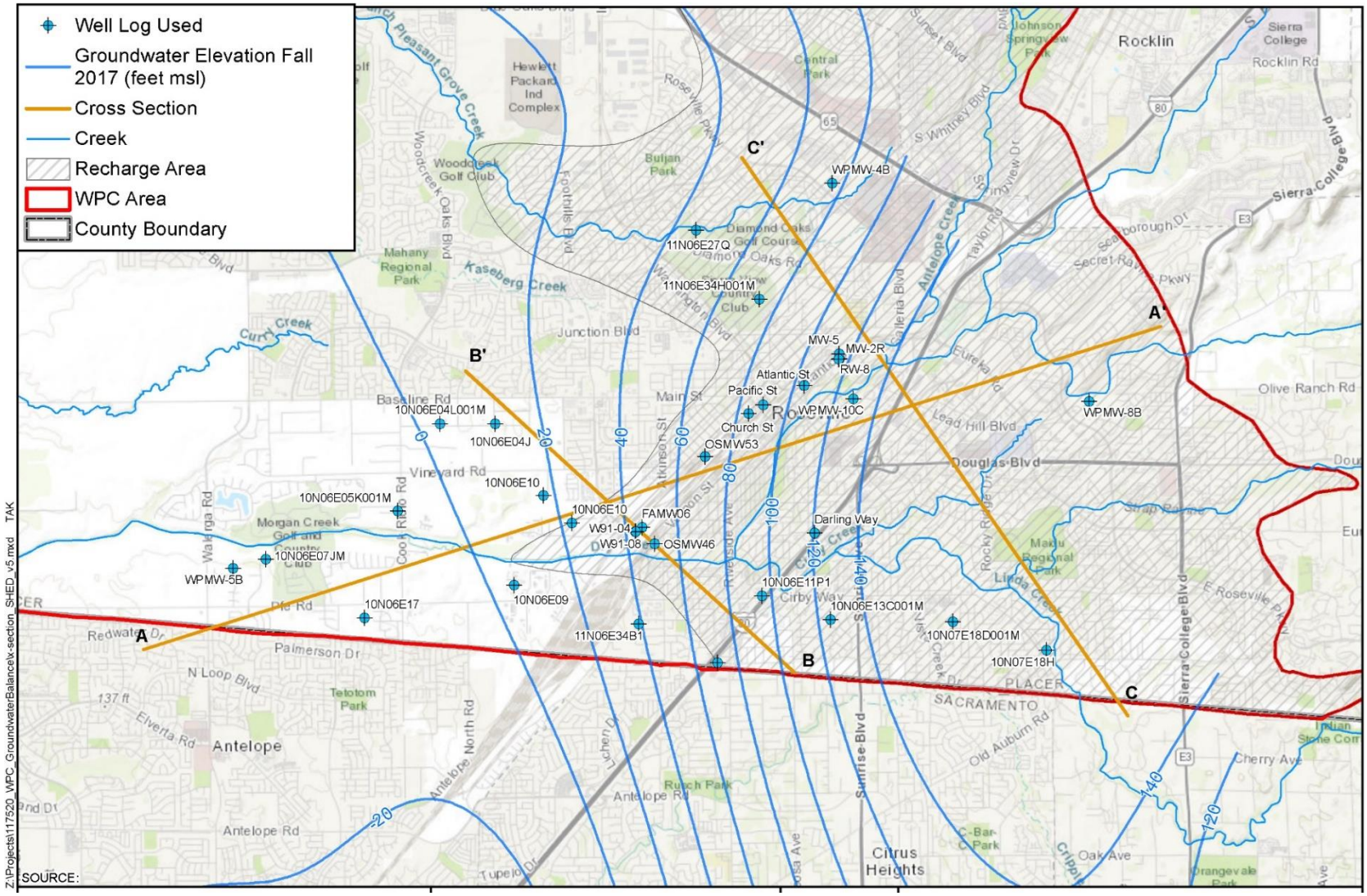

Figure O-11 Locations of Geologic Sections Dry Creek Area

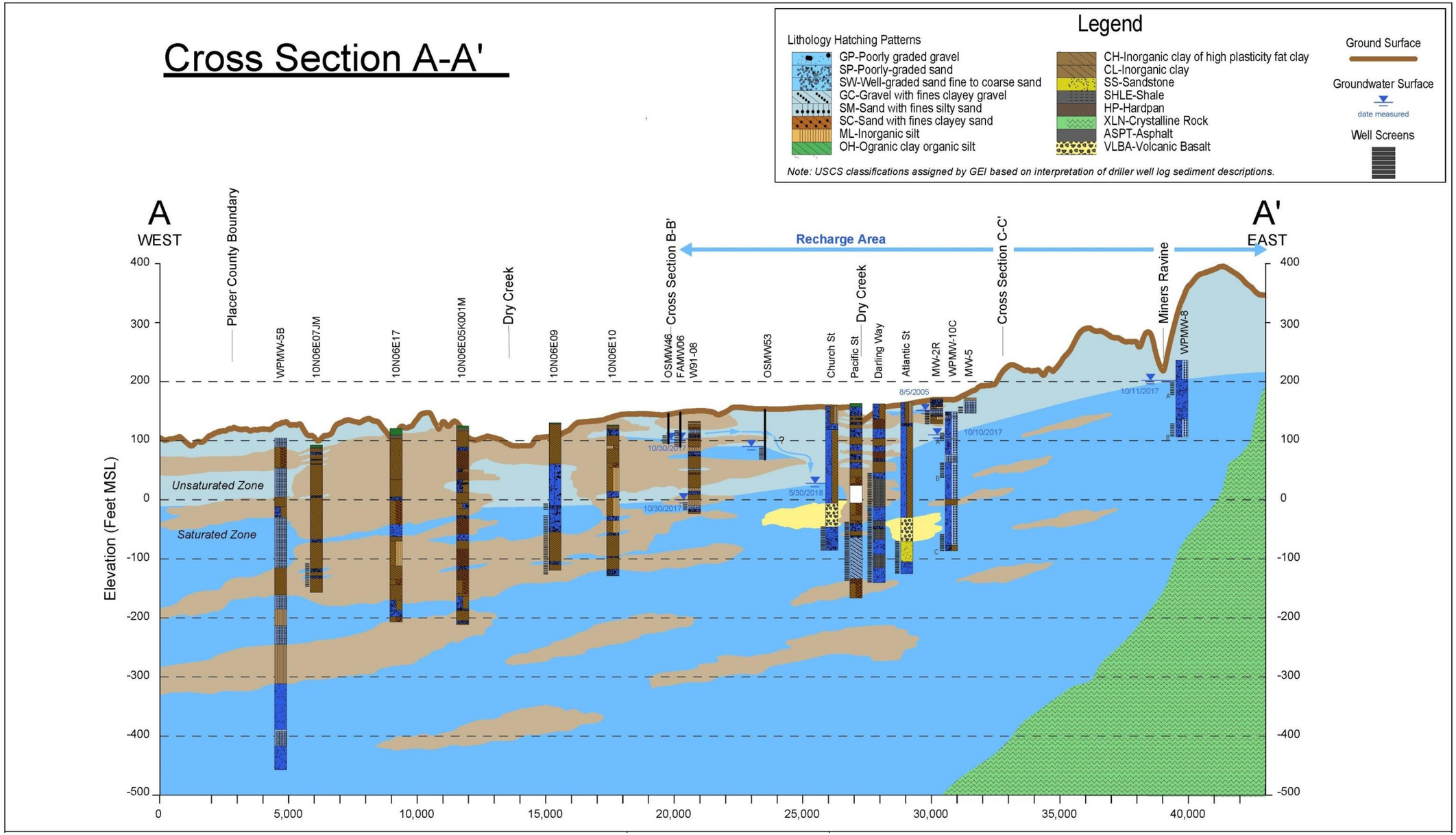

Figure O-12 Geologic Section A-A' Dry Creek Area

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Cross Section B-B'

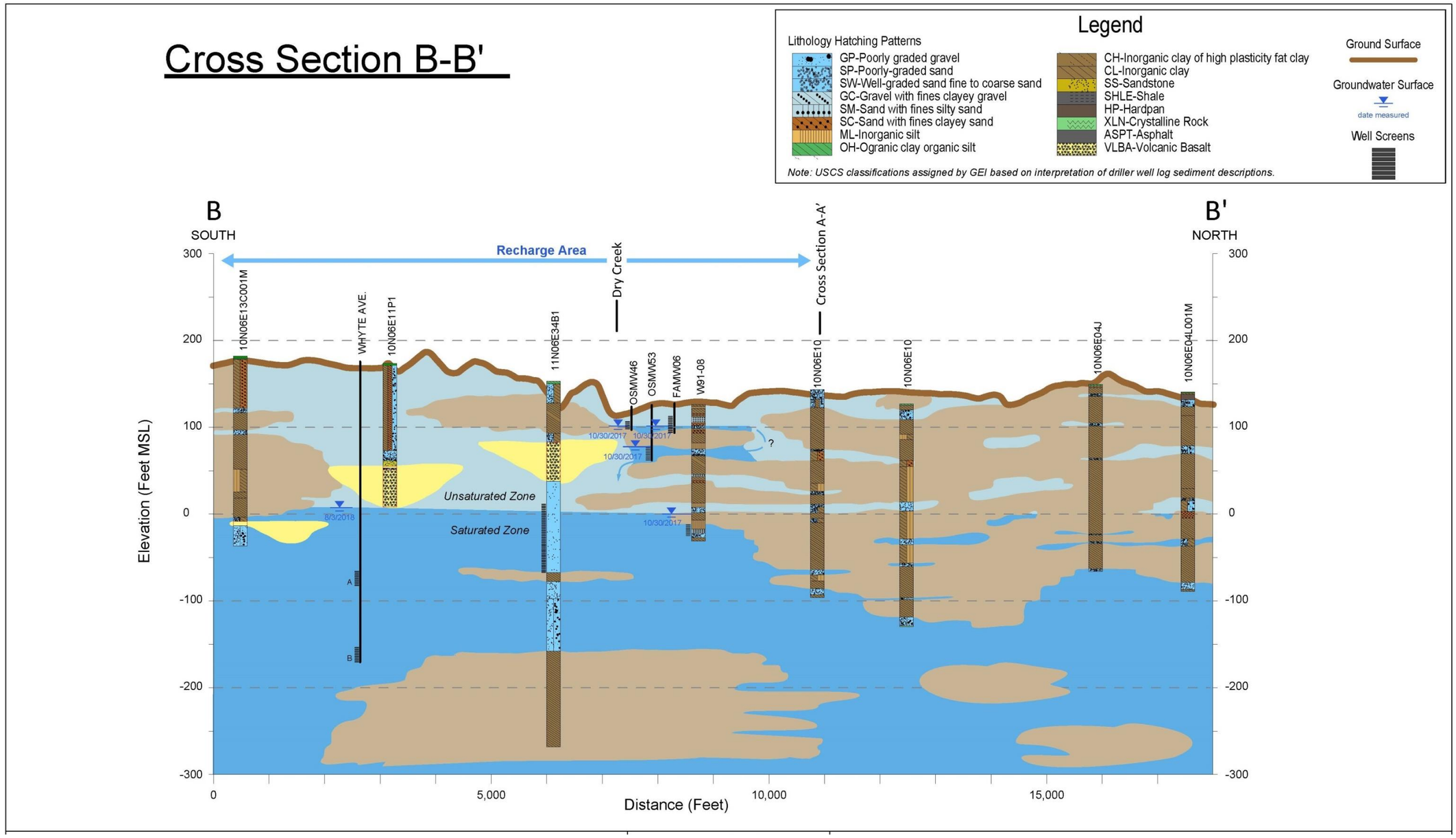

Figure O-13 Geologic Section B-B' Dry Creek Area

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Cross Section C-C'

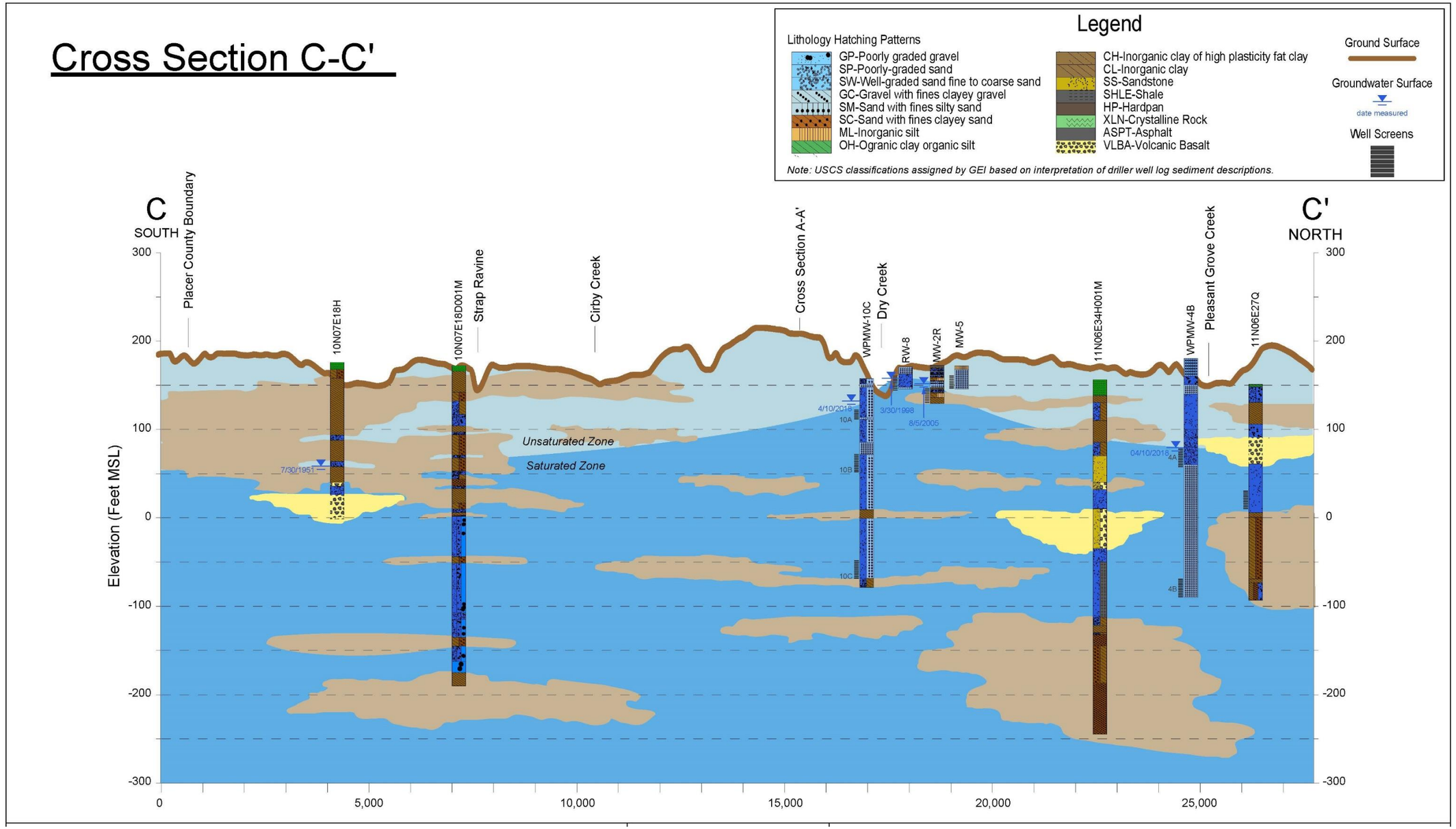

Figure O-14 Geologic Section C-C' Dry Creek Area

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Table O-1. Likely GDE Analyses

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
8	5	1	American River	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Quercus lobata requires a DTW of 24.31 ft[1] and the polygon is located between the 30 ft and 40 ft DTW contour interval. Species is likely dependent on the American River, not groundwater, at this location.	40	none	Flat	N/Flat	N- CASGEM Well 48012 (SGA_MW04, 09N05E34) avg DTW = 35 (69 points; 2007-2020) N - CASGEM Well 48014 (SGA_MW06, 08N06E05) avg DTW = 40 (72 points; 2007-2020)	none	Quercus lobata	Valley Oak														
8	5	2	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	No GDEs	30-45	none	Flat	N/Flat	N- CASGEM Well 48012 (SGA_MW04, 09N05E34) avg DTW = 35 (69 points; 2007-2020) N - CASGEM Well 48014 (SGA_MW06, 08N06E05) avg DTW = 40 (72 points; 2007-2020)	none																
8	5	3	American River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Quercus lobata occupies 0.18 acre of the section. (Refer to T8, R5, Section 10). All other species present have root depths that are shallow[1,3] and therefore not dependent on groundwater at this location. Species are likely dependent on the American River.	20-30	Valley Elderberry Longhorned Beetle	Flat	N/Flat	N- CASGEM Well 48012 (SGA_MW04, 09N05E34) avg DTW = 35 (69 points; 2007-2020) N - CASGEM Well 48014 (SGA_MW06, 08N06E05) avg DTW = 40 (72 points; 2007-2020)	Riverine, Lower Perennial, Emergent, Nonpersistent, Permanently Flooded	Populus fremontii	Fremont Cottonwood	Acer negundo	Box-elder	Salix exigua	Narrowleaf Willow	Quercus lobata	Valley Oak	Alnus rhombifolia	White Alder						
8	5	4	American River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	All species present have shallow root depths[1,3] and therefore not dependent on groundwater at this location. Species are likely dependent on the American River.	20-30	Swainson's Hawk Valley Elderberry Longhorned Beetle	Flat	N	N- CASGEM Well 48012 (SGA_MW04, 09N05E34) avg DTW = 35 (69 points; 2007-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Forested, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow	Salix gooddingii	Goodding's Willow	Alnus rhombifolia	White Alder								
8	5	10	American River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Quercus lobata requires a DTW of 24.31 ft[1] and the polygon is located between the 20 ft and 30 ft DTW contour interval. All other species present have root depths that are shallow[1] and therefore not dependent on groundwater at this location. Species are likely dependent on the American River.	20-30	none w/in NASb boundary	Flat	N/Flat	N- CASGEM Well 48012 (SGA_MW04, 09N05E34) avg DTW = 35 (69 points; 2007-2020) N - CASGEM Well 48014 (SGA_MW06, 08N06E05) avg DTW = 40 (72 points; 2007-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Salix exigua	Narrowleaf Willow	Acer negundo	Box-elder								

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
8	5	11	American River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation Species have rooting depths less than DTW	Quercus lobata is located where DTW is greater than 30 ft. Species are likely dependent on the American River. Can be eliminated because DTW is greater than 30 ft.	25-35	Swainson's Hawk Valley Elderberry Longhorned Beetle	Flat	N/Flat	N- CASGEM Well 48012 (SGA_MW04, 09N05E34) avg DTW = 35 (69 points; 2007-2020) N - CASGEM Well 48014 (SGA_MW06, 08N06E05) avg DTW = 40 (72 points; 2007-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Scrub-Shrub, Emergent, Persistent, Seasonally Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded, Palustrine, Forested, Seasonally Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak										
8	5	12	American River	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Location of species has DTW at greater than 30 ft. Species are likely dependent on the continuous flow of the American River, not groundwater at this location.	30-40	none	Flat	N/Flat	N- CASGEM Well 48012 (SGA_MW04, 09N05E34) avg DTW = 35 (69 points; 2007-2020) N - CASGEM Well 48014 (SGA_MW06, 08N06E05) avg DTW = 40 (72 points; 2007-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Forested, Seasonally Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak										
8	6	4	American River	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	40	none	Flat	N	N - CASGEM Well 9649 (SCGA #24, 09N06E33R001M) avg DTW = 51 (29 points; 2000-2020) N - CASGEM Well 48014 (SGA MW06, 08N06E05) avg DTW = 40 (72 points; 2007-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow	Quercus lobata	Valley Oak	Alnus rhombifolia	White Alder						
8	6	5	American River	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	40	Valley Elderberry Longhorned Beetle	Flat	N	N - CASGEM Well 9649 (SCGA #24, 09N06E33R001M) avg DTW = 51 (29 points; 2000-2020) N - CASGEM Well 48014 (SGA MW06, 08N06E05) avg DTW = 40 (72 points; 2007-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Acer negundo	Box-elder	Sambucus nigra	Common Elderberry	Juglans hindsii and hybrids*	No Cal Black Walnut						
8	6	6	American River	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	40	Valley Elderberry Longhorned Beetle	Flat	N	N - CASGEM Well 9649 (SCGA #24, 09N06E33R001M) avg DTW = 51 (29 points; 2000-2020) N - CASGEM Well 48014 (SGA MW06, 08N06E05) avg DTW = 40 (72 points; 2007-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Alnus rhombifolia	White Alder	Acer negundo	Box-elder						

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
8	6	7	American River	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	40	none	Flat	N	N - CASGEM Well 9649 (SCGA #24, 09N06E33R001M) avg DTW = 51 (29 points; 2000-2020) N - CASGEM Well 48014 (SGA MW06, 08N06E05) avg DTW = 40 (72 points; 2007-2020)	Palustrine, Scrub-Shrub, Seasonally Flooded, Palustrine, Unconsolidated Bottom, Permanently Flooded, Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood										
9	3	1	Sacramento River	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	none	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004M) avg DTW =9 (162 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Juglans hindsii and hybrids*	No California Black Walnut										
9	3	2	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004M) avg DTW =9 (162 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak												
9	3	12	Sacramento River	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	none w/in NASb boundary	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004M) avg DTW =9 (162 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak												
9	4	1	Residential	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	20-30	none	Flat	Flat	Y - CASGEM Well 8921 (SCWA_SGA_001, 09N04E01R001M) avg DTW = 29 (34 points; 2000-2020)	none														
9	4	2	Residential	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	10-20	none	Flat	Flat	Y - CASGEM Well 8921 (SCWA_SGA_001, 09N04E01R001M) avg DTW = 29 (34 points; 2000-2020)	none														
9	4	3	Residential	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	15-25	Swainson's Hawk Giant Gartersnake	Flat	Flat	Y - CASGEM Well 15690 (AB-3 shallow, 10N04E27R004M) avg DTW =17 (164 points; 2000-2020)	none														
9	4	4	Residential	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10-15	Giant Gartersnake (possibly extirpated) - area has been developed since sighted in 1986	Flat	Flat	Y - CASGEM Well 15690 (AB-3 shallow, 10N04E27R004M) avg DTW =17 (164 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded														
9	4	5	West Drainage Canal	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Salix gooddingii has a rooting depth of 6.89[1]. DTW is deeper than rooting depth. Less than 1.5 acres	10-20	Swainson's Hawk Giant Gartersnake	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004M) avg DTW =9 (162 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix gooddingii	Goodding's Willow												
9	4	6	Unspecified area	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	DTW is less than 30 ft.	<10	none	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004M) avg DTW =9 (162 points; 2000-2020)	Palustrine, Unconsolidated Shore, Seasonally Flooded	Quercus lobata	Valley Oak												
9	4	7	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Flat	Flat	Y - CASGEM Well 29915 (09N04E10C001M) avg DTW = 15 (82 points; 2000-2021)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
						diverse vegetation																							
9	4	8	Sacramento River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Flat	Flat	Y - CASGEM Well 29915 (09N04E10C001M) avg DTW = 15 (82 points; 2000-2021)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Schoenoplectus acutus*	Hardstem Bullrush	Typha angustifolia*	Narrowleaf Cattail	Platanus racemosa	California Sycamore								
9	4	9	Artificial surface water in subdivision?	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft. However, appears to be man-made lake/pond in development	10	Swainson's Hawk Giant Gartersnake	Flat	Flat	Y - CASGEM Well 29915 (09N04E10C001M) avg DTW = 15 (82 points; 2000-2021)	Palustrine, Forested, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail	Salix gooddingii	Goodding's Willow	Schoenoplectus acutus*	Hardstem Bullrush										
9	4	10	Residential/Commercial	2	Less likely	DTW < 30 ft Critical Species not likely present (possibly extirpated) No vegetation	No GDEs	10-15	Giant Gartersnake (possibly extirpated) - area has been developed since sighted in 1986	Flat	Flat	Y - CASGEM Well 29915 (09N04E10C001M) avg DTW = 15 (82 points; 2000-2021)	none																
9	4	11	Residential/Commercial	2	Less likely	DTW < 30 ft Critical Species not likely present (possibly extirpated) No vegetation	No GDEs	15-20	Giant Gartersnake (possibly extirpated) - area has been developed since sighted in 1987	Flat	Flat	Y - CASGEM Well 29915 (09N04E10C001M) avg DTW = 15 (82 points; 2000-2021)	none																
9	4	12	Residential/Commercial	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	15-25	none	Flat	Flat	Y - CASGEM Well 8921 (SCWA_SGA_001, 09N04E01R001M) avg DTW = 29 (34 points; 2000-2020)	none																
9	4	13	Residential/Commercial	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	15-25	none	Flat	Flat	Y - CASGEM Well 48040 (Chuckwagon, 09N04E13R001M) avg DTW = 19 (49 points; 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded																
9	4	14	Residential/Commercial	2	Less likely	DTW < 30 ft Critical Species not likely present (possibly extirpated) No vegetation	No GDEs	10-15	Swainson's Hawk (possible extirpated) last sighted 2003	Flat	Flat	Y - CASGEM Well 48040 (Chuckwagon, 09N04E13R001M) avg DTW = 19 (49 points; 2011-2020)	none																
9	4	15	Residential/Commercial	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	0-10	none	Flat	Flat	Y - CASGEM Well 48041 (Bannon Ck, 09N04E23R002M) avg DTW = 13 (34 points, 2011-2020)	none																
9	4	16	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	0-10	Swainson's Hawk	Flat	Flat	Y - CASGEM Well 29915 (09N04E10C001M) avg DTW = 15 (82 points; 2000-2021)	none																
9	4	17	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Valley Elderberry Longhorned Beetle	Flat	Flat	Y - CASGEM Well 29915 (09N04E10C001M) avg DTW = 15 (82 points; 2000-2021)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Platanus racemosa	California Sycamore												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/21)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
9	4	20	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Flat	Insufficient data	Y - CASGEM Well 8944 (SCWA_SGA_003, 09N04E27F001M) avg DTW = 21 (25 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak																
9	4	21	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Flat	Insufficient data	Y - CASGEM Well 8944 (SCWA_SGA_003, 09N04E27F001M) avg DTW = 21 (25 points; 2000-2020)	none	Quercus lobata	Valley Oak																
9	4	22	Residential	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft. However, appears to be in a developed area	0-10	Swainson's Hawk	Flat	Insufficient data	Y - CASGEM Well 8944 (SCWA_SGA_003, 09N04E27F001M) avg DTW = 21 (25 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Juglans hindsii and hybrids*	No Cal Black Walnut												
9	4	23	Residential	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft. However, vegetation may be part of landscaping	0-10	none	Flat	Flat	Y - CASGEM Well 48041 (Bannon Ck, 09N04E23R002M) avg DTW = 13 (34 points, 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Forested, Seasonally Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded	Quercus lobata	Valley Oak	Juglans hindsii and hybrids*	No Cal Black Walnut												
9	4	24	Residential	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	10-20	none	Flat	Flat	Y - CASGEM Well 48041 (Bannon Ck, 09N04E23R002M) avg DTW = 13 (34 points, 2011-2020)	none																
9	4	25	American River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	5-20	Swainson's Hawk Valley Elderberry Longhorned Beetle	Flat	Flat	Y - CASGEM Well 48041 (Bannon Ck, 09N04E23R002M) avg DTW = 13 (34 points, 2011-2020)	Palustrine, Forested, Seasonally Flooded, Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Forested, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Acer negundo	Box-elder	Vitis californica*	California Grape	Salix exigua	Narrowleaf Willow	Artemisia douglasiana**	Douglas' Wormwood				
9	4	26	Sacramento/American River Confluence	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk Valley Elderberry Longhorned Beetle	Flat	Flat	Y - CASGEM Well 48041 (Bannon Ck, 09N04E23R002M) avg DTW = 13 (34 points, 2011-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Salix lasiolepis	Arroyo Willow										
9	4	27	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk Valley Elderberry Longhorned Beetle	Flat	Insufficient data	Y - CASGEM Well 8944 (SCWA_SGA_003, 09N04E27F001M) avg DTW = 21 (25 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Forested, Seasonally Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood												
9	4	28	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0	Swainson's Hawk Valley Elderberry Longhorned Beetle	Flat	Insufficient data	Y - CASGEM Well 8944 (SCWA_SGA_003, 09N04E27F001M) avg DTW = 21 (25 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Lower Perennial, Unconsolidated Shore,	Quercus lobata	Valley Oak														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
													Seasonally Flooded															
9	4	29	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	10	Swainson's Hawk	Flat	Insufficient data	Y - CASGEM Well 8944 (SCWA_SGA_003, 09N04E27F001M) avg DTW = 21 (25 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow												
9	4	33	Mostly outside NASb boundary (Yolo) Boundary line within river	0	Not likely	DTW < 30 ft No Critical Species w/in NASb boundary No vegetation w/in NASb boundary	No GDEs	10	none			no representative hydrographs within contour interval	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded																
9	4	35	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Populus fremontii has a maximum rooting depth of 16.4[1].	20-30	Swainson's Hawk Valley Elderberry Longhorned Beetle	Flat	Insufficient data	Y - CASGEM Well 8944 (SCWA_SGA_003, 09N04E27F001M) avg DTW = 21 (25 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood														
9	5	1	McClellan AFB	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	125-135	none	Flat	N	N - CASGEM Well 48013 (SGA_MW-5, 09N06E05) avg DTW = 144 (29 points; 2009-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded																
9	5	2	McClellan AFB	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	105-125	none			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded																
9	5	3	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	90-100	Tri-Colored Blackbird Vernal Pool Fairy Shrimp			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix exigua	Narrowleaf Willow	Acer negundo	Box-elder												
9	5	4	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	70-85	none	Flat	N/Flat	N - CASGEM Well 48010 (SGA_MW02, 10N05E32) avg DTW = 65 (35 points; 2011-2020) N - CASGEM Well 48011 (SGA_MW03, 10N05E32) avg DTW = 70 (35 points; 2011-2020)	Palustrine, Scrub-Shrub, Seasonally Flooded	Quercus lobata	Valley Oak														
9	5	5	Dry Creek	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	45-70	Swainson's Hawk Vernal Pool Fairy Shrimp	Flat	N/Flat	N - CASGEM Well 48010 (SGA_MW02, 10N05E32) avg DTW = 65 (35 points; 2011-2020) N - CASGEM Well 48011 (SGA_MW03, 10N05E32) avg DTW = 70 (35 points; 2011-2020)	Palustrine, Scrub-Shrub, Seasonally Flooded, Palustrine, Forested, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus Lobata	Valley Oak	Juglans hindsii and hybrids*	No California Black Walnut								

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
9	5	6	Dry Ck/Steelhead Ck confluence	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Location of species has DTW at greater than 30 ft. Species are likely dependent on surface water from Dry Ck/Steelhead Ck, not groundwater, at this location.	35-45	Swainson's Hawk	Flat	N/Flat/Flat	N - CASGEM Well 48010 (SGA_MW02, 10N05E32) avg DTW = 65 (35 points; 2011-2020) N - CASGEM Well 48011 (SGA_MW03, 10N05E32) avg DTW = 70 (35 points; 2011-2020) Y - CASGEM Well 8921 (SCWA_SGA_001, 09N04E01R001M) avg DTW = 29 (34 points; 2000-2020)	Palustrine, Unconsolidated Shore, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak	Typha angustifolia*	Narrowleaf Cattail												
9	5	7	Steelhead Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Location of Salix exigua has DTW greater than 30 ft[1]. Species is likely dependent on surface water from Steelhead Ck, not groundwater, at this location.	30-40	none	Flat	Flat	Y - CASGEM Well 8921 (SCWA_SGA_001, 09N04E01R001M) avg DTW = 29 (34 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Forested, Seasonally Flooded	Salix exigua	Narrowleaf Willow														
9	5	8	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	40-60	none			no representative hydrographs within contour interval	none																
9	5	9	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	60-80	none			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded, California Warm Temperate Marsh/Seep																
9	5	10	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	80-100	none	Flat	Flat	N - CASGEM Well 40050 (DWR_SGA_002, 09N05E14B001M) avg DTW = 103 (125 points; 2000-2021)	none																
9	5	11	McClellan AFB	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	100-120	Vernal Pool Fairy Shrimp	Flat	Flat	N - CASGEM Well 40050 (DWR_SGA_002, 09N05E14B001M) avg DTW = 103 (125 points; 2000-2021)	none																

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
9	5	12	Arcade Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated DTW is greater than 30 ft	110-130	none	Flat	Flat/Y	N - CASGEM Well 40050 (DRW_SGA_002, 09N05E14B001M) avg DTW = 103 (125 points; 2000-2021) N - CASGEM Well 48017 (Well 10, 09N05E13L002M) avg DTW = 106 (47 points; 2010-2020)	none	Quercus lobata	Valley Oak												
9	5	13	Arcade Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated DTW is greater than 100 ft	100-120	none	Flat	Flat/Y	N - CASGEM Well 40050 (DRW_SGA_002, 09N05E14B001M) avg DTW = 103 (125 points; 2000-2021) N - CASGEM Well 48017 (Well 10, 09N05E13L002M) avg DTW = 106 (47 points; 2010-2020)	none	Quercus lobata	Valley Oak												
9	5	14	Arcade Ck - Haggin Oaks Golf Complex	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated DTW is greater than 30 ft	90-110	Vernal Pool Fairy Shrimp	Flat	Flat/Y	N - CASGEM Well 40050 (DRW_SGA_002, 09N05E14B001M) avg DTW = 103 (125 points; 2000-2021) N - CASGEM Well 48017 (Well 10, 09N05E13L002M) avg DTW = 106 (47 points; 2010-2020)	none	Quercus lobata	Valley Oak												
9	5	15	Arcade Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated DTW is greater than 30 ft	85-90	none	Flat	Flat	N - CASGEM Well 40050 (DWR_SGA_002, 09N05E14B001M) avg DTW = 103 (125 points; 2000-2021)	none	Quercus lobata	Valley Oak												
9	5	16	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	No GDEs	60-80	none			no representative hydrographs within contour interval	none	Quercus lobata	Valley Oak												
9	5	17	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	40-60	none			no representative hydrographs within contour interval	none														
9	5	18	Steelhead Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Location has DTW greater than 30 ft. Species are likely dependent on surface water from Steelhead Ck, not groundwater, at this location.	35	none	Flat	Flat	Y - CASGEM Well 48040 (Chuckwagon, 09N04E13R001M) avg DTW = 19 (49 points; 2011-2020)	Palustrine, Forested, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Schoenoplectus acutus*	Hardstem Bullrush	Typha angustifolia*	Narrowleaf Cattail										

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
9	5	19	Steelhead Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Location has DTW greater than 30 ft. Species are likely dependent on surface water from Steelhead Ck, not groundwater, at this location.	35	Vernal Pool Tadpole Shrimp	Flat	Y/Flat	N - CASGEM Well 9643 (DWR_SGA_005, 09N05E28K001M) avg DTW = 60 (115 points, 2000-2020) Y - CASGEM Well 48040 (Chuckwagon, 09N04E13R001M) avg DTW = 19 (49 points; 2011-2020)	Palustrine, Forested, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Typha angustifolia*	Narrowleaf Cattail										
9	5	20	Arcade Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW is greater than 30 ft	40-60	none	Flat	Y	N - CASGEM Well 9643 (DWR_SGA_005, 09N05E28K001M) avg DTW = 60 (115 points, 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Schoenoplectus acutus*	Hardstem Bullrush	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood										
9	5	21	Arcade Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	70-75	none			no representative hydrographs within contour interval	none	Quercus lobata	Valley Oak												
9	5	22	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	75-80	none			no representative hydrographs within contour interval	none	Quercus lobata	Valley Oak												
9	5	23	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	55-90	none	N	Flat	N - CASGEM Well 9641 (DWR_SGA_004, 09N05E25J001M) avg DTW = 95 (213 points, 2000-2021)	none														
9	5	24	Del Paso Country Club	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated DTW is greater than 30 ft	90-105	none	N	Flat	N - CASGEM Well 9641 (DWR_SGA_004, 09N05E25J001M) avg DTW = 95 (213 points, 2000-2021)	Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak												
9	5	25	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	70-95	none	N	Flat	N - CASGEM Well 9641 (DWR_SGA_004, 09N05E25J001M) avg DTW = 95 (213 points, 2000-2021)	none														
9	5	26	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	60-90	none	N	Flat	N - CASGEM Well 9641 (DWR_SGA_004, 09N05E25J001M) avg DTW = 95 (213 points, 2000-2021)	none														
9	5	27	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	55-75	none	Flat	Y	N - CASGEM Well 9643 (DWR_SGA_005, 09N05E28K001M) avg DTW = 60 (115 points, 2000-2020)	none														
9	5	28	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	45-70	none	Flat	Y	N - CASGEM Well 9643 (DWR_SGA_005, 09N05E28K001M) avg DTW = 60 (115 points, 2000-2020)	none														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
9	5	29	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	30-55	none	Flat	Y	N - CASGEM Well 9643 (DWR_SGA_005, 09N05E28K001M) avg DTW = 60 (115 points, 2000-2020)	none															
9	5	30	American River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Quercus lobata requires a DTW of 24.31 ft[1]. All other species present (except Juglans hindsii and hybrids) have root depths that are shallow and therefore not dependent on groundwater at this location[1].	20-30	Swainson's Hawk Valley Elderberry Longhorned Beetle	Flat	Flat	Y - CASGEM Well 48041 (Bannon Ck, 09N04E23R002M) avg DTW = 13 (34 points, 2011-2020)	Palustrine, Forested, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Salix gooddingii	Goodding's Willow	Juglans hindsii and hybrids*	No Cal Black Walnut								
9	5	31	American River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	20-30	Valley Elderberry Longhorned Beetle Vernal Pool Fairy Shrimp	Flat	Flat	Y - CASGEM Well 48041 (Bannon Ck, 09N04E23R002M) avg DTW = 13 (34 points, 2011-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Forested, Seasonally Flooded, Palustrine, Forested, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak										
9	5	32	American River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Quercus lobata requires a DTW of 24.31 ft.[1] The polygon for Quercus lobata is at the 30 ft contour. All other species present have root depths that are shallow[1,5] and therefore not dependent on groundwater at this location.	20-40	Swainson's Hawk Valley Elderberry Longhorned Beetle	Flat	Flat	N - CASGEM Well 48012 (SGA_MW04, 09N05E34) avg DTW = 35 (69 points; 2007-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Forested, Seasonally Flooded, Palustrine, Forested, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Platanus racemosa	California Sycamore								
9	5	33	American River next to Cal Expo	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Location Quercus lobata is between the 30 ft and 40 ft DTW contour interval. All other species present have root depths that are shallow[1,3] and therefore not dependent on groundwater at this location. Species are likely dependent on the American River.	25-50	Bank Swallow Valley Elderberry Longhorned Beetle	Flat	Flat	N - CASGEM Well 48012 (SGA_MW04, 09N05E34) avg DTW = 35 (69 points; 2007-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Forested, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Scrub-Shrub, Emergent, Persistent, Seasonally Flooded, Palustrine, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow	Juglans hindsii and hybrids*	No Cal Black Walnut	Salix gooddingii	Goodding's Willow	Acer negundo	Box-elder	Alnus rhombifolia	White Alder	Salix lasiolepis	Arroyo Willow	Sambucus nigra	Common Elderberry

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
9	5	34	American River	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Quercus lobata requires a DTW of 24.31 ft[1]. The polygon for Quercus lobata is at the 30 ft DTW contour. All other species present have root depths that are shallow[1] and therefore not dependent on groundwater at this location. Species are likely dependent on the American River.	30-50	none	Flat	Flat	N - CASGEM Well 48012 (SGA_MW04, 09N05E34) avg DTW = 35 (69 points; 2007-2020)	Palustrine, Unconsolidated Bottom, Permanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Juglans hindsii and hybrids*	No Cal Black Walnut	Quercus lobata	Valley Oak	Acer negundo	Box-elder	Populus fremontii	Fremont Cottonwood								
9	5	35	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	35-70	none	Flat	Flat	N - CASGEM Well 48021 (MW12A, 09N05E35) avg DTW = 62 (27 points, 2010-2020	none																
9	5	36	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	40-80	none	Flat	Flat	N - CASGEM Well 48021 (MW12A, 09N05E35) avg DTW = 62 (27 points, 2010-2020	none																
9	6	1	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	95-110	none			no representative hydrographs within contour interval	none																
9	6	2	North Ridge Country Club	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	105-120	none	Flat	Flat	N - CASGEM Well 48029 (Well N28, 09N06E03C001M) avg DTW = 134 (43 points, 2011-2020)	none																
9	6	3	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	110-130	none	Flat	Flat	N - CASGEM Well 48029 (Well N28, 09N06E03C001M) avg DTW = 134 (43 points, 2011-2020)	none																
9	6	4	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	120-140	none	Flat	N	N - CASGEM Well 48013 (SGA_MW-5, 09N06E05) avg DTW = 144 (29 points; 2009-2020)	none	Populus fremontii	Fremont Cottonwood														
9	6	5	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	130-150	none	Flat	N	N - CASGEM Well 48013 (SGA_MW-5, 09N06E05) avg DTW = 144 (29 points; 2009-2020)	none																
9	6	6	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	130-150	none	Flat	N	N - CASGEM Well 48013 (SGA_MW-5, 09N06E05) avg DTW = 144 (29 points; 2009-2020)	none																
9	6	7	Arcade Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	120-130	none	Flat	N	N - CASGEM Well 48013 (SGA_MW-5, 09N06E05) avg DTW = 144 (29 points; 2009-2020)	none	Quercus lobata	Valley Oak														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
9	6	8	Arcade Ck - American River College	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	110-130	none	Flat	N	N - CASGEM Well 48013 (SGA_MW-5, 09N06E05) avg DTW = 144 (29 points; 2009-2020)	none	Quercus lobata	Valley Oak														
9	6	9	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	105-125	none			no representative hydrographs within contour interval	none																
9	6	10	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	100-120	none			no representative hydrographs within contour interval	none																
9	6	11	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	90-110	none			no representative hydrographs within contour interval	none																
9	6	12	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	no GDEs	85-100	none			no representative hydrographs within contour interval	none																
9	6	13	American River	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	70-90	none			no representative hydrographs within contour interval	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood												
9	6	14	American River	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	75-85	Bank Swallow			no representative hydrographs within contour interval	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Salix lasiolepis	Arroyo Willow	Salix exigua	Narrowleaf Willow	Acer negundo	Box-elder						
9	6	15	American River	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	80-100	none			no representative hydrographs within contour interval	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak														
9	6	16	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	85-110	none			no representative hydrographs within contour interval	none																
9	6	17	Chicken Ranch Slough	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	95-115	none	Flat	Y	N - CASGEM Well 48017 (Well 10, 09N05E13L002M) avg DTW = 106 (47 points; 2010-2020)	none	Quercus lobata	Valley Oak														
9	6	18	Arcade Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	100-120	none	Flat	Y	N - CASGEM Well 48017 (Well 10, 09N05E13L002M) avg DTW = 106 (47 points; 2010-2020)	Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
9	6	19	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	90-105	none	Flat	Y	N - CASGEM Well 48017 (Well 10, 09N05E13L002M) avg DTW = 106 (47 points; 2010-2020)	none	Quercus lobata	Valley Oak														
9	6	20	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	75-100	none	N	Flat	N - CASGEM Well 9641 (DWR_SGA_004, 09N05E25J001M) avg DTW = 95 (213 points, 2000-2021)	none	Quercus lobata	Valley Oak														
9	6	21	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	No GDEs	65-100	none	N	Flat	N - CASGEM Well 9641 (DWR_SGA_004, 09N05E25J001M) avg DTW = 95 (213 points, 2000-2021)	none	Quercus lobata	Valley Oak														
9	6	22	American River	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	60-80	Swainson's Hawk			no representative hydrographs within contour interval	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Heterotheca oregona*	Oregon Goldenaster	Acer negundo	Box-elder	Juglans hindsii and hybrids*	No California Black Walnut								
9	6	23	American River	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	70-80	Valley Elderberry Longhorn Beetle, Bank Swallow			no representative hydrographs within contour interval	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Heterotheca oregona*	Oregon Goldenaster	Salix exigua	Narrowleaf Willow								
9	6	24	American River	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	70	none			no representative hydrographs within contour interval	Palustrine, Forested, Seasonally Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Acer negundo	Box-elder												
9	6	27	American River	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	55-65	Valley Elderberry Longhorned Beetle	Flat	N	N - CASGEM Well 9649 (SCGA #24, 09N06E33R001M) avg DTW = 51 (29 points; 2000-2020) N - CASGEM Well 48014 (SGA MW06, 08N06E05) avg DTW = 40 (72 points; 2007-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded	Quercus lobata	Valley Oak	Heterotheca oregona*	Oregon Goldenaster	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow								
9	6	28	American River	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	55-70	none	Flat	N	N - CASGEM Well 9649 (SCGA #24, 09N06E33R001M) avg DTW = 51 (29 points; 2000-2020) N - CASGEM Well 48014 (SGA MW06, 08N06E05) avg DTW = 40 (72 points; 2007-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded	Heterotheca oregona*	Oregon Goldenaster	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Alnus rhombifolia	White Alder	Salix gooddingii	Goodding's willow						
9	6	29	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	55-85	none	N	Flat	N - CASGEM Well 9641 (DWR_SGA_004, 09N05E25J001M) avg DTW = 95 (213 points, 2000-2021)	none																

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
9	6	30	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	75-95	none	N	Flat	N - CASGEM Well 9641 (DWR_SGA_004, 09N05E25J001M) avg DTW = 95 (213 points, 2000-2021)	none															
9	6	31	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	40-80	none	Flat	Flat	N - CASGEM Well 48021 (MW12A, 09N05E35) avg DTW = 62 (27 points, 2010-2020	none															
9	6	32	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	40-60	none			no representative hydrographs within contour interval	none															
9	6	33	American River	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	45-55	none	Flat	N	N - CASGEM Well 9649 (SCGA #24, 09N06E33R001M) avg DTW = 51 (29 points; 2000-2020) N - CASGEM Well 48014 (SGA MW06, 08N06E05) avg DTW = 40 (72 points; 2007-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Populus fremontii	Fremont Cottonwood	Salix gooddingii	Goodding's Willow	Quercus lobata	Valley Oak	Acer negundo	Box-elder	Alnus rhombifolia	White Alder						
9	7	3	American River	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Quercus lobata is located where DTW is greater than 30 ft (50 ft)[1]. Populus fremontii has a maximum rooting depth of 16.4[1]. Salix gooddingii and Salix exigua (using rooting depth for S. gooddingii of 6.89 ft) requires surface water and elevated water table[1].	30-50	none			no representative hydrographs within contour interval	Palustrine, Scrub-Shrub, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow										
9	7	4	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	50-100	none			no representative hydrographs within contour interval	none															
9	7	5	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	75-105	none			no representative hydrographs within contour interval	none															
9	7	6	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	90-105	none			no representative hydrographs within contour interval	none															
9	7	7	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	75-95	none			no representative hydrographs within contour interval	none															
9	7	8	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	60-90	none			no representative hydrographs within contour interval	none															
9	7	9	American River/Folsom Lake Rec Area	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting	Can be eliminated as DTW is greater than 30 ft	40-50	Vernal Pool Fairy Shrimp			no representative hydrographs within contour interval	Palustrine, Forested, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Schoenoplectus acutus*	Hardstem Bullrush	Salix gooddingii	Goodding's Willow							

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
						depths less than DTW																							
9	7	10	American River/Folsom Lake Rec Area	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation Species has rooting depth less than DTW	Populus fremontii has a maximum rooting depth of 16.4[1].	25-45	none			no representative hydrographs within contour interval	Palustrine, Scrub-Shrub, Seasonally Flooded	Populus fremontii	Fremont Cottonwood															
9	7	15	Alder Creek Development	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation w/in NASb boundary	No GDEs within NASb boundary	30	none			no representative hydrographs within contour interval	none																	
9	7	16	American River	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	40-50	Valley Elderberry Longhorn Beetle			no representative hydrographs within contour interval	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak													
9	7	17	American River/Sailor Bar	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	55-70	Vernal Pool Fairy Shrimp, Valley Elderberry Longhorn Beetle			no representative hydrographs within contour interval	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Juglans hindsii and hybrids*	Northern Cal Black Walnut	Alnus rhombifolia	White Alder								
9	7	18	American River Parkway	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	70-80	none			no representative hydrographs within contour interval	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak													
10	3	1	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	10-20	Valley Elderberry Longhorn Beetle	Flat	Flat	Y - CASGEM Well 51223 (TNBC Atkinson, 10N04E07) avg DTW = 16 (46 points; 2015-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak															

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	3	12	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	10-20	Swainson's Hawk	Flat	Flat	Y - CASGEM Well 51223 (TNBC Atkinson, 10N04E07) avg DTW = 16 (46 points; 2015-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood												
10	3	13	Sacramento River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Giant garter snake Swainson's Hawk	Flat	Flat	Y - CASGEM Well 51223 (TNBC Atkinson, 10N04E07) avg DTW = 16 (46 points; 2015-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow										
10	3	23	Teal Bend Golf Course	1	Not likely	Vegetation species location on golf course likely supported by irrigation. Critical Species may be present Lack of diverse vegetation	Teal Bend GC was built in 1997. The current growth pattern of Q. lobata and P. fremontii do not follow the pattern of same species in the area. Vegetation on the golf course is likely supported by artificial irrigation. Aerial photos from 1993 show that the area was used for agriculture.	0-10	Swainson's Hawk	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004M) avg DTW =9 (162 points; 2000-2020)	Palustrine, Unconsolidated Bottom, Permanently Flooded, Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood												
10	3	24	Teal Bend Golf Course/Sac International Airport	1	Not likely	Vegetation species location on golf course likely supported by irrigation. No Critical Species Lack of diverse vegetation	Teal Bend GC was built in 1997. The current growth pattern of Q. lobata and P. fremontii do not follow the pattern of same species in the area. Vegetation on the golf course is likely supported by artificial irrigation. Aerial photos from 1993 show that the area was used for agriculture.	0-10	none	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004M) avg DTW =9 (162 points; 2000-2020)	Palustrine, Scrub-Shrub, Seasonally Flooded, Palustrine, Aquatic Bed, Permanently Flooded	Quercus lobata	Valley Oak												
10	3	25	Teal Bend Golf Course/Sac International Airport	1	Not likely	Vegetation species location on golf course likely supported by irrigation. Critical Species may be present Lack of diverse vegetation	Teal Bend GC was built in 1997. The current growth pattern of Q. lobata and P. fremontii do not follow the pattern of same species in the area. Vegetation on the golf course is likely supported by artificial irrigation. Aerial photos from 1993 show that the area was used for agriculture.	0-10	Swainson's Hawk	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004M) avg DTW =9 (162 points; 2000-2020)	Palustrine, Scrub-Shrub, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded, Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak	Salix exigua	Narrowleaf Willow												
10	3	26	Teal Bend Golf Course/Sacramento River	1	Not likely	Vegetation species location on golf course likely supported by irrigation. No Critical Species Lack of diverse vegetation	Teal Bend GC was built in 1997. The current growth pattern of Q. lobata and P. fremontii do not follow the pattern of same species in the area. Vegetation on the golf course is likely supported by artificial	0-10	none	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004M) avg DTW =9 (162 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Platanus racemosa	California Sycamore												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
							irrigation. Aerial photos from 1993 show that the area was used for agriculture.																					
10	3	27	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0	Swainson's Hawk	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004M) avg DTW =9 (162 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood												
10	3	34	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0	Swainson's Hawk	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004M) avg DTW =9 (162 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood												
10	3	35	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004M) avg DTW =9 (162 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Platanus racemosa	California Sycamore												
10	3	36	Sacramento International Airport	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	<10	none	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004M) avg DTW =9 (162 points; 2000-2020)	none																
10	4	1	Steelhead Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	30-45	Swainson's Hawk	N	N	N - CASGEM Well 50874 (L-5, 10N04E01) avg DTW = 58 (87 points, 2014-2021)	none																
10	4	2	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	15-30	Giant Gartersnake			no representative hydrographs within contour interval	none																
10	4	3	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	15	none	Flat	Flat	Y - CASGEM Well 51223 (TNBC Atkinson, 10N04E07) avg DTW = 16 (46 points; 2015-2020)	none																
10	4	4	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10-15	Giant Gartersnake	Flat	Flat	Y - CASGEM Well 51223 (TNBC Atkinson, 10N04E07) avg DTW = 16 (46 points; 2015-2020)	none																
10	4	5	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10-15	Giant Gartersnake	Flat	Flat	Y - CASGEM Well 51223 (TNBC Atkinson, 10N04E07) avg DTW = 16 (46 points; 2015-2020)	none																

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	4	6	Unnamed drainage	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	1952 Aerial photo shows little native vegetation, ag land predominates. 1981 Aerial photo shows area was a mobile home park surrounded by farm land. Quercus are also located along what appears to be an artificial drainage associated with nearby ag	0-10	none	Flat	Flat	Y - CASGEM Well 51223 (TNBC Atkinson, 10N04E07) avg DTW = 16 (46 points; 2015-2020)	none	Quercus lobata	Valley Oak																
10	4	7	Unnamed drainage	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Populus fremontii has a maximum rooting depth of 16.4[1]. Typha angustifolia habitat is marshy with shallow surface water[2]. Species are located adjacent to a canal and are likely supported by surface water.	10-20	Giant garter snake	Flat	Flat	Y - CASGEM Well 51223 (TNBC Atkinson, 10N04E07) avg DTW = 16 (46 points; 2015-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail	Populus fremontii	Fremont Cottonwood														
10	4	8	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10	Giant Gartersnake	Flat	Flat	Y - CASGEM Well 51223 (TNBC Atkinson, 10N04E07) avg DTW = 16 (46 points; 2015-2020)	none																
10	4	9	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	10	none	Flat	Flat	Y - CASGEM Well 51223 (TNBC Atkinson, 10N04E07) avg DTW = 16 (46 points; 2015-2020)	none																
10	4	10	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10	Giant Gartersnake	Flat	Flat	Y - CASGEM Well 32580 (SCWA_SGA_006, 10N04E23A001M) avg DTW = 6 (42 points, 2000-2020)	none																
10	4	11	Aquaculture (Sterling Caviar)/Natomas Basin Preserve	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Species have shallow rooting depth and are located on and adjacent to aquiculture facility and are likely dependent on artificial surface water sources.	10-20	Giant garter snake	Flat	Flat	Y - CASGEM Well 32580 (SCWA_SGA_006, 10N04E23A001M) avg DTW = 6 (42 points, 2000-2020)	Palustrine, Unconsolidated Shore, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail	Schoenoplectus acutus*	Hardstem Bullrush												
10	4	12	Aquaculture (Sterling Caviar)/Natomas Basin Preserve	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Species have shallow rooting depth and are located on and adjacent to aquiculture facility and are likely dependent on artificial surface water sources.	20-40	Tri-Colored Blackbird	Flat	Flat	Y - CASGEM Well 15688 (SCWA_SGA_007, 10N04E24B001M) avg DTW = 18 (35 points, 2000-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Schoenoplectus acutus*	Hardstem Bullrush														
10	4	13	Steelhead Ck	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10-30	Giant Gartersnake	Flat	Flat	Y - CASGEM Well 15688 (SCWA_SGA_007, 10N04E24B001M) avg DTW = 18 (35 points, 2000-2020)	none																
10	4	14	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	10	none	Flat	Flat	Y - CASGEM Well 32580 (SCWA_SGA_006, 10N04E23A001M) avg DTW = 6 (42 points, 2000-2020)	none																

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	4	15	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10	Giant Gartersnake	Flat	Flat	Y - CASGEM Well 32580 (SCWA_SGA_006, 10N04E23A001M) avg DTW = 6 (42 points, 2000-2020)	none														
10	4	16	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	10	none	Flat	Flat	Y - CASGEM Well 32580 (SCWA_SGA_006, 10N04E23A001M) avg DTW = 6 (42 points, 2000-2020)	none														
10	4	17	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10	Giant Gartersnake	Flat	Flat	Y - CASGEM Well 51223 (TNBC Atkinson, 10N04E07) avg DTW = 16 (46 points; 2015-2020)	none														
10	4	18	Unnamed drainage	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Giant garter snake	Flat	Flat	Y - CASGEM Well 51223 (TNBC Atkinson, 10N04E07) avg DTW = 16 (46 points; 2015-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail	Salix exigua	Narrowleaf Willow	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak							
10	4	19	Sacramento International Airport	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	No GDEs	<10	Giant garter snake	Flat	Flat	Y - CASGEM Well 51223 (TNBC Atkinson, 10N04E07) avg DTW = 16 (46 points; 2015-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix exigua	Narrowleaf Willow												
10	4	20	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10	Giant garter snake	Flat	Flat	Y - CASGEM Well 32580 (SCWA_SGA_006, 10N04E23A001M) avg DTW = 6 (42 points, 2000-2020)	none														
10	4	21	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10	Giant garter snake	Flat	Flat	Y - CASGEM Well 32580 (SCWA_SGA_006, 10N04E23A001M) avg DTW = 6 (42 points, 2000-2020)	none														
10	4	22	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10	Giant garter snake	Flat	Flat	Y - CASGEM Well 32580 (SCWA_SGA_006, 10N04E23A001M) avg DTW = 6 (42 points, 2000-2020)	none														
10	4	23	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10	Giant garter snake	Flat	Flat	Y - CASGEM Well 32580 (SCWA_SGA_006, 10N04E23A001M) avg DTW = 6 (42 points, 2000-2020)	none														
10	4	24	Steelhead Ck	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10-30	Giant garter snake	Flat	Flat	Y - CASGEM Well 15688 (SCWA_SGA_007, 10N04E24B001M) avg DTW = 18 (35 points, 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded														
10	4	25	Steelhead Ck	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	15-35	none	Flat	Flat	Y - CASGEM Well 15688 (SCWA_SGA_007, 10N04E24B001M) avg DTW = 18 (35 points, 2000-2020)	Palustrine, Emergent, Persistent, Semipermanently Flooded														
10	4	26	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10-25	Giant Gartersnake	Flat	Flat	Y - CASGEM Well 15690 (AB-3 shallow, 10N04E27R004M) avg DTW =17 (164 points; 2000-2020)	none														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	4	27	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10-15	Giant Gartersnake	Flat	Flat	Y - CASGEM Well 15690 (AB-3 shallow, 10N04E27R004 M) avg DTW =17 (164 points; 2000-2020)	none																
10	4	28	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10-15	Giant Gartersnake	Flat	Flat	Y - CASGEM Well 15690 (AB-3 shallow, 10N04E27R004 M) avg DTW =17 (164 points; 2000-2020)	none																
10	4	29	East of Sacramento International Airport	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10	Giant Gartersnake	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004 M) avg DTW =9 (162 points; 2000-2020)	none																
10	4	30	Sacramento International Airport	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	<10	none	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004 M) avg DTW =9 (162 points; 2000-2020)	none																
10	4	31	Sacramento International Airport	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	<10	Swainson's Hawk	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004 M) avg DTW =9 (162 points; 2000-2020)	Palustrine, Unconsolidated Shore, Seasonally Flooded																
10	4	32	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10	Giant Gartersnake	Flat	Flat	Y - CASGEM Well 24318 (AB-4 shallow, 10N04E31M004 M) avg DTW =9 (162 points; 2000-2020)	none																
10	4	33	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10-15	Giant Gartersnake	Flat	Flat	Y - CASGEM Well 15690 (AB-3 shallow, 10N04E27R004 M) avg DTW =17 (164 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded																
10	4	34	Residential/Commercial	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDE's	15-25	none	Flat	Flat	Y - CASGEM Well 15690 (AB-3 shallow, 10N04E27R004 M) avg DTW =17 (164 points; 2000-2020)	none																
10	4	35	Residential/Commercial	2	Less likely	DTW < 30 ft Critical Species likely extirpated Lack of diverse vegetation	Populus fremontii has a maximum rooting depth of 16.4 ft[1].	20-30	Giant Gartersnake (possibly extirpated) - area has been developed	Flat	Flat	Y - CASGEM Well 15690 (AB-3 shallow, 10N04E27R004 M) avg DTW =17 (164 points; 2000-2020)	none	Populus fremontii	Fremont Cottonwood														
10	4	36	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	25-30	Giant garter snake Swainson's Hawk	Flat	Flat	Y - CASGEM Well 8921 (SCWA_SGA_001, 09N04E01R001 M) avg DTW = 29 (34 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded																
10	5	1	Curry Ck	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	115-130	none	N	N	N - CASGEM Well 48573 (SVMW West - 1A, 11N05E35) avg DTW = 111 (85 points, 2011-2021	none																
10	5	2	Curry Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation		105-115	none	N	N	N - CASGEM Well 48573 (SVMW West - 1A, 11N05E35) avg DTW = 111 (85 points, 2011-2021	Palustrine, Emergent, Persistent, Seasonally Flooded	Schoenoplectus acutus	Hardstem Bullrush														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	5	3	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	95-105	none	N	N	N - CASGEM Well 48573 (SVMW West - 1A, 11N05E35) avg DTW = 111 (85 points, 2011-2021	none														
10	5	4	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	80-90	none			no representative hydrographs within contour interval	none														
10	5	5	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	70-80	none	Flat	Flat	N - CASGEM Well 48009 (SGA_MW01, 10N05E17) avg DTW = 62 (19 points, 2011-2021)	none														
10	5	6	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	45-60	none	Flat	Flat	N - CASGEM Well 48009 (SGA_MW01, 10N05E17) avg DTW = 62 (19 points, 2011-2021)	none														
10	5	7	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	40-60	Swainson's Hawk	Flat	Flat	N - CASGEM Well 48009 (SGA_MW01, 10N05E17) avg DTW = 62 (19 points, 2011-2021)	none														
10	5	8	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	70-80	Vernal Pool Fairy Shrimp	Flat	Flat	N - CASGEM Well 48009 (SGA_MW01, 10N05E17) avg DTW = 62 (19 points, 2011-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded														
10	5	9	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	80-90	Vernal Pool Fairy Shrimp			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded														
10	5	10	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	90-100	none			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded														
10	5	11	Dry Creek	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	110-120	Swainson's Hawk	N	Flat	N - CASGEM Well 48043 (Lone Oak Park, 10N05E13F001M) avg DTW = 122 (30 points, 2011-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak												
10	5	12	Dry Creek	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	115-130	none	N	Flat	N - CASGEM Well 48043 (Lone Oak Park, 10N05E13F001M) avg DTW = 122 (30 points, 2011-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak												
10	5	13	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	125-140	none	N	Flat	N - CASGEM Well 48043 (Lone Oak Park, 10N05E13F001M) avg DTW = 122 (30 points, 2011-2020)	none														
10	5	14	Antelope Greens Golf Course/Gibson Ranch County Park	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	100-110	none	Flat	Flat	N - CASGEM Well 13654 (SCWA_SGA_009, 10N05E26B002M) avg DTW = 107 (40 points, 2000-2021)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	5	15	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	90-100	Vernal Pool Fairy Shrimp	Flat	Flat	N - CASGEM Well 13654 (SCWA_SGA_009, 10N05E26B002 M) avg DTW = 107 (40 points, 2000-2021)	none																
10	5	16	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	80-90	Vernal Pool Fairy Shrimp			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded																
10	5	17	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	60-80	none	Flat	Flat	N - CASGEM Well 48009 (SGA_MW01, 10N05E17) avg DTW = 62 (19 points, 2011-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded																
10	5	18	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	35-65	none	Flat	Flat	N - CASGEM Well 48009 (SGA_MW01, 10N05E17) avg DTW = 62 (19 points, 2011-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded																
10	5	19	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	30-55	Vernal Pool Fairy Shrimp	Flat	N/Flat	N - CASGEM Well 48010 (SGA_MW02, 10N05E32) avg DTW = 64 (35 points, 2011-2020 Y - CASGEM Well 15688 (SCWA_SGA_007, 10N04E24B001 M) avg DTW = 18 (35 points, 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded																
10	5	20	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	55-75	none	Flat	N	N - CASGEM Well 48010 (SGA_MW02, 10N05E32) avg DTW = 64 (35 points, 2011-2020	Palustrine, Emergent, Persistent, Seasonally Flooded																
10	5	21	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	75-90	none			no representative hydrographs within contour interval	none																
10	5	22	Dry Creek	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	90-100	none	Flat	Flat	N - CASGEM Well 13654 (SCWA_SGA_009, 10N05E26B002 M) avg DTW = 107 (40 points, 2000-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Populus Fremontii	Fremont Cottonwood												
10	5	23	Cherry Island Golf Course/Soccer Complex	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	100-115	none	Flat	Flat	N - CASGEM Well 13654 (SCWA_SGA_009, 10N05E26B002 M) avg DTW = 107 (40 points, 2000-2021)	Palustrine, Scrub-Shrub, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Acer negundo	Box-elder												
10	5	24	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	120-155	none	Flat	Flat	N - CASGEM Well 13654 (SCWA_SGA_009, 10N05E26B002 M) avg DTW = 107 (40 points, 2000-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail	Persicaria lapathifolia*	Curly-topped knotweed												
10	5	25	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	130-160	none	N	N	N - CASGEM Well 48026 (Well 15, 09N06E06A001 M) avg DTW = 119 (23 points, 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded																
10	5	26	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	100-130	none	Flat	Flat	N - CASGEM Well 13654 (SCWA_SGA_009, 10N05E26B002 M) avg DTW = 107 (40 points, 2000-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded																

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	5	27	Dry Creek Parkway	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	90-100	none	Flat	Flat	N - CASGEM Well 13654 (SCWA_SGA_009, 10N05E26B002 M) avg DTW = 107 (40 points, 2000-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow												
10	5	28	Dry Creek	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	70-80	none	Flat	Flat	N - CASGEM Well 13654 (SCWA_SGA_009, 10N05E26B002 M) avg DTW = 107 (40 points, 2000-2021)	Palustrine, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak														
10	5	29	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	55-70	none	Flat	Flat	N - CASGEM Well 48011 (SGA_MW03, 10N05E32) avg DTW = 70 (35 points, 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded																
10	5	30	East of Steelhead Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	30-40	none	Flat	Flat	Y - CASGEM Well 8921 (SCWA_SGA_001, 09N04E01R001 M) avg DTW = 29 (34 points; 2000-2020)	Palustrine, Scrub-Shrub, Semipermanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Scrub-Shrub, Semipermanently Flooded	Persicaria lapathifolia*	Curlytop Knotweed														
10	5	31	East of Steelhead Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Populus fremontii has a maximum rooting depth of 16.4[1]. DTW is greater than 30 ft. Species is likely dependent on surface water from Steelhead Ck., not groundwater.	30-40	Vernal Pool Fairy Shrimp	Flat	Flat	Y - CASGEM Well 8921 (SCWA_SGA_001, 09N04E01R001 M) avg DTW = 29 (34 points; 2000-2020)	none	Populus fremontii	Fremont Cottonwood														
10	5	32	Dry Creek Parkway	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	60-70	Swainson's Hawk	Flat	Flat	N - CASGEM Well 48011 (SGA_MW03, 10N05E32) avg DTW = 70 (35 points, 2011-2020)	Palustrine, Forested, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak														
10	5	33	Central Park/Central Park Horse Area	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	70-90	none	Flat	Flat	N - CASGEM Well 48011 (SGA_MW03, 10N05E32) avg DTW = 70 (35 points, 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak														
10	5	34	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	90-110	none			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded																
10	5	35	McClellan AFB	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	110-120	none	N	N	N - CASGEM Well 48026 (Well 15, 09N06E06A001 M) avg DTW = 119 (23 points, 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood														
10	5	36	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	130-160	none	N	N	N - CASGEM Well 48026 (Well 15, 09N06E06A001 M) avg DTW = 119 (23 points, 2011-2020)	none																
10	6	1	Dry Ck	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation Species has rooting depth less than DTW	Populus fremontii has a maximum rooting depth of 16.4[1].	20-35	none	Flat	Flat	Y - CASGEM Well 51287 (WPMW-10A, 10N06E01) avg DTW = 14 (69 points; 2015-2020) Y - CASGEM Well 51286 (WPMW-9A, 10N06E01) avg DTW = 13 (69 points; 2015-2020)	none	Populus fremontii	Fremont Cottonwood														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	6	2	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Populus fremontii has a maximum rooting depth of 16.4[1].	30-65	none			no representative hydrographs within contour interval	none	Populus fremontii	Fremont Cottonwood												
10	6	3	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	65-105	none			no representative hydrographs within contour interval	none														
10	6	4	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	110-140	none	N	N	N - CASGEM Well 13659 (10N06E05H001M) avg DTW = 148 (229 points, 2000-2020)	none														
10	6	5	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	140	none	N	N	N - CASGEM Well 13659 (10N06E05H001M) avg DTW = 148 (229 points, 2000-2020)	none														
10	6	6	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	130-140	none	N	Flat	N - CASGEM Well 48043 (Lone Oak Park, 10N05E13F001M) avg DTW = 122 (30 points, 2011-2020)	none														
10	6	7	Lower Dry Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	130-145	none	N	Flat	N - CASGEM Well 48043 (Lone Oak Park, 10N05E13F001M) avg DTW = 122 (30 points, 2011-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak												
10	6	8	Lower Dry Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	140-150	none	N	N	N - CASGEM Well 48038 (Antelope North (A), 10N06E16) avg DTW = 147 (23 points; 2011-2020) N - CASGEM Well 13659 (10N06E05H001M) avg DTW = 148 (229 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded, Palustrine, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak												
10	6	9	Lower Dry Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	110-140	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 48038 (Antelope North (A), 10N06E16) avg DTW = 147 (23 points; 2011-2020) N - CASGEM Well 13659 (10N06E05H001M) avg DTW = 148 (229 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Juglans hindsii and hybrids*	No California Black Walnut	Salix lasiolepis	Arroyo Willow	Populus fremontii	Fremont Cottonwood						
10	6	10	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	70-120	none	N	N	N - CASGEM Well 48038 (Antelope North (A), 10N06E16) avg DTW = 147 (23 points; 2011-2020) N - CASGEM Well 13659 (10N06E05H001M) avg DTW = 148 (229 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood										

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	6	11	Cirby Ck/Dry Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	40-80	none	Flat	Flat	Y - CASGEM Well 51287 (WPMW-10A, 10N06E01) avg DTW = 14 (69 points; 2015-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Fraxinus latifolia*	Oregon Ash										
10	6	12	Cirby Ck/Linda Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	30-60	none	Flat	Flat	Y - CASGEM Well 51287 (WPMW-10A, 10N06E01) avg DTW = 14 (69 points; 2015-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak														
10	6	13	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	60-85	none			no representative hydrographs within contour interval	none	Quercus lobata	Valley Oak														
10	6	14	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	65-105	none			no representative hydrographs within contour interval	none																
10	6	15	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	90-130	none			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded																
10	6	16	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	120-160	none	N	N	N - CASGEM Well 48038 (Antelope North (A), 10N06E16) avg DTW = 147 (23 points, 2011-2020)	none																
10	6	17	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	150-170	none	N	N	N - CASGEM Well 48038 (Antelope North (A), 10N06E16) avg DTW = 147 (23 points, 2011-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded																
10	6	18	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	130-165	none			no representative hydrographs within contour interval	none																
10	6	19	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	145-185	none	N	N	N - CASGEM Well 33087 (SCWA_SGA_010, 10N06E21F002M) avg DTW = 174 (36 points, 2000-2021)	none																

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	6	20	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	165-185	none	N	N	N - CASGEM Well 48030 (Monument A, 10N06E20) avg DTW = 195 (19 points, 2011-2020)	none																
10	6	21	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	135-170	none	N	N	N - CASGEM Well 33087 (SCWA_SGA_010, 10N06E21F002M) avg DTW = 174 (36 points, 2000-2021)	none																
10	6	22	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	105-140	none	N	N	N - CASGEM Well 48042 (Twin Creeks Park, 10N06E27F001M) avg DTW = 133 (25 points, 2011-2020)	Palustrine, Forested, Seasonally Flooded																
10	6	23	Cripple Ck	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	90-115	none	N	N	N - CASGEM Well 48042 (Twin Creeks Park, 10N06E27F001M) avg DTW = 133 (25 points, 2011-2020)	Palustrine, Forested, Seasonally Flooded																
10	6	24	Madera Park	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	80-90	none	Flat	Flat	N - CASGEM Well 13803 (SGWA_SGA_11, 10N07E20) avg DTW = 117 (19 points, 2011-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak														
10	6	25	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	No GDEs	105-125	none	Flat	Flat	N - CASGEM Well 48015 (SGA_MW08, 10N07E21) avg DTW = 106 (19 points, 2011-2020)	Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	6	26	Arcade Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	110-120	none	N	N	N - CASGEM Well 48042 (Twin Creeks Park, 10N06E27F001M) avg DTW = 133 (25 points, 2011-2020)	Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak														
10	6	27	Cripple Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	120-140	none	N	N	N - CASGEM Well 48042 (Twin Creeks Park, 10N06E27F001M) avg DTW = 133 (25 points, 2011-2020)	Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak														
10	6	28	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	140-170	none	N	N	N - CASGEM Well 48042 (Twin Creeks Park, 10N06E27F001M) avg DTW = 133 (25 points, 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak														
10	6	29	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	170-180	none	N	N	N - CASGEM Well 48030 (Monument A, 10N06E20) avg DTW = 195 (19 points, 2011-2020)	none																
10	6	30	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	160-180	none	N	N	N - CASGEM Well 48030 (Monument A, 10N06E20) avg DTW = 195 (19 points, 2011-2020)	none																
10	6	31	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	150-175	none	N	N	N - CASGEM Well 48026 (Well 15, 09N06E06A001M) avg DTW = 119 (23 points, 2011-2020)	none																
10	6	32	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	145-175	none	Flat	N	N - CASGEM Well 48013 (SGA_MW-5, 09N06E05) avg DTW = 144 (29 points; 2009-2020)	none																
10	6	33	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	135-160	none	Flat	Flat	N - CASGEM Well 48029 (Well N28, 09N06E03C001M) avg DTW = 134 (43 points, 2011-2020)	none	Quercus lobata	Valley Oak														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	6	34	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	125-140	none	Flat	Flat	N - CASGEM Well 48029 (Well N28, 09N06E03C001M) avg DTW = 134 (43 points, 2011-2020)	none	Quercus lobata	Valley Oak												
10	6	35	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	115-125	none	Flat	Flat	N - CASGEM Well 48029 (Well N28, 09N06E03C001M) avg DTW = 134 (43 points, 2011-2020)	none	Quercus lobata	Valley Oak												
10	6	36	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	110	none	N	N	N - CASGEM Well 48042 (Twin Creeks Park, 10N06E27F001M) avg DTW = 133 (25 points, 2011-2020)	none	Quercus lobata	Valley Oak												
10	7	4	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	30-50	none	N	N	Y - CASGEM Well 51283 (WPMW-7A, 10N07E05) avg DTW = 21 (69 points; 2015-2020) Y - CASGEM Well 51284 (WPMW-8A, 10N07E05) avg DTW = 29 (69 points; 2015-2020)	none														
10	7	5	Miner's Ravine	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation Species has rooting depth less than DTW	Salix exigua has shallow rooting depth and generally occurs near surface water	20-30	none	N	N	Y - CASGEM Well 51283 (WPMW-7A, 10N07E05) avg DTW = 21 (69 points; 2015-2020) Y - CASGEM Well 51284 (WPMW-8A, 10N07E05) avg DTW = 29 (69 points; 2015-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Salix exigua	Narrowleaf Willow												
10	7	6	Residential/Commercial	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	20-30	none	N	N	Y - CASGEM Well 51283 (WPMW-7A, 10N07E05) avg DTW = 21 (69 points; 2015-2020) Y - CASGEM Well 51284 (WPMW-8A, 10N07E05) avg DTW = 29 (69 points; 2015-2020)	none														
10	7	7	Linda Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft.	40-60	none	N	N	no representative hydrographs within contour interval	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak												
10	7	8	Strap Ravine/Maidu Regional Park	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	40-60	none	Y/N	Y/N	no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Typha angustifolia*	Narrowleaf Cattail	Quercus lobata	Valley Oak	Schoenoplectus acutus*	Hardstem Bullrush						

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	7	9	Strap Ravine	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	55-65	Valley Elderberry Longhorn Beetle Tricolored Blackbird	Y/N	Y/N	no representative hydrographs within contour interval	Palustrine, Unconsolidated Bottom, Semipermanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Typha angustifolia*	Narrowleaf Cattail	Salix exigua	Narrowleaf Willow										
10	7	10	Strap Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	50-60	none	Y/N	Y/N	no representative hydrographs within contour interval	none	Populus fremontii	Fremont Cottonwood														
10	7	15	Residential	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	75-100	Valley Elderberry Longhorn Beetle	Flat	Flat	N - CASGEM Well 13803 (SGWA_SGA_11, 10N07E20) avg DTW = 117 (19 points, 2011-2020)	none																
10	7	16	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	70-90	none	Flat	Flat	N - CASGEM Well 13803 (SGWA_SGA_11, 10N07E20) avg DTW = 117 (19 points, 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail	Populus fremontii	Fremont Cottonwood	Salix lasiolepis	Arroyo Willow										
10	7	17	Linda Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	60-90	none	Flat	Flat	N - CASGEM Well 13803 (SGWA_SGA_11, 10N07E20) avg DTW = 117 (19 points, 2011-2020)	Palustrine, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak														
10	7	18	Cripple Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	55-85	none	Flat	Flat	N - CASGEM Well 13803 (SGWA_SGA_11, 10N07E20) avg DTW = 117 (19 points, 2011-2020)	none	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	7	19	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	85-105	none	Flat	Flat	N - CASGEM Well 13803 (SGWA_SGA_11, 10N07E20) avg DTW = 117 (19 points, 2011-2020)	none	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood										
10	7	20	Linda Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	90-110	none	Flat	Flat	N - CASGEM Well 13803 (SGWA_SGA_11, 10N07E20) avg DTW = 117 (19 points, 2011-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood										
10	7	21	Linda Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	90-110	none	Flat	Flat	N - CASGEM Well 33380 (SCWA_SGA_012, 10N07E29G001M) avg DTW = 109 (39 points, 2000-2020) N - CASGEM Well 48015 (SGA_MW08, 10N07E21) avg DTW = 106 (19 points, 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded	Quercus lobata	Valley Oak										
10	7	22	Bud and Artie Davis Park	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	Can be eliminated as DTW is greater than 30 ft	85-100	none	Flat	Flat	N - CASGEM Well 48015 (SGA_MW08, 10N07E21) avg DTW = 106 (19 points, 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded														
10	7	23	Adjacent to Folsom Lk	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	75-80	none			no representative hydrographs within contour interval	none														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	7	26	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	50-70	none			no representative hydrographs within contour interval	none														
10	7	27	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	80-100	none	Flat/Y	Flat	N - CASGEM Well 48015 (SGA_MW08, 10N07E21) avg DTW = 106 (19 points, 2011-2020) N - CASGEM Well 48016 (SGA_MW09, 10N07E28) avg DTW = 115 (35 points; 2011-2020)	Palustrine, Forested, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded	Populus fremontii	Fremont Cottonwood										
10	7	28	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	100-120	none	Flat/Y	Flat	N - CASGEM Well 48015 (SGA_MW08, 10N07E21) avg DTW = 106 (19 points, 2011-2020) N - CASGEM Well 48016 (SGA_MW09, 10N07E28) avg DTW = 115 (35 points; 2011-2020)	Palustrine, Scrub-Shrub, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak	Salix exigua	Narrowleaf Willow	Populus Fremontii	Fremont Cottonwood						
10	7	29	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation		110-120	none	Flat	Flat	N - CASGEM Well 33380 (SCWA_SGA_012, 10N07E29G001M) avg DTW = 109 (39 points, 2000-2020) N - CASGEM Well 48015 (SGA_MW08, 10N07E21) avg DTW = 106 (19 points, 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak										
10	7	30	Arcade Ck	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	105-115	none	Flat	Flat	N - CASGEM Well 33380 (SCWA_SGA_012, 10N07E29G001M) avg DTW = 109 (39 points, 2000-2020) N - CASGEM Well 48015 (SGA_MW08, 10N07E21) avg DTW = 106 (19 points, 2011-2020)	Palustrine, Forested, Seasonally Flooded												
10	7	31	Sunrise Golf Course/Tempo Park	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	110	none	Flat	Flat	N - CASGEM Well 33380 (SCWA_SGA_012, 10N07E29) avg DTW = 109 (41 points, 2000-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak										

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
10	7	32	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	90-120	none	Flat	Flat	N - CASGEM Well 33380 (SCWA_SGA_012, 10N07E29) avg DTW = 109 (41 points, 2000-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded																		
10	7	33	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	75-120	none	Flat/Y	Flat	N - CASGEM Well 48015 (SGA_MW08, 10N07E21) avg DTW = 106 (19 points, 2011-2020) N - CASGEM Well 48016 (SGA_MW09, 10N07E28) avg DTW = 115 (35 points; 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded																		
10	7	34	American River/Negro Bar	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	50-60	none			no representative hydrographs within contour interval	none	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood														
10	7	35	American River	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	40-60	none			no representative hydrographs within contour interval	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak	Alnus rhombifolia	White Alder	Populus Fremontii	Fremont Cottonwood												
11	3	1	Main Canal	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	0	Giant Gartersnake	Flat	N	Y - CASGEM Well 47776 (Sut Co MW-5A, 11N03E02Q002M) avg DTW = 9 (62 points; 2012-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded, California Warm Temperate Marsh/Seep																		
11	3	2	Unspecified area	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	0	Giant Gartersnake	Flat	N	Y - CASGEM Well 47776 (Sut Co MW-5A, 11N03E02Q002M) avg DTW = 9 (62 points; 2012-2021)	none																		

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
11	3	3	Sacramento River	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	0	none	Flat	N	Y - CASGEM Well 47776 (Sut Co MW-5A, 11N03E02Q002M) avg DTW = 9 (62 points; 2012-2021)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak														
11	3	4	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0	Giant Gartersnake	Flat	N	Y - CASGEM Well 47776 (Sut Co MW-5A, 11N03E02Q002M) avg DTW = 9 (62 points; 2012-2021)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak														
11	3	9	Feather River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Flat/N	N*/N	Y - CASGEM Well 12777 (11N03E15C001M) avg DTW = 15 (135 points, 2000-2017) Y - CASGEM Well 47776 (Sut Co MW-5A, 11N03E02Q002M) avg DTW = 9 (61 points; 2012-2021)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Unconsolidated Bottom, Permanently Flooded	Platanus racemosa	California Sycamore	Salix Gooding	Goodding's Willow	Quercus lobata	Valley Oak										
11	3	10	Feather River	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	none	Flat	N*/N	Y - CASGEM Well 12777 (11N03E15C001M) avg DTW = 15 (135 points, 2000-2017) Y - CASGEM Well 47776 (Sut Co MW-5A, 11N03E02Q002M) avg DTW = 9 (61 points; 2012-2021)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus Fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak										
11	3	11	Unspecified area	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation		<10	none	Flat	N	Y - CASGEM Well 47776 (Sut Co MW-5A, 11N03E02Q002M) avg DTW = 9 (62 points; 2012-2021)	none	Salix exigua	Narrowleaf Cattail														
11	3	12	Main Canal	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Giant garter snake	Flat	N	Y - CASGEM Well 47776 (Sut Co MW-5A, 11N03E02Q002M) avg DTW = 9 (62 points; 2012-2021)	none	Typha angustifolia*	Narrowleaf Cattail														
11	3	13	Cross Canal	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	none	Flat	N	Y - CASGEM Well 47776 (Sut Co MW-5A, 11N03E02Q002M) avg DTW = 9 (62 points; 2012-2021)	none	Salix gooddingii	Goodding's Willow														
11	3	14	Main Canal and adjacent undisturbed area	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	none	Flat	N	Y - CASGEM Well 47776 (Sut Co MW-5A, 11N03E02Q002M) avg DTW = 9 (62 points; 2012-2021)	none	Quercus lobata	Valley Oak														
11	3	15	Feather River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Flat	N	Y - CASGEM Well 47776 (Sut Co MW-5A, 11N03E02Q002M) avg DTW = 9 (62 points; 2012-2021)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded	Populus Fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak										

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
11	3	22	Feather River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Bank Swallow Swainson's Hawk Tri-Colored Blackbird Valley Elderberry Longhorned Beetle	Flat	N*	Y - CASGEM Well 12777 (11N03E15C001M) avg DTW = 15 (135 points, 2000-2017)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus Fremontii	Fremont Cottonwood														
11	3	23	Feather River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Populus fremontii has a maximum rooting depth of 16.4 ft and Salix gooddingii has a maximum rooting depth of 6.89[1]. Location of species in on the riparian corridor. Quercus is pre-dominantly located along the Cross Canal and the Main Canal. Salix gooddingii is located an area that appears to be undisturbed as it remains the same in 2020 as aerial photos indicate in 1952	10-20	Swainson's Hawk	Flat	N*	Y - CASGEM Well 12777 (11N03E15C001M) avg DTW = 15 (135 points, 2000-2017)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Unconsolidated Shore, Seasonally Flooded, Palustrine, Forested, Seasonally Flooded	Populus Fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow										
11	3	24	Cross Canal	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	5-15	none	Flat	N*	Y - CASGEM Well 12777 (11N03E15C001M) avg DTW = 15 (135 points, 2000-2017)	none	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow										
11	3	25	Sacramento River	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	10-20	none	Flat	N	Y - CASGEM Well 10509 (11N04E19E002M) avg DTW = 16 (145 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood										
11	3	26	Sacramento River	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft	10	none	Flat	N	Y - CASGEM Well 10509 (11N04E19E002M) avg DTW = 16 (145 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood												
11	3	36	Sacramento River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	10-20	Swainson's Hawk	Flat	Flat	Y - CASGEM Well 51223 (TNBC Atkinson, 10N04E07) avg DTW = 16 (46 points; 2015-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak												
11	4	1	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	35-55	none	Y	N*/N	N - CASGEM Well 10503 (11N04E01M002M) avg DTW = 46 (177 points; 2000-2018) N - CASGEM Well 10508 (So Sut WD, 11N04E15Q001M) avg DTW = 36 (68 points; 2000-2020)	none														
11	4	2	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	20-40	none	Flat	N	Y - CASGEM Well 17037 (So Sut WD, 12N04E34H001M) avg DTW = 26 (23 points; 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded														

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11	4	3	King's Slough, unnamed drainage	2	Less likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Salix exigua are typically located at sites that have a generally high water table, and most stands are adjacent to flowing water[1]. Typha angustifolia habitat is marshy with shallow surface water[2].	10-20	none	Flat	Flat	Y - CASGEM Well 25773 (SUT-P1, 11N04E04N004M) avg DTW = 13 (59 points; 2015-2020)	Palustrine, Emergent, Persistent, Seasonally	Typha angustifolia*	Narrowleaf Cattail	Salix exigua	Narrowleaf Willow												
11	4	4	Cross Canal	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Flat	Flat	Y - CASGEM Well 25773 (SUT-P1, 11N04E04N004M) avg DTW = 13 (59 points; 2015-2020)	Palustrine, Forested, Seasonally Flooded	Salix gooddingii	Goodding's Willow	Salix exigua	Narrowleaf Willow	Typha angustifolia*	Narrowleaf Cattail	Populus Fremontii	Fremont Cottonwood								
11	4	5	Unspecified area	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	0-10	Swainson's Hawk, Giant Gartersnake	Flat	Flat	Y - CASGEM Well 25773 (SUT-P1, 11N04E04N004M) avg DTW = 13 (59 points; 2015-2020)	none																
11	4	6	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	0-10	Giant Gartersnake	Flat	Flat	Y - CASGEM Well 25773 (SUT-P1, 11N04E04N004M) avg DTW = 13 (59 points; 2015-2020)	none																
11	4	7	Cross Canal	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Giant garter snake	Flat	Flat	Y - CASGEM Well 25773 (SUT-P1, 11N04E04N004M) avg DTW = 13 (59 points; 2015-2020)	none	Salix gooddingii	Goodding's Willow	Populus fremontii	Fremont Cottonwood												
11	4	8	Cross Canal	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Giant garter snake Swainson's Hawk	Flat	Flat	Y - CASGEM Well 25773 (SUT-P1, 11N04E04N004M) avg DTW = 13 (59 points; 2015-2020)	none	Salix gooddingii	Goodding's Willow	Populus fremontii	Fremont Cottonwood												
11	4	9	Unspecified area	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Surface water species < .89 ac, predominantly in Section 4	0-10	Giant garter snake	Flat	N	Y - CASGEM Well 39806 (11N04E09D002M) avg DTW = 14 (172 points; 2000-2020)	none	Salix gooddingii	Goodding's Willow														
11	4	10	Pleasant Grove Creek Canal	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10-25	Swainson's Hawk	Flat	N	Y - CASGEM Well 17037 (So Sut WD, 12N04E34H001M) avg DTW = 26 (23 points; 2011-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded																
11	4	11	Pleasant Grove Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Populus fremontii has a maximum rooting depth of 16.4[1]. Quercus lobata has a maximum rooting depth of 24.02[1]. DTW is greater than 30 ft. Species is likely dependent on surface water from Pleasant Grove Ck., not groundwater. Can be eliminated because DTW is grater than 30 ft.	35-40	Vernal Pool Tadpole Shrimp	Y	N*/N	N - CASGEM Well 10503 (11N04E01M002M) avg DTW = 46 (177 points; 2000-2018) N - CASGEM Well 10508 (So Sut WD, 11N04E15Q001M) avg DTW = 36 (68 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Typha angustifolia*	Narrowleaf Cattail										

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
11	4	12	on Pleasant Grove Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	50-60	Swainson's Hawk	Y	N*/N	N - CASGEM Well 10503 (11N04E01M002M) avg DTW = 46 (177 points; 2000-2018) N - CASGEM Well 10508 (So Sut WD, 11N04E15Q001M) avg DTW = 36 (68 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow										
11	4	13	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	45-65	none	Y	N	N - CASGEM Well 10507 (So Sut WD, 11N04E13R001M) avg DTW = 81 (76 points; 2000-2020)	none														
11	4	14	Pleasant Grove Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Salix gooddingii has a rooting depth of 6.89[1]. DTW is deeper than rooting depth. Typha angustifolia habitat is marshy with shallow surface water[2].	30-45	Swainson's Hawk	Y	N*/N	N - CASGEM Well 10503 (11N04E01M002M) avg DTW = 46 (177 points; 2000-2018) N - CASGEM Well 10508 (So Sut WD, 11N04E15Q001M) avg DTW = 36 (68 points; 2000-2020)	none	Quercus lobata	Valley Oak	Typha angustifolia*	Narrowleaf Cattail	Salix exigua	Narrowleaf Willow								
11	4	15	Pleasant Grove Ck Canal	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Salix gooddingii has a rooting depth of 6.89[1]. DTW is deeper than rooting depth. Typha angustifolia habitat is marshy with shallow surface water[2].	15-30	none	Y	N*/N	N - CASGEM Well 10503 (11N04E01M002M) avg DTW = 46 (177 points; 2000-2018) N - CASGEM Well 10508 (So Sut WD, 11N04E15Q001M) avg DTW = 36 (68 points; 2000-2020)	none	Salix gooddingii	Goodding's Willow	Typha angustifolia*	Narrowleaf Cattail										
11	4	16	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	5-20	none	Flat	N	Y - CASGEM Well 39806 (11N04E09D002M) avg DTW = 14 (172 points; 2000-2020)	none														
11	4	17	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	0-10	none	Flat	N	Y - CASGEM Well 39806 (11N04E09D002M) avg DTW = 14 (172 points; 2000-2020)	none														
11	4	18	Cross Canal	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Giant garter snake Swainson's Hawk	Flat	N	Y - CASGEM Well 10509 (11N04E19E002M) avg DTW = 16 (145 points; 2000-2020)	none	Salix gooddingii	Goodding's Willow	Salix exigua	Narrowleaf Willow										
11	4	19	Unspecified area	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10-15	Giant Gartersnake	Flat	N	Y - CASGEM Well 10509 (11N04E19E002M) avg DTW = 16 (145 points; 2000-2020)	none														
11	4	20	Unspecified area	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10-15	Giant Gartersnake	Flat	N	Y - CASGEM Well 10509 (11N04E19E002M) avg DTW = 16 (145 points; 2000-2020)	none														
11	4	21	Unspecified area	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	15-20	Giant Gartersnake	Flat	N	Y - CASGEM Well 10509 (11N04E19E002M) avg DTW = 16 (145 points; 2000-2020)	none														
11	4	22	Curry Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	DTW is greater than 30 ft. Schoenoplectus acutus has rooting depth between 0.33 and 5 ft[3].	20-35	none	Y	N	N - CASGEM Well 10508 (So Sut WD, 11N04E15Q001M) avg DTW = 36 (68 points; 2000-2020)	none	Schoenoplectus acutus*	Hardstem Bulrush												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
11	4	23	Pleasant Grove Ck Canal and Curry Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	DTW is greater than 30 ft. Schoenoplectus acutus has rooting depth between 0.33 and 5 ft[3].	30-40	Swainson's Hawk	Y	N	N - CASGEM Well 10508 (So Sut WD, 11N04E15Q001M) avg DTW = 36 (68 points; 2000-2020)	none	Schoenoplectus acutus*	Hardstem Bulrush	Typha angustifolia*	Narrowleaf Cattail										
11	4	24	Curry Ck	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	50-65	none	Y	N	N - CASGEM Well 10507 (So Sut WD, 11N04E13R001M) avg DTW = 81 (76 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded														
11	4	25	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Salix gooddingii has a rooting depth of 6.89[3]. DTW is deeper than rooting depth.	60	none	Y	N	N - CASGEM Well 10507 (So Sut WD, 11N04E13R001M) avg DTW = 81 (76 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix gooddingii	Goodding's Willow												
11	4	26	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	DTW is greater than 30 ft. Schoenoplectus acutus has rooting depth between 0.33 and 5 ft[3].	40-45	Vernal Pool Fairy Shrimp Vernal Pool Tadpole Shrimp	Y	N	N - CASGEM Well 10507 (So Sut WD, 11N04E13R001M) avg DTW = 81 (76 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Unconsolidated Bottom, Semipermanently Flooded	Schoenoplectus acutus*	Hardstem Bullrush												
11	4	27	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	20-30	none	Y	N	N - CASGEM Well 10508 (So Sut WD, 11N04E15Q001M) avg DTW = 36 (68 points; 2000-2020)	none														
11	4	28	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	15-20	none			no representative hydrographs within contour interval	none														
11	4	29	North Drainage Canal	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	15	none			no representative hydrographs within contour interval	none														
11	4	30	Unspecified area	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10-15	Giant Gartersnake			no representative hydrographs within contour interval	none														
11	4	31	Unspecified area	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10-15	Giant Gartersnake Tricolored Blackbird			no representative hydrographs within contour interval	none														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
11	4	32	Unspecified area	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	15	Giant Gartersnake			no representative hydrographs within contour interval	none																
11	4	33	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	15-20	none			no representative hydrographs within contour interval	none																
11	4	34	Unspecified area	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	20-30	Vernal Pool Fairy Shrimp			no representative hydrographs within contour interval	none																
11	4	35	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	30-45	none			no representative hydrographs within contour interval	none																
11	4	36	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	45-60	Vernal Pool Fairy Shrimp			no representative hydrographs within contour interval	none																
11	5	1	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	65-80	none			no representative hydrographs within contour interval	none																
11	5	2	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	70-85	none			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded																
11	5	3	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	75-90	none	Flat	N	N - CASGEM Well 48569 (CVMW-1A, 11N05E14) avg DTW = 90 (81 points, 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded																
11	5	4	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	75-90	Vernal Pool Fairy Shrimp	Y	N	N - CASGEM Well 11221 (So Sut WD, 11N05E18R001M) avg DTW = 90 (66 points, 2000-2021	none																
11	5	5	King Slough	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	60-70	Swainson's Hawk Vernal Pool Fairy Shrimp	Flat/Y	Insufficient data/N	N - CASGEM Well 11217 (11N05E06H001M) avg DTW = 61 (39 points; 2000-2015) N - CASGEM Well 32067 (12N05E33C001M) avg DTW = 77 (119 points; 2000-2020)	none	Populus fremontii	Fremont Cottonwood												
11	5	6	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	60-70	none	Y	Insufficient data/N	N - CASGEM Well 11217 (11N05E06H001M) avg DTW = 61 (39 points; 2000-2015) N - CASGEM Well 32067 (12N05E33C001M) avg DTW = 77 (119 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
11	5	7	Pleasant Grove Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	60-70	Vernal Pool Fairy Shrimp	Y	Insufficient data/Y*	N - CASGEM Well 11217 (11N05E06H001M) avg DTW = 61 (39 points; 2000-2015) N - CASGEM Well 11220 (11N05E17A004M) avg DTW = 99 (107 points; 2000-2019)	Palustrine, Scrub-Shrub, Seasonally Flooded	Quercus lobata	Valley Oak												
11	5	8	Pleasant Grove Ck & unnamed drainage ditch	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	80-90	Vernal Pool Fairy Shrimp	Y	Insufficient data/Y*	N - CASGEM Well 11217 (11N05E06H001M) avg DTW = 61 (39 points; 2000-2015) N - CASGEM Well 11220 (11N05E17A004M) avg DTW = 99 (107 points; 2000-2019)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak												
11	5	9	Pleasant Grove Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	90-100	Vernal Pool Fairy Shrimp	Y	Insufficient data/Y*	N - CASGEM Well 11217 (11N05E06H001M) avg DTW = 61 (39 points; 2000-2015) N - CASGEM Well 11220 (11N05E17A004M) avg DTW = 99 (107 points; 2000-2019)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood										
11	5	10	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	90-100	Tricolored Blackbird	N	N	N - CASGEM Well 48563 (WPMW-2A, 11N06E07) avg DTW = 81 (86 points, 2011-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Typha angustifolia*	Narrowleaf Cattail	Salix gooddingii	Goodding's Willow								
11	5	11	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	90	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 48563 (WPMW-2A, 11N06E07) avg DTW = 81 (86 points, 2011-2021)	California Warm Temperate Marsh/Seep	Quercus lobata	Valley Oak												
11	5	12	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	80-95	none	N	N	N - CASGEM Well 48563 (WPMW-2A, 11N06E07) avg DTW = 81 (86 points, 2011-2021)	none														
11	5	13	Residential	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	85-90	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 54798 (Well 14 MW-A, 11N06E18) avg DTW = 103 (74 points, 2013-2021)	none														
11	5	14	Pleasant Grove Ck and unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	90-100	none	Flat	N	N - CASGEM Well 48569 (CVMW-1A, 11N05E14) avg DTW = 90 (81 points, 2011-2020)	none	Quercus lobata	Valley Oak												
11	5	15	Pleasant Grove Dk	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	90-100	none	Flat	N	N - CASGEM Well 48569 (CVMW-1A, 11N05E14) avg DTW = 90 (81 points, 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow	Typha angustifolia*	Narrowleaf Cattail								
11	5	16	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	90-100	none	Y	N	N - CASGEM Well 11221 (So Sut WD, 11N05E18R001M) avg DTW = 90 (66 points, 2000-2021	none														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
11	5	17	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Quercus lobata requires a DTW of 24.31 ft.[1]	80-90	none	Y	N	N - CASGEM Well 11221 (So Sut WD, 11N05E18R001M) avg DTW = 90 (66 points, 2000-2021	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak														
11	5	18	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	60-80	none	Y	N	N - CASGEM Well 11221 (So Sut WD, 11N05E18R001M) avg DTW = 90 (66 points, 2000-2021	none																
11	5	19	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	70-80	none	Y	N	N - CASGEM Well 11221 (So Sut WD, 11N05E18R001M) avg DTW = 90 (66 points, 2000-2021	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak														
11	5	20	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	80-90	Vernal Pool Fairy Shrimp, Swainson's Hawk	Y	N	N - CASGEM Well 11221 (So Sut WD, 11N05E18R001M) avg DTW = 90 (66 points, 2000-2021	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded	Schoenoplectus acutus*	Hardstem Bulrush	Salix gooddingii	Goodding's Willow										
11	5	21	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	95-100	none	Y	N	N - CASGEM Well 11221 (So Sut WD, 11N05E18R001M) avg DTW = 90 (66 points, 2000-2021	none																
11	5	22	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	100	none	Flat	N	N - CASGEM Well 48569 (CVMW-1A, 11N05E14) avg DTW = 90 (81 points, 2011-2020)	none																
11	5	23	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	90-105	none	Flat	N	N - CASGEM Well 48569 (CVMW-1A, 11N05E14) avg DTW = 90 (81 points, 2011-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded																
11	5	24	Pleasant Grove Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	90-100	Vernal Pool Fairy Shrimp	Flat	N	N - CASGEM Well 48569 (CVMW-1A, 11N05E14) avg DTW = 90 (81 points, 2011-2020)	none	Quercus lobata	Valley Oak														
11	5	25	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	110-125	none	N	N	N - CASGEM Well 48560 (WPMW-1A, 11N05E25) avg DTW = 111 (91 points, 2011-2020)	none																
11	5	26	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	105-115	none	N	N	N - CASGEM Well 48560 (WPMW-1A, 11N05E25) avg DTW = 111 (91 points, 2011-2020)	none																
11	5	27	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	100-105	none	N	N	N - CASGEM Well 48560 (WPMW-1A, 11N05E25) avg DTW = 111 (91 points, 2011-2020)	California Warm Temperate Marsh/Seep																

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
11	5	28	Curry Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	90-100	none	Flat	N	N - CASGEM Well 48569 (CVMW-1A, 11N05E14) avg DTW = 90 (81 points, 2011-2020)	none	Populus fremontii	Fremont Cottonwood														
11	5	29	Curry Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	80-90	Swainson's Hawk	Y	N	N - CASGEM Well 10507 (So Sut WD, 11N04E13R001M) avg DTW = 81 (76 points; 2000-2020)	none	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow												
11	5	30	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	60-70	Vernal Pool Fairy Shrimp, Swainson's Hawk	Y	N	N - CASGEM Well 10507 (So Sut WD, 11N04E13R001M) avg DTW = 81 (76 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood														
11	5	31	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	60-80	none	Flat	Flat	N - CASGEM Well 48009 (SGA_MW01, 10N05E17) avg DTW = 62 (19 points, 2011-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded																
11	5	32	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	80-90	Swainson's Hawk	Y	N	N - CASGEM Well 11221 (So Sut WD, 11N05E18R001M) avg DTW = 90 (66 points, 2000-2021	Palustrine, Emergent, Persistent, Seasonally Flooded																
11	5	33	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	90-100	none	N	N	N - CASGEM Well 48573 (SVMW West - 1A, 11N05E35) avg DTW = 111 (85 points, 2011-2021	none																
11	5	34	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	105-110	none	N	N	N - CASGEM Well 48573 (SVMW West - 1A, 11N05E35) avg DTW = 111 (85 points, 2011-2021	Palustrine, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Platanus racemosa	California Sycamore												
11	5	35	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	100-110	none	N	N	N - CASGEM Well 48573 (SVMW West - 1A, 11N05E35) avg DTW = 111 (85 points, 2011-2021	none	Quercus lobata	Valley Oak														
11	5	36	Curry Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	130	none	N	N	N - CASGEM Well 48573 (SVMW West - 1A, 11N05E35) avg DTW = 111 (85 points, 2011-2021	none	Typha angustifolia*	Narrowleaf Cattail														
11	6	1	Pleasant Grove Ck w/in residential area	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	40-50	none			no representative hydrographs within contour interval	none	Populus fremontii	Fremont Cottonwood														
11	6	2	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	40-50	none			no representative hydrographs within contour interval	none	Quercus lobata	Valley Oak														
11	6	3	Residential	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	55-65	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 51290 (Tinker MW, 11N06E09) avg DTW = 75 (82 points, 2013-2021)	none																

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
11	6	4	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	60-70	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 51290 (Tinker MW, 11N06E09) avg DTW = 75 (82 points, 2013-2021)	none														
11	6	5	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	65-75	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 51290 (Tinker MW, 11N06E09) avg DTW = 75 (82 points, 2013-2021)	none														
11	6	6	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	65-75	none	N	N	N - CASGEM Well 51290 (Tinker MW, 11N06E09) avg DTW = 75 (82 points, 2013-2021)	none														
11	6	7	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	75-85	none	N	N	N - CASGEM Well 51290 (Tinker MW, 11N06E09) avg DTW = 75 (82 points, 2013-2021)	none														
11	6	8	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	75-85	none	N	N	N - CASGEM Well 51290 (Tinker MW, 11N06E09) avg DTW = 75 (82 points, 2013-2021)	none														
11	6	9	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	70-80	none	N	N	N - CASGEM Well 51290 (Tinker MW, 11N06E09) avg DTW = 75 (82 points, 2013-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail	Quercus lobata	Valley Oak										
11	6	10	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	60-70	none	N	N	N - CASGEM Well 51290 (Tinker MW, 11N06E09) avg DTW = 75 (82 points, 2013-2021)	none	Salix goodddingii	Goodding's Willow	Typha angustifolia*	Narrowleaf Cattail										
11	6	11	Pleasant Grove Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	50-60	none	N	N	N - CASGEM Well 51290 (Tinker MW, 11N06E09) avg DTW = 75 (82 points, 2013-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded	Schoenoplectus acutus*	Hardstem Bulrush	Salix exigua	Narrowleaf Willow	Salix goodddingii	Goodding's Willow								
11	6	12	Pleasant Grove Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	40-50	Vernal Pool Fairy Shrimp			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix goodddingii	Goodding's Willow	Quercus lobata	Valley Oak	Salix exigua	Narrowleaf Willow								
11	6	13	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	40-45	none			no representative hydrographs within contour interval	Palustrine, Scrub-Shrub, Seasonally Flooded	Quercus lobata	Valley Oak												
11	6	14	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	40-55	none			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Schoenoplectus acutus*	Hardstem Bulrush										
11	6	15	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	60-70	none	N	N	N - CASGEM Well 51290 (Tinker MW, 11N06E09) avg DTW = 75 (82 points, 2013-2021)	none	Schoenoplectus acutus*	Hardstem Bulrush	Salix exigua	Narrowleaf Willow	Populus fremontii	Fremont Cottonwood								

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
11	6	16	Residential/Commercial	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	70-80	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 51290 (Tinker MW, 11N06E09) avg DTW = 75 (82 points, 2013-2021)	none	Salix exigua	Narrowleaf Willow	Typha angustifolia*	Narrowleaf Cattail										
11	6	17	Pleasant Grove Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	80-90	Swainson's Hawk	N	N	N - CASGEM Well 54798 (Well 14 MW-A, 11N06E18) avg DTW = 103 (74 points, 2013-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak												
11	6	18	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	85-95	none	N	N	N - CASGEM Well 54798 (Well 14 MW-A, 11N06E18) avg DTW = 103 (74 points, 2013-2021)	none														
11	6	19	Multiple Parks and Golf Courses	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	100	Vernal Pool Fairy Shrimp, Swainson's Hawk	N	N	N - CASGEM Well 54798 (Well 14 MW-A, 11N06E18) avg DTW = 103 (74 points, 2013-2021)	none	Quercus lobata	Valley Oak												
11	6	20	So Branch Pleasant Grove Ck/located in open space adjacent to residential area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	85-100	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 54798 (Well 14 MW-A, 11N06E18) avg DTW = 103 (74 points, 2013-2021)	none														
11	6	21	Commercial	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	70-90	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 51290 (Tinker MW, 11N06E09) avg DTW = 75 (82 points, 2013-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded														
11	6	22	Residential/Commercial	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	50-70	Vernal Pool Fairy Shrimp			no representative hydrographs within contour interval	none														
11	6	23	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	30-55	none			no representative hydrographs within contour interval	none														
11	6	24	Antelope Ck	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated as DTW is less than 30 ft	20-30	none			no representative hydrographs within contour interval	Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak												
11	6	25	Antelope Ck	3	Likely	DTW < 30 ft No Critical Species Diverse vegetation	Quercus lobata requires a DTW of 24.31 ft.[1] The polygon for Quercus lobata is at the 30 ft contour. All other species present have root depths that are shallow[1,5] and therefore not dependent on groundwater at this location.	20-30	none	Flat	Flat	Y - CASGEM Well 51287 (WPMW-10A, 10N06E01) avg DTW = 14 (69 points; 2015-2020)	Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Typha angustifolia	Narrowleaf Cattail	Salix exigua	Narrowleaf Willow						
11	6	26	Residential/Commercial	3	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Populus fremontii has a maximum rooting depth of 16.4[1]. Salix gooddingii and Salix exigua (using rooting depth for S. gooddingii of 6.89 ft) requires surface water	25-40	Vernal Pool Fairy Shrimp			no representative hydrographs within contour interval	none	Salix exigua	Narrowleaf Willow	Salix lasiolepis	Arroyo Willow	Salix gooddingii	Goodding's Willow	Populus fremontii	Fremont Cottonwood						

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
							and elevated water table[1].																					
11	6	27	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	40-65	none			no representative hydrographs within contour interval	Palustrine, Scrub-Shrub, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow										
11	6	28	Residential	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated as DTW is greater than 30 ft	65-90	Vernal Pool Fairy Shrimp			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Salix exigua	Narrowleaf Willow	Populus fremontii	Fremont Cottonwood										
11	6	29	Bear Dog and Mahany Regional Park	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	100-120	Vernal Pool Tadpole Shrimp			no representative hydrographs within contour interval	none	Salix exigua	Narrowleaf Willow														
11	6	30	Residential	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	120	Swainson's Hawk	N	N	N - CASGEM Well 48560 (WPMW-1A, 11N05E25) avg DTW = 111 (91 points, 2011-2020)	none	Salix lasiolepsis	Arroyo Willow	Salix exigua	Narrowleaf Willow												
11	6	31	Residential	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	120-140	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 48560 (WPMW-1A, 11N05E25) avg DTW = 111 (91 points, 2011-2020)	none																
11	6	32	Residential	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	110-120	Vernal Pool Fairy Shrimp	Flat	N	N - CASGEM Well 48576 (SVMW East-2A, 11N05E36) avg DTW = 123 (88 points, 2011-2021)	none	Salix exigua	Narrowleaf Willow														
11	6	33	Residential	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	No GDEs	65-100	Vernal Pool Fairy Shrimp			no representative hydrographs within contour interval	none	Populus fremontii	Fremont Cottonwood														
11	6	34	Sierra View Country Club	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	35-65	none			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak														
11	6	35	Roseville Public Cemetery	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft	20	none	Flat	Flat	Y - CASGEM Well 51287 (WPMW-10A, 10N06E01) avg DTW = 14 (69 points; 2015-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Populus fremontii	Fremont Cottonwood														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
11	6	36	Miner's Ravine	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft	20	none	Flat	Flat	Y - CASGEM Well 51287 (WPMW-10A, 10N06E01) avg DTW = 14 (69 points; 2015-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak												
11	7	5	Clover Valley Ck	0	Not likely	DTW ≥ 30 ft No Critical Species w/in NASb boundary No vegetation	No GDEs	30-40	California Black Rail (located outside NASb boundary)			no representative hydrographs within contour interval	none															
11	7	6	Clover Valley Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	40	none			no representative hydrographs within contour interval	Palustrine, Forested, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak												
11	7	7	Clover Valley Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated as DTW is greater than 30 ft	40	none			no representative hydrographs within contour interval	none	Quercus lobata	Valley Oak													
11	7	18	Antelope Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Quercus lobata has a maximum rooting depth of 24.02[1]. Species is likely dependent on surface water from Pleasant Grove Ck., not groundwater. Can be eliminated because DTW is grater than 30 ft.	30	none			no representative hydrographs within contour interval	Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak													
11	7	19	Antelope Ck	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated as DTW is less than 30 ft	20-30	none			no representative hydrographs within contour interval	Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood											
11	7	30	Secret Ravine	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated as DTW is less than 30 ft	<20	none	Flat	Flat	Y - CASGEM Well 51282 (WPMW-6A, 11N07E30) avg DTW = -0.77 (57 points, 2015-2021)	Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak													
11	7	31	Unnamed drainage	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated as DTW is less than 30 ft	20-30	Vernal Pool Fairy Shrimp	N	N	Y - CASGEM Well 51283 (WPMW-7A, 10N07E05) avg DTW = 21 (69 points; 2015-2020) Y - CASGEM Well 51284 (WPMW-8A, 10N07E05) avg DTW = 29 (69 points; 2015-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow											
11	7	32	Unnamed drainage	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated as DTW is less than 30 ft	20-30	none	N	N	Y - CASGEM Well 51283 (WPMW-7A, 10N07E05) avg DTW = 21 (69 points; 2015-2020) Y - CASGEM Well 51284 (WPMW-8A, 10N07E05) avg DTW = 29 (69 points; 2015-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood													
12	3	1	NASb - Sutter boundary	1	Not likely	DTW < 30 ft No Critical Species w/in NASb boundary No vegetation w/in NASb boundary	Cannot be eliminated as DTW is less than 30 ft	0-10	Swainson's Hawk (outside NASb boundary)	Y	N*	Y - CASGEM Well 17025 (So Sut WD 12N04E05R004M) avg DTW = 19 (104 points, 2000-2019)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded															

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
12	3	11	Mostly outside NASb boundary (Sutter) Boundary line within river	0	Not likely	DTW < 30 ft No Critical Species w/in NASb boundary No vegetation w/in NASb boundary	No GDEs	0	none w/in NASb boundary	Y	N*	Y - CASGEM Well 17025 (So Sut WD 12N04E05R004M) avg DTW = 19 (104 points, 2000-2019)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded																	
12	3	12	Feather River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated as DTW is less than 30 ft	0-10	Bank Swallow Swainson's Hawk Western Yellow-Billed Cuckoo	Y	N*	Y - CASGEM Well 17033 (12N04E18D001M) avg DTW = 18 (92 points; 2000-2017	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Acer negundo	Box-elder	Platanus racemosa	California Sycamore	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's willow								
12	3	13	Unnamed drainage	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated as DTW is less than 30 ft	0-10	Swainson's Hawk	Y	N*	Y - CASGEM Well 17033 (12N04E18D001M) avg DTW = 18 (92 points; 2000-2017	none	Quercus lobata	Valley Oak																
12	3	14	Feather River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated as DTW is less than 30 ft	0-10	Bank Swallow	Flat	N*	Y - CASGEM Well 17012 (12N03E23N001M) avg DTW = 12 (157 points; 2000-2017)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow										
12	3	22	Feather River	2	Less Likely	DTW < 30 ft No Critical Species w/in NASb boundary Lack of diverse vegetation	Quercus lobata present is likely dependent on surface water	0-10	Bank Swallow (outside NASb boundary)	Flat	N*	Y - CASGEM Well 17012 (12N03E23N001M) avg DTW = 12 (157 points; 2000-2017)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak														
12	3	23	Feather River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated as DTW is less than 30 ft	0-10	Swainson's Hawk	Flat	N*	Y - CASGEM Well 17012 (12N03E23N001M) avg DTW = 12 (157 points; 2000-2017)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak														
12	3	24	Developed Parcel	2	Less Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation Plant Species on developed parcel	Quercus lobata appears to be on private land; may be irrigated	0-10	Swainson's Hawk	Flat	N*	Y - CASGEM Well 17012 (12N03E23N001M) avg DTW = 12 (157 points; 2000-2017)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak														
12	3	25	Unnamed drainage	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated as DTW is less than 30 ft	0-10	Giant Gartersnake	Flat	N*	Y - CASGEM Well 17012 (12N03E23N001M) avg DTW = 12 (157 points; 2000-2017)	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix exigua	Narrowleaf Willow														
12	3	26	Feather River	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated as DTW is less than 30 ft	0-10	none	Flat	N*	Y - CASGEM Well 17012 (12N03E23N001M) avg DTW = 12 (157 points; 2000-2017)	none	Quercus lobata	Valley Oak														
12	3	27	Feather River	2	Less Likely	DTW < 30 ft Critical Species outside NASb boundary Lack of diverse vegetation	Cannot be eliminated as DTW is less than 30 ft	0-10	Bank Swallow (outside NASb boundary)	Flat	N*	Y - CASGEM Well 17012 (12N03E23N001M) avg DTW = 12 (157 points; 2000-2017)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
12	3	34	Feather River	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated as DTW is less than 30 ft	0-10	Swainson's Hawk	Flat	N	Y - CASGEM Well 47776 (Sut Co MW-5A, 11N03E02Q002M) avg DTW = 9 (62 points; 2012-2021)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood												
12	3	35	Unspecified area	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	0-10	Giant Gartersnake	Flat	N	Y - CASGEM Well 47776 (Sut Co MW-5A, 11N03E02Q002M) avg DTW = 9 (62 points; 2012-2021)	none																
12	3	36	Unspecified area	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	0	Giant Gartersnake	Flat	N	Y - CASGEM Well 47776 (Sut Co MW-5A, 11N03E02Q002M) avg DTW = 9 (62 points; 2012-2021)	none																
12	4	1	Raccoon Ck	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Populus fremontii has a maximum rooting depth of 16.4 ft[1]. Similar species to Fraxinus latifolia (F. velutina) has rooting depth of 7 ft[1]	20-30	none	Y	N	Y - CASGEM Well 17019 (12N04E02P001M) avg DTW = 27 (136 points; 2000-2020) Y - CASGEM Well 35624 (So Sut WD, 13N04E35Q002M) avg DTW = 29 (63 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Populus fremontii	Fremont Cottonwood	Fraxinus latifolia*	Oregon Ash										
12	4	2	Raccoon Ck	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Similar species to Fraxinus latifolia (F. velutina) has rooting depth of 7 ft[1].	10-20	none	Y	N	Y - CASGEM Well 17019 (12N04E02P001M) avg DTW = 27 (136 points; 2000-2020) Y - CASGEM Well 35624 (So Sut WD, 13N04E35Q002M) avg DTW = 29 (63 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Forested, Seasonally Flooded	Fraxinus latifolia*	Oregon Ash										
12	4	3	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	15-20	none	Y	N*	Y - CASGEM Well 17025 (So Sut WD 12N04E05R004M) avg DTW = 19 (104 points, 2000-2019)	none																
12	4	4	Unspecified area	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	10	Swainson's Hawk	Y	N*	Y - CASGEM Well 17025 (So Sut WD 12N04E05R004M) avg DTW = 19 (104 points, 2000-2019)	none																
12	4	5	Unnamed Drainage	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	none	Y	N*	Y - CASGEM Well 17025 (So Sut WD 12N04E05R004M) avg DTW = 19 (104 points, 2000-2019)	none	Quercus lobata	Valley Oak														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
12	4	6	Feather River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Bank Swallow Swainson's Hawk	Y	N*	Y - CASGEM Well 17025 (So Sut WD 12N04E05R004M) avg DTW = 19 (104 points, 2000-2019)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Juglans hindsii and hybrids*	No Cal Black Walnut										
12	4	7	Feather River & unnamed drainage canal	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Y	N*	Y - CASGEM Well 17025 (So Sut WD 12N04E05R004M) avg DTW = 19 (104 points, 2000-2019)	none w/in NASb boundary	Populus fremontii	Fremont Cottonwood	Acer negundo	Box-elder	Salix gooddingii	Goodding's Willow	Platanus racemosa	California Sycamore	Quercus lobata	Valley Oak						
12	4	8	Unspecified area	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Vernal Pool Tadpole Shrimp Giant Gartersnake	Y	N*	Y - CASGEM Well 17025 (So Sut WD 12N04E05R004M) avg DTW = 19 (104 points, 2000-2019)	none	Quercus lobata	Valley Oak														
12	4	9	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	0-10	none	Y	N*	Y - CASGEM Well 17025 (So Sut WD 12N04E05R004M) avg DTW = 19 (104 points, 2000-2019)	none																
12	4	10	Raccoon Ck	3	Likely	DTW < 30 ft No Critical Species Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	10-20	none	Y/Flat	N	N - CASGEM Well 17027 (So Sut WD, 12N04E10D002M) avg DTW = 30 (35 points; 2011-2020) Y - CASGEM Well 17023 (AB-1 shallow, 12N04E03N004M) avg DTW = 21 (154 points; 2000-2020)	none	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Platanus racemosa	California Sycamore	Salix exigua	Narrowleaf Willow								
12	4	11	Raccoon Ck & Buckham Slough	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Salix gooddingii has a maximum rooting depth of 6.89 ft and Populus fremontii has a maximum rooting depths of 16.4[1]. Similar species to Fraxinus latifolia (F. velutina) has rooting depth of 7 ft[1]. Typha angustifolia habitat is marshy with shallow surface water[2].	10-20	Swainson's Hawk	Y	N	Y - CASGEM Well 17019 (12N04E02P001M) avg DTW = 27 (136 points; 2000-2020) Y - CASGEM Well 35624 (So Sut WD, 13N04E35Q002M) avg DTW = 29 (63 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Fraxinus latifolia*	Oregon Ash	Typha angustifolia*	Narrowleaf Cattail	Salix gooddingii	Goodding's Willow								
12	4	12	Unnamed drainage	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Populus fremontii has a maximum rooting depth of 16.4[1]. Valley Oak has a maximum rooting depth of 24.02[1]. Species is likely dependent on surface water from drainage	25-35	none	Y	N	Y - CASGEM Well 17019 (12N04E02P001M) avg DTW = 27 (136 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
12	4	13	Unnamed drainage	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	25-40	none	Y	N	N - CASGEM Well 39691 (AB-2 Shal, 12N04E26J004M) avg DTW = 34 (157 points, 2000-2020) N - CASGEM Well 24495 (12N04E25N001M) avg DTW = 37 (155 points; 2005-2018)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded														
12	4	14	Buckham Slough/Markham Ravine	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Can be eliminated as Typha angustifolia requires marshy conditions and shallow surface water[2].	20-30	none	Y/N	N	Y - CASGEM Well 17031 (So Sut WD, 12N04E16A004M) avg DTW = 20 (67 points; 2000-2020) N - CASGEM 17027 (So Sut WD, 12N04E10D002M) avg DTW = 30 (35 points; 2011-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Typha angustifolia*	Narrowleaf Cattail												
12	4	15	Raccoon Ck & Eastside Canal	3	Likely	DTW < 30 ft No Critical Species Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	10-20	none	Y/N	N	Y - CASGEM Well 17031 (So Sut WD, 12N04E16A004M) avg DTW = 20 (67 points; 2000-2020) N - CASGEM 17027 (12N04E10D002M) avg DTW = 30 (35 points; 2011-2020)	none	Quercus lobata	Valley Oak	Salix exigua	Narrowleaf Willow	Salix gooddingii	Goodding's Willow								
12	4	16	Raccoon Ck	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Can be eliminated as Typha angustifolia requires marshy conditions and shallow surface water[2].	0-10	none	Y/N	N	Y - CASGEM Well 17031 (So Sut WD, 12N04E16A004M) avg DTW = 20 (67 points; 2000-2020) N - CASGEM 17027 (So Sut WD, 12N04E10D002M) avg DTW = 30 (35 points; 2011-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Typha angustifolia*	Narrowleaf Cattail												
12	4	17	Racoon Ck & Ping Slough	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Y/N	N	Y - CASGEM Well 17031 (So Sut WD, 12N04E16A004M) avg DTW = 20 (67 points; 2000-2020) N - CASGEM 17027 (12N04E10D002M) avg DTW = 30 (35 points; 2011-2020)	none	Quercus lobata	Valley Oak												
12	4	18	Raccoon Ck & Ping Slough Confluence	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Diminimis Oaks	0-10	Swainson's Hawk	Flat	N*	Y - CASGEM Well 17033 (12N04E18D001M) avg DTW = 18 (92 points; 2000-2017	none	Quercus lobata	Valley Oak												
12	4	19	Main Canal	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Giant Gartersnake Swainson Hawk	Flat	N*	Y - CASGEM Well 17033 (12N04E18D001M) avg DTW = 18 (92 points; 2000-2017	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix exigua	Narrowleaf Willow	Salix gooddingii	Goodding's Willow	Quercus lobata	Valley Oak								
12	4	20	Unspecified area	2	Less likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	0-10	Vernal Pool Tadpole Shrimp	Flat	N*	Y - CASGEM Well 17033 (12N04E18D001M) avg DTW = 18 (92 points; 2000-2017	none												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
12	4	21	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	5-15	none	Flat	N*	Y - CASGEM Well 17033 (12N04E18D001M) avg DTW = 18 (92 points; 2000-2017	none														
12	4	22	East Side Canal	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Might be eliminated as Salix exigua and Typha angustifolia require surface water or elevated water table[1,2].	10-20	none	Y	N*	N - CASGEM Well 17035 (12N04E24M002M) avg DTW = 34 (142 points 2000-2017)	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix exigua	Narrowleaf Willow	Typha angustifolia*	Narrowleaf Cattail										
12	4	23	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	20-30	none	Y	N*	N - CASGEM Well 17035 (12N04E24M002M) avg DTW = 34 (142 points 2000-2017)	none														
12	4	24	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	30-40	none	Y	N*	N - CASGEM Well 17035 (12N04E24M002M) avg DTW = 34 (142 points 2000-2017)	none														
12	4	25	Auburn Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Populus fremontii has a maximum rooting depth of 16.4[1]. Quercus lobata has a maximum rooting depth of 24.02[1]. DTW is greater than 30 ft. Species is likely dependent on surface water from Auburn Ravine, not groundwater.	30-45	none	Y	N	N - CASGEM Well 39691 (AB-2 Shal, 12N04E26J004M) avg DTW = 34 (157 points, 2000-2020) N - CASGEM Well 24495 (12N04E25N001M) avg DTW = 37 (155 points; 2005-2018)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak										
12	4	26	Unspecified area	3	Likely	DTW < 30 ft No Critical Species Diverse Vegetation	Populus fremontii has a maximum rooting depth of 16.4[1]. Salix exigua (using rooting depth for S. gooddingii of 6.89 ft) requires surface water and elevated water table. Quercus lobata may be reliant on groundwater in this area.	20-30	none	Y	N	N - CASGEM Well 39691 (AB-2 Shal, 12N04E26J004M) avg DTW = 34 (157 points, 2000-2020) N - CASGEM Well 24495 (12N04E25N001M) avg DTW = 37 (155 points; 2005-2018)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow	Quercus lobata	Valley Oak										
12	4	27	East Side Canal	3	Likely	DTW < 30 ft No Critical Species Diverse Vegetation	Location of Salix exigua appears artificial. 1962 aerial photo does not have this feature. Populus fremontii has a maximum rooting depth of 16.4[1] and is probably dependent on surface water from the Auburn Ravine.	10-20	none	Flat	N	Y - CASGEM Well 25784 (So Sut WD, 12N04E29J001M) avg DTW = 9 (61 points; 2005-2020) Y - CASGEM 17037 (So Sut WD, 12N04E34H001M) avg DTW = 26 (23 points; 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow	Schoenoplectus acutus*	Hardstem Bullrush										
12	4	28	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	10	none	Flat	N	Y - CASGEM Well 25784 (So Sut WD, 12N04E29J001M) avg DTW = 9 (61 points; 2005-2020) Y - CASGEM 17037 (So Sut WD, 12N04E34H001M) avg DTW = 26 (23 points; 2011-2020)	none														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
12	4	29	Unspecified area	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	0-10	Swainson's Hawk	Flat	N	Y - CASGEM Well 25784 (So Sut WD, 12N04E29J001M) avg DTW = 9 (61 points; 2005-2020) Y - CASGEM 17037 (So Sut WD, 12N04E34H001M) avg DTW = 26 (23 points; 2011-2020)	none																
12	4	30	Unspecified area	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	0-10	Swainson's Hawk, Giant Gartersnake	Flat	N	Y - CASGEM Well 25784 (So Sut WD, 12N04E29J001M) avg DTW = 9 (61 points; 2005-2020)	none																
12	4	31	Unnamed drainage	2	Less Likely	DTW < 30 ft Critical Species may be present No vegetation	No GDEs	0-10	Giant Gartersnake	Flat	N	Y - CASGEM Well 25784 (So Sut WD, 12N04E29J001M) avg DTW = 9 (61 points; 2005-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded																
12	4	32	Unspecified area	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Salix gooddingii may be dependent on groundwater. However, vegetation appears to be sparse and located in agricultural drainage. Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Flat	N	Y - CASGEM Well 25784 (So Sut WD, 12N04E29J001M) avg DTW = 9 (61 points; 2005-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Schoenoplectus acutus*	Hardstem Bullrush	Salix gooddingii	Goodding's Willow												
12	4	33	Unspecified area	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Salix exigua is located along the East Side Canal and likely dependent on surface water	0-10	none	Flat	N	Y - CASGEM Well 17037 (So Sut WD, 12N04E34H001M) avg DTW = 26 (23 points; 2011-2020)	none	Salix exigua	Narrowleaf Willow														
12	4	34	East Side Canal	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Species present have shallow rooting depths (less than 10 ft)[1,2].	10-20	Swainson's Hawk	Flat	N	Y - CASGEM Well 17037 (So Sut WD, 12N04E34H001M) avg DTW = 26 (23 points; 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix gooddingii	Goodding's Willow	Salix exigua	Narrowleaf Willow	Populus fremontii	Fremont Cottonwood	Typha angustifolia*	Narrowleaf Cattail								
12	4	35	King Slough	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Species present have shallow rooting depths (less than 10 ft)[1,2].	20-30	none	Flat	N	Y - CASGEM Well 17037 (So Sut WD, 12N04E34H001M) avg DTW = 26 (23 points; 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix gooddingii	Goodding's Willow														
12	4	36	King Slough	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Species present have shallow rooting depths (less than 10 ft)[1,2].	35-50	none	Flat	N	Y - CASGEM Well 17037 (So Sut WD, 12N04E34H001M) avg DTW = 26 (23 points; 2011-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix gooddingii	Goodding's Willow														
12	5	1	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	35-40	none	Flat	Flat	N - CASGEM Well 32899 (12N05E01D002M) avg DTW = 32 (113 points; 2000-2020) N - CASGEM Well 49933 (MW 2-3, 12N06E06) avg DTW = 33 (84 points; 2012-2020)	none	Quercus lobata	Valley Oak														
12	5	2	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	35-40	Swainson's Hawk	Flat	Flat	N - CASGEM Well 32899 (12N05E01D002M) avg DTW = 32 (113 points; 2000-2020) N - CASGEM Well 49933 (MW 2-3, 12N06E06) avg DTW = 33 (84 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded																

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
12	5	3	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	35-45	none	Flat	Flat	N - CASGEM Well 32899 (12N05E01D002M) avg DTW = 32 (113 points; 2000-2020) N - CASGEM Well 49933 (MW 2-3, 12N06E06) avg DTW = 33 (84 points; 2012-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded														
12	5	4	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	35-45	none	Flat	Flat	N - CASGEM Well 32899 (12N05E01D002M) avg DTW = 32 (113 points; 2000-2020) N - CASGEM Well 49933 (MW 2-3, 12N06E06) avg DTW = 33 (84 points; 2012-2020)	none														
12	5	5	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft. Populus fremontii has a maximum rooting depth of 16.4[1].	35-40	none	Y	N	N - CASGEM Well 17043 (12N05E06R001M) avg DTW = 53 (84 points; 2000-2020) Y - CASGEM Well 40137 (So Sut WD, 13N05E31K001M) avg DTW = 27 (94 points, 2000-2020)	Palustrine, Scrub-Shrub, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood												
12	5	6	Raccoon Ck	2	Less Likely	DTW < 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft. Populus fremontii has a maximum rooting depth of 16.4[1]. Typha angustifolia requires shallow surface water[2].	25-35	none	Y	N	N - CASGEM Well 17043 (12N05E06R001M) avg DTW = 53 (84 points; 2000-2020) Y - CASGEM Well 40137 (So Sut WD, 13N05E31K001M) avg DTW = 27 (94 points, 2000-2020)	Palustrine, Forested, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Typha angustifolia*	Narrowleaf Cattail										
12	5	7	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because Typha angustifolia requires shallow surface water[2].	30-40	none	Y	N	N - CASGEM Well 17043 (12N05E06R001M) avg DTW = 53 (84 points; 2000-2020) Y - CASGEM Well 40137 (So Sut WD, 13N05E31K001M) avg DTW = 27 (94 points, 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail												
12	5	8	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated because DTW is greater than 30 ft.	35-45	none	Y	N	N - CASGEM Well 32903 (12N05E17A002M) avg DTW = 58 (254 points; 2000-2020)	Palustrine, Emergent, Persistent, Semipermanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Unconsolidated Bottom, Semipermanently Flooded	Typha angustifolia*	Narrowleaf Cattail	Schoenoplectus acutus*	Hardstem Bullrush	Populus fremontii	Fremont Cottonwood								
12	5	9	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft.	45-50	none	Y	N	N - CASGEM Well 32903 (12N05E17A002M) avg DTW = 58 (254 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail												
12	5	10	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft.	40-50	none	Y	N	N - CASGEM Well 32903 (12N05E17A002M) avg DTW = 58 (254 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail	Salix gooddingii	Goodding's Willow										

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
12	5	11	Dammed unnamed drainages	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft.	40-51	Conservancy Fairy Shrimp Vernal Pool Fairy Shrimp	Flat	Flat	N - CASGEM Well 49942 (Airport 4 MW, 12N06E07) avg DTW = 45 (86 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Salix gooddingii	Goodding's Willow												
12	5	12	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	35-40	none	Flat	Flat	N - CASGEM Well 49942 (Airport 4 MW, 12N06E07) avg DTW = 45 (86 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded														
12	5	13	Markham Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated because DTW is greater than 30 ft.	40-50	none	Flat	Flat	N - CASGEM Well 49942 (Airport 4 MW, 12N06E07) avg DTW = 45 (86 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Salix exigua	Narrowleaf Willow	Typha angustifolia*	Narrowleaf Cattail	Schoenoplectus acutus*	Hardstem Bullrush	Populus fremontii	Fremont Cottonwood						
12	5	14	Markham Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated because DTW is greater than 30 ft.	45-50	none	Flat	Flat	N - CASGEM Well 49942 (Airport 4 MW, 12N06E07) avg DTW = 45 (86 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Unconsolidated Shore, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak						
12	5	15	Markham Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated because DTW is greater than 30 ft.	45-55	none	Y	N	N - CASGEM Well 32903 (12N05E17A002M) avg DTW = 58 (254 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded, Palustrine, Unconsolidated Bottom, Semipermanently Flooded	Typha angustifolia*	Narrowleaf Cattail	Salix gooddingii	Goodding's Willow	Populus fremontii	Fremont Cottonwood						
12	5	16	Markham Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated because DTW is greater than 30 ft.	45-55	none	Y	N	N - CASGEM Well 32903 (12N05E17A002M) avg DTW = 58 (254 points; 2000-2020)	Palustrine, Scrub-Shrub, Seasonally Flooded	Salix exigua	Narrowleaf Willow	Typha angustifolia*	Narrowleaf Cattail	Salix gooddingii	Goodding's Willow						
12	5	17	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated because DTW is greater than 30 ft.	45-55	Tricolored Blackbird	Y	N	N - CASGEM Well 32903 (12N05E17A002M) avg DTW = 58 (254 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix gooddingii	Goodding's Willow	Salix exigua	Narrowleaf Willow	Typha angustifolia*	Narrowleaf Cattail						
12	5	18	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft.	40-50	Tricolored Blackbird	Y	N	N - CASGEM Well 32903 (12N05E17A002M) avg DTW = 58 (254 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix gooddingii	Goodding's Willow										
12	5	19	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft.	50	none	Y	N	N - CASGEM Well 32903 (12N05E17A002M) avg DTW = 58 (254 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Schoenoplectus acutus*	Hardstem Bullrush										
12	5	20	Unspecified area	0	Not Likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	50-65	none	Y	N	N - CASGEM Well 32903 (12N05E17A002M) avg DTW = 58 (254 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
12	5	21	Unspecified area	0	Not Likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	55-65	none	Y	N	N - CASGEM Well 32903 (12N05E17A002M) avg DTW = 58 (254 points; 2000-2020)	none														
12	5	22	Unspecified area	0	Not Likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft.	60-70	none	Y	N	N - CASGEM Well 32903 (12N05E17A002M) avg DTW = 58 (254 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Schoenoplectus acutus*	Hardstem Bullrush												
12	5	23	Lincoln Communication Annex	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft.	50-55	Vernal Pool Fairy Shrimp, Vernal Pool Tadpole Shrimp	Y	N	N - CASGEM Well 32903 (12N05E17A002M) avg DTW = 58 (254 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak												
12	5	24	Unspecified area	0	Not Likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft.	50	none	N	N	N - CASGEM Well 49927 (MW 1-1, 12N06E30) avg DTW = 57 (85 points; 2012-2020)	none	Quercus lobata	Valley Oak												
12	5	25	Auburn Ravine	1	Not Likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated because DTW is greater than 30 ft.	50-60	Swainson's Hawk Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 49927 (MW 1-1, 12N06E30) avg DTW = 57 (85 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Forested, Seasonally Flooded, Palustrine, Unconsolidated Shore, Seasonally Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Typha angustifolia*	Narrowleaf Cattail	Salix exigua	Narrowleaf Willow						
12	5	26	Auburn Ravine	1	Not Likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated because DTW is greater than 30 ft.	55-65	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 49927 (MW 1-1, 12N06E30) avg DTW = 57 (85 points; 2012-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Salix exigua	Narrowleaf Willow	Typha angustifolia*	Narrowleaf Cattail						
12	5	27	Auburn Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft.	60-70	none	Y	N	N - CASGEM Well 32067 (12N05E33C001M) avg DTW = 77 (119 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Typha angustifolia*	Narrowleaf Cattail										
12	5	28	Auburn Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft.	60-70	none	Y	N	N - CASGEM Well 32066 (12N05E29D001M) avg DTW = 57 (122 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow										

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
12	5	29	Auburn Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft.	60-70	none	Y	N	N - CASGEM Well 32066 (12N05E29D001M) avg DTW = 57 (122 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded	Populus fremontii	Fremont Cottonwood												
12	5	30	Auburn Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft.	55-65	none	Y	N	N - CASGEM Well 32066 (12N05E29D001M) avg DTW = 57 (122 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood												
12	5	31	King Slough	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	50-65	none	Y	N	N - CASGEM Well 32066 (12N05E29D001M) avg DTW = 57 (122 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded														
12	5	32	King Slough	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	65-75	none	Y	N	N - CASGEM Well 32066 (12N05E29D001M) avg DTW = 57 (122 points; 2000-2020)	none														
12	5	33	King Slough	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	70-80	none	Y	N	N - CASGEM Well 32067 (12N05E33C001M) avg DTW = 77 (119 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded														
12	5	34	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Typha angustifolia is dependent on shallow groundwater[2]	65-75	none	Y	N	N - CASGEM Well 32067 (12N05E33C001M) avg DTW = 77 (119 points; 2000-2020)	none	Typha angustifolia*	Narrowleaf Cattail												
12	5	35	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	60-75	none	Y	N	N - CASGEM Well 32067 (12N05E33C001M) avg DTW = 77 (119 points; 2000-2020)	none														
12	5	36	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	55-70	none	Y	N	N - CASGEM Well 32067 (12N05E33C001M) avg DTW = 77 (119 points; 2000-2020)	none														
12	6	2	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft. Quercus lobata has a rooting depth of 24.02[1].	30	none	Flat	Flat	N - CASGEM Well 51329 (Swainson, 12N06E05) avg DTW = 30 (60 points; 2015-2020)	Palustrine, Unconsolidated Shore, Seasonally Flooded, Californian Warm Temperate Marsh/Seep Group	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood										
12	6	3	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	30	none	Flat	Flat	N - CASGEM Well 51329 (Swainson, 12N06E05) avg DTW = 30 (60 points; 2015-2020)	none														
12	6	4	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	All species present have root depths that are shallow[1,2,3]. Species are likely dependent on the seeps and seasonal flooding, not groundwater.	30	Tri-Colored Blackbird	Flat	Flat	N - CASGEM Well 51329 (Swainson, 12N06E05) avg DTW = 30 (60 points; 2015-2020) N - CASGEM Well 13162 (12N06E06A001M) avg DTW = 32 (75 points; 2012-2020) N - CASGEM 49933 (MW 2-3, 12N06E06) avg DTW = 33 (84 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Emergent, Persistent, Semipermanently Flooded, California Warm Temperate Marsh/Seep	Typha angustifolia*	Narrowleaf Cattail	Schoenoplectus acutus*	Hardstem Bullrush	Populus fremontii	Fremont Cottonwood								

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
12	6	5	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Quercus lobata (less than 3 acres) is located along W. Wise Rd and likely not dependent on groundwater, but on irrigation from adjacent ag operation (alfalfa). GDEs in this section are sparse.	30	Tri-Colored Blackbird Vernal Pool Fairy Shrimp	Flat	Flat	N - CASGEM Well 51329 (Swainson, 12N06E05) avg DTW = 30 (60 points; 2015-2020) N - CASGEM Well 13162 (12N06E06A001M) avg DTW = 32 (75 points; 2012-2020) N - CASGEM 49933 (MW 2-3, 12N06E06) avg DTW = 33 (84 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Schoenoplectus acutus*	Hardstem Bullrush	Quercus lobata	Valley Oak												
12	6	6	Lincoln Regional Airpark	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	30-35	none	Flat	Flat	N - CASGEM Well 51329 (Swainson, 12N06E05) avg DTW = 30 (60 points; 2015-2020) N - CASGEM Well 13162 (12N06E06A001M) avg DTW = 32 (75 points; 2012-2020) N - CASGEM 49933 (MW 2-3, 12N06E06) avg DTW = 33 (84 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded														
12	6	7	Lincoln Regional Airpark	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	35-40	none	Flat	Flat	N - CASGEM Well 49942 (Airport 4 MW, 12N06E07) avg DTW = 45 (86 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded														
12	6	8	Residential/Commercial	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW greater than 30 ft	35-40	Vernal Pool Fairy Shrimp	Flat	Flat	N - CASGEM Well 49942 (Airport 4 MW, 12N06E07) avg DTW = 45 (86 points; 2012-2020)	California Warm Temperate Marsh/Seep	Typha angustifolia*	Narrowleaf Cattail	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow	Populus fremontii	Fremont Cottonwood						
12	6	9	Residential	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW greater than 30 ft	35-50	Swainson's Hawk	Flat	Flat	N - CASGEM Well 49942 (Airport 4 MW, 12N06E07) avg DTW = 45 (86 points; 2012-2020)	California Warm Temperate Marsh/Seep	Typha angustifolia*	Narrowleaf Cattail	Populus fremontii	Fremont Cottonwood	Salix gooddingii	Goodding's Willow	Quercus lobata	Valley Oak						
12	6	10	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW greater than 30 ft	35-40	Vernal Pool Fairy Shrimp	Flat	Flat	N - CASGEM Well 51329 (Swainson, 12N06E05) avg DTW = 30 (60 points; 2015-2020)	California Warm Temperate Marsh/Seep, Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Emergent, Persistent, Semipermanently Flooded	Schoenoplectus acutus*	Hardstem Bullrush	Typha angustifolia*	Narrowleaf Cattail	Populus fremontii	Fremont Cottonwood								

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
12	6	11	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Quercus lobata has a rooting depth of 24.02[1]. Species in northern portion of the section may be dependent on groundwater. The southern portion of the section has DTW greater than 30 ft	30-35	Vernal Pool Fairy Shrimp	Flat	Flat	N - CASGEM Well 49937 (MW 5-1, 12N06E21) avg DTW = 40 (85 points; 2012-2020) N - CASGEM Well 49938 (MW 5-2, 12N06E21) avg DTW = 36 (85 points; 2012-2020)	Arid West freshwater emergent marsh, Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood										
12	6	12	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Quercus lobata has a rooting depth of 24.02[1].	30-35	none	Flat	Flat	N - CASGEM Well 49937 (MW 5-1, 12N06E21) avg DTW = 40 (85 points; 2012-2020) N - CASGEM Well 49938 (MW 5-2, 12N06E21) avg DTW = 36 (85 points; 2012-2020)	none	Quercus lobata	Valley Oak												
12	6	13	Turkey Creek Golf Club	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Quercus lobata has a rooting depth of 24.02[1].	35	none	Flat	Flat	N - CASGEM Well 49937 (MW 5-1, 12N06E21) avg DTW = 40 (85 points; 2012-2020) N - CASGEM Well 49938 (MW 5-2, 12N06E21) avg DTW = 36 (85 points; 2012-2020)	none	Quercus lobata	Valley Oak												
12	6	14	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Quercus lobata has a rooting depth of 24.02[1]. Can be eliminated because DTW is greater than 30 ft.	35-40	none	Flat	Flat	N - CASGEM Well 49937 (MW 5-1, 12N06E21) avg DTW = 40 (85 points; 2012-2020) N - CASGEM Well 49938 (MW 5-2, 12N06E21) avg DTW = 36 (85 points; 2012-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Typha angustifolia*	Narrowleaf Cattail								
12	6	15	Residential/Commercial	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Quercus lobata has a rooting depth of 24.02[1].	40-50	none	Flat	Flat	N - CASGEM Well 49937 (MW 5-1, 12N06E21) avg DTW = 40 (85 points; 2012-2020) N - CASGEM Well 49938 (MW 5-2, 12N06E21) avg DTW = 36 (85 points; 2012-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Schoenoplectus acutus*	Hardstem Bullrush								
12	6	16	Residential	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Quercus lobata has a rooting depth of 24.02[1]. Can be eliminated because DTW is greater than 30 ft.	45-55	none	Flat	Flat	N - CASGEM Well 49937 (MW 5-1, 12N06E21) avg DTW = 40 (85 points; 2012-2020) N - CASGEM Well 49938 (MW 5-2, 12N06E21) avg DTW = 36 (85 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, California Warm Temperate Marsh/Seep	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Salix gooddingii	Goodding's Willow								
12	6	17	Residential	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW greater than 30 ft	50	Vernal Pool Fairy Shrimp	Flat	Flat	N - CASGEM Well 49934 (MW 3-1, 12N06E17) avg DTW = 55 (85 points; 2012 - 2020)	Palustrine, Unconsolidated Bottom, Permanently Flooded, California Warm Temperate Marsh/Seep	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow	Typha angustifolia*	Narrowleaf Cattail						
12	6	18	Markham Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW greater than 30 ft	40-50	none	Flat	Flat	N - CASGEM Well 49942 (Airport 4 MW, 12N06E07) avg DTW = 45 (86 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, California Warm Temperate Marsh/Seep	Quercus lobata	Valley Oak	Typha angustifolia*	Narrowleaf Cattail	Juglans hindsii and hybrids*	No Cal Black Walnut	Populus fremontii	Fremont Cottonwood						

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12	6	19	Auburn Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW greater than 30 ft	50	none	N	N	N - CASGEM Well 49927 (MW 1-1, 12N06E30) avg DTW = 57 (85 points; 2012-2020)	Palustrine, Forested, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded, California Warm Temperate Marsh/Seep	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow										
12	6	20	Auburn Ravine	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated DTW greater than 30 ft	50	Tri-Colored Blackbird Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 49941 (SLC - 3, 12N06E29) avg DTW = 65 (70 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak														
12	6	21	Auburn Ravine	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW greater than 30 ft	50	Vernal Pool Fairy Shrimp	Flat	Flat	N - CASGEM Well 49937 (MW 5-1, 12N06E21) avg DTW = 40 (85 points; 2012-2020) N - CASGEM Well 49938 (MW 5-2, 12N06E21) avg DTW = 36 (85 points; 2012-2020)	California Warm Temperate Marsh/Seep, Palustrine, Emergent, Persistent, Seasonally Flooded	Juglans hindsii*	No Cal Black Walnut	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow										
12	6	22	Residential/Commercial	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW greater than 30 ft	45-50	Vernal Pool Fairy Shrimp	Flat	Flat	N - CASGEM Well 49937 (MW 5-1, 12N06E21) avg DTW = 40 (85 points; 2012-2020) N - CASGEM Well 49938 (MW 5-2, 12N06E21) avg DTW = 36 (85 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Acer negundo	Box-elder	Populus fremontii	Fremont Cottonwood										
12	6	23	Ingram Slough	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated DTW greater than 30 ft.	40	none	Flat	Flat	N - CASGEM Well 49937 (MW 5-1, 12N06E21) avg DTW = 40 (85 points; 2012-2020) N - CASGEM Well 49938 (MW 5-2, 12N06E21) avg DTW = 36 (85 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail														
12	6	24	Ingram Slough	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated DTW greater than 30 ft.	40	none	Flat	Flat	N - CASGEM Well 49937 (MW 5-1, 12N06E21) avg DTW = 40 (85 points; 2012-2020) N - CASGEM Well 49938 (MW 5-2, 12N06E21) avg DTW = 36 (85 points; 2012-2020)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Typha angustifolia*	Narrowleaf Cattail														
12	6	25	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW greater than 30 ft.	40	none	Flat	Flat	N - CASGEM Well 49937 (MW 5-1, 12N06E21) avg DTW = 40 (85 points; 2012-2020) N - CASGEM Well 49938 (MW 5-2, 12N06E21) avg DTW = 36 (85 points; 2012-2020)	California Warm Temperate Marsh/Seep, Palustrine, Forested, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Typha angustifolia*	Narrowleaf Cattail	Salix gooddingii	Goodding's Willow										

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
12	6	26	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW greater than 30 ft.	45-50	none	Flat	Flat	N - CASGEM Well 49937 (MW 5-1, 12N06E21) avg DTW = 40 (85 points; 2012-2020) N - CASGEM Well 49938 (MW 5-2, 12N06E21) avg DTW = 36 (85 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, California Warm Temperate Marsh/Seep	Typha angustifolia*	Narrowleaf Cattail	Salix exigua	Narrowleaf Willow	Salix gooddingii	Goodding's Willow										
12	6	27	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated DTW greater than 30 ft.	50	Tricolored Blackbird, Vernal Pool Fairy Shrimp	Flat	Flat	N - CASGEM Well 49937 (MW 5-1, 12N06E21) avg DTW = 40 (85 points; 2012-2020) N - CASGEM Well 49938 (MW 5-2, 12N06E21) avg DTW = 36 (85 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail												
12	6	28	Residential	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	55	Tricolored Blackbird, Vernal Pool Fairy Shrimp, Vernal Pool Tadpole Shrimp	N	N	N - CASGEM Well 49941 (SLC - 3, 12N06E29) avg DTW = 65 (70 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded														
12	6	29	Ingram Slough	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated DTW greater than 30 ft	55-60	Tri-Colored Blackbird	N	N	N - CASGEM Well 49941 (SLC - 3, 12N06E29) avg DTW = 65 (70 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded	Schoenoplectus acutus*	Hardstem Bullrush												
12	6	30	Orchard Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW greater than 30 ft	50	none	N	N	N - CASGEM Well 49927 (MW 1-1, 12N06E30) avg DTW = 57 (85 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow								
12	6	31	Orchard Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated DTW greater than 30 ft	55-65	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 49927 (MW 1-1, 12N06E30) avg DTW = 57 (85 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood												
12	6	32	Orchard Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated DTW greater than 30 ft	55-65	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 49927 (MW 1-1, 12N06E30) avg DTW = 57 (85 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood												
12	6	33	Orchard Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated DTW greater than 30 ft	55-65	Tri-Colored Blackbird Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 49927 (MW 1-1, 12N06E30) avg DTW = 57 (85 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix exigua	Narrowleaf Willow												
12	6	34	Orchard Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW greater than 30 ft	50-60	Tri-Colored Blackbird	N	N	N - CASGEM Well 49941 (SLC - 3, 12N06E29) avg DTW = 65 (70 points; 2012-2020)	none	Salix exigua	Narrowleaf Willow	Salix gooddingii	Goodding's Willow	Typha angustifolia*	Narrowleaf Cattail								

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
12	6	35	Residential	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW greater than 30 ft	45-55	Tri-Colored Blackbird Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 49940 (SLC - 2, 12N06E29) avg DTW = 72 (79 points, 2012-2020	Palustrine, Emergent, Persistent, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak										
12	6	36	Residential	0	Not Likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated DTW greater than 30 ft	40-45	none			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail	Populus fremontii	Fremont Cottonwood	Salix gooddingii	Goodding's Willow	Quercus lobata	Quercus lobata								
12	7	19	Unspecified area	0	Not Likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs within NASb boundary	40	none			no representative hydrographs within contour interval	none																
12	7	29	Most of section is outside NASb boundary - Foothills	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs within NASb boundary	40	none			no representative hydrographs within contour interval	none																
12	7	30	Unspecified area	0	Not Likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated DTW greater than 30 ft	40	none			no representative hydrographs within contour interval	Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak														
12	7	31	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated DTW greater than 30 ft	40	none			no representative hydrographs within contour interval	none	Quercus lobata	Valley Oak														
12	7	32	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	40	none			no representative hydrographs within contour interval	none																
13	4	11	Bear River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk Valley Elderberry Longhorned Beetle	Flat	Flat	Y - CASGEM Well 38351 (BR-1A, 13N04E11R005M) avg DTW = 14 (131 points; 2003-2020)	none w/in NASb boundary	Populus fremontii	Fremont Cottonwood	Salix gooddingii	Goodding's Willow	Salix exigua	Narrowleaf Willow										
13	4	12	Bear River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Valley Elderberry Longhorned Beetle	Flat	Flat	Y - CASGEM Well 38351 (BR-1A, 13N04E11R005M) avg DTW = 14 (131 points; 2003-2020)	none w/in NASb boundary	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow	Populus fremontii	Fremont Cottonwood	Salix lasiolepis	Arroyo Willow								
13	4	13	Yankee Slough	3	Likely	DTW < 30 ft No Critical Species Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	none	Flat	Flat	Y - CASGEM Well 38351 (BR-1A, 13N04E11R005M) avg DTW = 14 (131 points; 2003-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Typha angustifolia*	Narrowleaf Cattail	Salix exigua	Narrowleaf Willow	Quercus lobata	Valley Oak										
13	4	14	Yankee Slough	3	Likely	DTW < 30 ft No Critical Species Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	none	Flat	Flat	Y - CASGEM Well 38351 (BR-1A, 13N04E11R005M) avg DTW = 14 (131 points; 2003-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Juglans hindsii and hybrids*	No Cal Black Walnut	Typha angustifolia*	Narrowleaf Cattail	Salix exigua	Narrowleaf Willow	Populus fremontii	Fremont Cottonwood						
13	4	15	Bear River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Y	N	Y - CASGEM Well 17191 (So Sut WD, 13N04E22D001M) avg DTW = 22 (76 points; 2000-2020)	none w/in NASb boundary	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Salix lasiolepis	Arroyo Willow	Acer negundo	Box-elder								
13	4	16	Bear River	4	Likely	DTW < 30 ft Critical Species may be present	Cannot be eliminated because DTW is less than 30 ft.	0-10	Giant garter snake Swainson's Hawk	Flat	N	Y - CASGEM Well 17188 (13N04E16N001M) avg DTW = 17 (164 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Salix gooddingii	Goodding's Willow										

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
						Diverse vegetation																					
13	4	17	Bear River - NASb - So Yuba boundary	3	Likely	DTW < 30 ft Critical Species may be present Lack of diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Flat	N	Y - CASGEM Well 17188 (13N04E16N001M) avg DTW = 17 (164 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak											
13	4	20	Bear River - NASb - So Yuba boundary	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Flat	N	Y - CASGEM Well 17188 (13N04E16N001M) avg DTW = 17 (164 points; 2000-2020)	none	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow									
13	4	21	Yankee Slough	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Flat	N	Y - CASGEM Well 17188 (13N04E16N001M) avg DTW = 17 (164 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow	Salix exigua	Narrowleaf Willow	Populus fremontii	Fremont Cottonwood							
13	4	22	Yankee Slough	3	Likely	DTW < 30 ft No Critical Species Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	none	Y	N	Y - CASGEM Well 17191 (So Sut WD, 13N04E22D001M) avg DTW = 22 (76 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Unconsolidated Bottom, Semipermanently Flooded	Juglans hindsii and hybrids*	Northern California Black Walnut	Quercus lobata	Valley Oak	Typha angustifolia*	Narrowleaf Cattail									
13	4	23	Unspecified area	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	none	Flat	N	Y - CASGEM Well 17193 (13N04E23A002M) avg DTW = 18 (152 points; 2000-2021)	Palustrine, Emergent, Persistent, Seasonally Flooded	Schoenoplectus acutus*	Hardstem Bullrush	Salix exigua	Narrowleaf Willow											
13	4	24	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	10-20	none	Flat	N	Y - CASGEM Well 17193 (13N04E23A002M) avg DTW = 18 (152 points; 2000-2021)	none															
13	4	25	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	10-20	none	Flat	N	Y - CASGEM Well 17193 (13N04E23A002M) avg DTW = 18 (152 points; 2000-2021)	none															
13	4	26	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	5-15	none	Flat	N	Y - CASGEM Well 17193 (13N04E23A002M) avg DTW = 18 (152 points; 2000-2021)	none															
13	4	27	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	0-10	none	Flat	N	N - CASGEM Well 24452 (So Sut, 13N04E33J002M) avg DTW = 33 (46 points, 2008-2020)	Palustrine, Emergent, Persistent, Semipermanently Flooded															
13	4	28	Ping Slough	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Flat	N	N - CASGEM Well 24452 (So Sut, 13N04E33J002M) avg DTW = 33 (46 points, 2008-2020)	Palustrine, Emergent, Persistent, Semipermanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Scrub-Shrub, Broad-Leaved-Evergreen, Seasonally Flooded, Palustrine, Unconsolidated Bottom, Semipermanently Flooded	Typha angustifolia*	Narrowleaf Cattail	Quercus lobata	Valley Oak	Schoenoplectus acutus*	Hardstem Bullrush	Salix gooddingii	Goodding's Willow							

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
13	4	29	Yankee and Ping Sloughs	3	Likely	DTW < 30 ft No Critical Species Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	none	Y	N	Y - CASGEM Well 35623 (13N04E32G001M) avg DTW = 25 (71 points; 2000-2020)	Palustrine, Forested, Broad-Leaved-Evergreen, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Unconsolidated Bottom, Semipermanently Flooded	Schoenoplectus acutus*	Hardstem Bullrush	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Salix gooddingii	Goodding's Willow								
13	4	30	Feather River/Yankee and Ping Sloughs	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk	Y	N	Y - CASGEM Well 35623 (13N04E32G001M) avg DTW = 25 (71 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow										
13	4	31	Yankee & Ping Sloughs	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	Swainson's Hawk Tricolored Blackbird (possibly extirpated)	Y	N	Y - CASGEM Well 35623 (13N04E32G001M) avg DTW = 25 (71 points; 2000-2020)	Palustrine, Aquatic Bed, Semipermanently Flooded, Palustrine, Unconsolidated Bottom, Semipermanently Flooded, Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Juglans hindsii and hybrids*	No Cal Black Walnut										
13	4	32	Unspecified area	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminate as DTW is less than 30 ft	0-10	none	Y	N	Y - CASGEM Well 35623 (13N04E32G001M) avg DTW = 25 (71 points; 2000-2020)	none	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood												
13	4	33	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	0-10	none	Flat	N	N - CASGEM Well 24452 (So Sut, 13N04E33J002M) avg DTW = 33 (46 points, 2008-2020)	none																
13	4	34	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	5-15	none	Flat	N	N - CASGEM Well 24452 (So Sut, 13N04E33J002M) avg DTW = 33 (46 points, 2008-2020)	none																
13	4	35	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	10-20	none	Y	N	Y - CASGEM Well 35624 (So Sut WD, 13N04E35Q002M) avg DTW = 29 (63 points, 2000-2020)	none																
13	4	36	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	15-25	none	Y	N	Y - CASGEM Well 35624 (So Sut WD, 13N04E35Q002M) avg DTW = 29 (63 points, 2000-2020)	none																
13	5	1	Bear River	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	35-45	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 52555 (Spencer, 13N05E12) avg DTW = 52 (59 points; 2016-2020) N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points; 2016-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak												
13	5	2	Bear River	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of	Can be eliminated because DTW is greater than 30 ft	30-35	none	N	N	N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points, 2016-2020)	none	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
						diverse vegetation																					
13	5	3	Bear River - no GDEs within NASb boundary	1	Not likely	DTW < 30 ft No Critical Species w/in NASb boundary No vegetation w/in NASb boundary	No GDEs within NASb boundary	20-30	none	N	N	N - CASGEM Well 47857 (PMW-27, 14N05E34F003 M) avg DTW = 59 (2765 points; 2007-2020) N - CASGEM Well 52555 (Spencer, 13N05E12) avg DTW = 52 (59 points; 2016-2020)	none														
13	5	7	Bear River	3	Likely	DTW < 30 ft No Critical Species Diverse Vegetation	All species present have root depths that are shallow[1]. Based on average DTW in nearby wells DTW is greater than 30 ft.	10-20	none	Flat/Y	N	Y - CASGEM Well 35627 (YCWA-13, 13N05E06R004 M) avg DTW = 29 (107 points; 2011-2020) Y - CASGEM Well 17209 (So Sut WD, 13N05E18C001 M) avg DTW = 28 (73 points; 2000-2020)	none	Populus fremontii	Fremont Cottonwood	Salix gooddingii	Goodding's Willow	Salix exigua	Narrowleaf Willow								
13	5	8	Bear River	3	Likely	DTW < 30 ft No Critical Species Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft	10-20	none	Flat/Y	N	Y - CASGEM Well 35627 (YCWA-13, 13N05E06R004 M) avg DTW = 29 (107 points; 2011-2020) Y - CASGEM Well 17209 (So Sut WD, 13N05E18C001 M) avg DTW = 28 (73 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Populus fremontii	Fremont Cottonwood	Salix gooddingii	Goodding's Willow	Arundo donax**	Giant Reed	Salix exigua	Narrowleaf Willow						
13	5	9	Bear River	3	Likely	DTW < 30 ft No Critical Species Diverse Vegetation	Quercus lobata maximum rooting depth is 24.31[1]; cannot be eliminated	20-25	none	Flat/Y	N	Y - CASGEM Well 35627 (YCWA-13, 13N05E06R004 M) avg DTW = 29 (107 points; 2011-2020) Y - CASGEM Well 17209 (So Sut WD, 13N05E18C001 M) avg DTW = 28 (73 points; 2000-2020)	none	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow	Populus fremontii	Fremont Cottonwood	Arundo donax**	Giant Reed						
13	5	10	Bear River	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Quercus lobata maximum rooting depth is 24.31[1]; cannot be eliminated.	25-30	Swainson's Hawk Vernal Pool Fairy Shrimp Valley Elderberry Longhorned Beetle	Y	N*/N	Y - CASGEM Well 17206 (13N05E09R001 M) avg DTW = 27 (87 points; 2000-2017) Y - CASGEM 17209 (So Sut WD, 13N05E18C001 M) avg DTW = 28 (73 points; 2000-2020)	California Warm Temperate Marsh/Seep, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded	Salix gooddingii	Goodding's Willow	Typha angustifolia*	Narrowleaf Cattail	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak						
13	5	11	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Populus fremontii has a maximum rooting depth of 16.4 ft[1].	30-45	none	N	N	N - CASGEM Well 52555 (Spencer, 13N05E12) avg DTW = 52 (59 points; 2016-2020) N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points; 2016-2020)	California Warm Temperate Marsh/Seep	Populus fremontii	Fremont Cottonwood												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
13	5	12	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	35-45	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 52555 (Spencer, 13N05E12) avg DTW = 52 (59 points; 2016-2020) N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points; 2016-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded														
13	5	13	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	30-50	none	N	N	N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points, 2016-2020)	none														
13	5	14	Unspecified area	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Populus fremontii has a maximum rooting depth of 6.89[1].	25-30	none	N	N	N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points, 2016-2020)	none	Populus fremontii	Fremont Cottonwood												
13	5	15	Unspecified area	4	Likely	DTW < 30 ft Critical Species may be present Diverse vegetation	Populus fremontii has a maximum rooting depth of 6.89[1]. All other species have shallow rooting depth[1,2].	25	Vernal Pool Fairy Shrimp	Y	N/N*	Y - CASGEM Well 17210 (13N05E22C003M) avg DTW = 27 (78 points; 2000-2020) Y - CASGEM Well 17206 (13N05E09R001M) avg DTW = 27 (87 points; 2000-2017)	Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded, California Warm Temperate Marsh/Seep	Typha angustifolia*	Narrowleaf Cattail	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow								
13	5	16	Yankee Slough	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Populus fremontii has a maximum rooting depth of 16.4 ft[1].	20-25	none	Y	N/N*	Y - CASGEM Well 17210 (13N05E22C003M) avg DTW = 27 (78 points; 2000-2020) Y - CASGEM Well 17206 (13N05E09R001M) avg DTW = 27 (87 points; 2000-2017)	none	Populus fremontii	Fremont Cottonwood												
13	5	17	Yankee Slough	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Populus fremontii has a maximum rooting depth of 16.4 ft[1].	25	none	Flat	N	N - CASGEM Well 17208 (13N05E17R001M) avg DTW = 31 (135 points, 2000-2021)	none	Populus fremontii	Fremont Cottonwood												
13	5	18	Yankee Slough	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Cannot be eliminated because DTW is less than 30 ft.	0-10	none	Y	N	Y - CASGEM Well 17209 (So Sut WD, 13N05E18C001M) avg DTW = 28 (73 points; 2000-2020)	none	Salix exigua	Narrowleaf Willow												
13	5	19	Unspecified area	1	Not Likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	15-25	none	Y	N	Y - CASGEM Well 17209 (So Sut WD, 13N05E18C001M) avg DTW = 28 (73 points; 2000-2020)	California Warm Temperate Marsh/Seep														
13	5	20	Unspecified area	1	Not Likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	20-30	none	Flat	N	N - CASGEM Well 17208 (13N05E17R001M) avg DTW = 31 (135 points, 2000-2021)	none														
13	5	21	Yankee Slough	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Populus fremontii has a maximum rooting depth of 16.4 ft[1].	25	none	Flat	N	Y - CASGEM Well 24451 (13N05E16F001M) avg DTW = 27 (36 points; 2008-2020) N - CASGEM Well 17208 (13N05E17R001M) avg DTW = 31 (135 points; 2000-2021)	none	Populus fremontii	Fremont Cottonwood												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
13	5	22	Yankee Slough	0	Not Likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Populus fremontii has a maximum rooting depth of 16.4 ft[1].	30-35	none	Y	N	Y - CASGEM Well 17210 (13N05E22C003 M) avg DTW = 27 (78 points; 2000-2020) N - CASGEM Well 17208 (13N05E17R001 M) avg DTW = 31 (135 points; 2000-2021)	none	Populus fremontii	Fremont Cottonwood												
13	5	23	Surface water ponds?	0	Not Likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Populus fremontii has a maximum rooting depth of 16.4 ft and Salix gooddingii has a maximum rooting depth of 6.89[1].	30-35	none	N	N	N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points, 2016-2020)	none	Typha angustifolia*	Narrowleaf Cattail	Populus fremontii	Fremont Cottonwood	Schoenoplectus acutus*	Hardstem Bullrush	Salix gooddingii	Goodding's Willow						
13	5	24	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can eliminate because DTW is greater than 30 ft.	35-40	Tri-Colored Blackbird	N	N	N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points, 2016-2020)	California Warm Temperate Marsh/Seep, Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Emergent, Persistent, Semipermanently Flooded	Schoenoplectus acutus*	Hardstem Bullrush	Populus fremontii	Fremont Cottonwood										
13	5	25	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	40	none	N	N	N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points, 2016-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded														
13	5	26	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	35-40	none	Flat	Flat	N - CASGEM Well 32899 (12N05E01D002 M) avg DTW =32 (84 points, 2000-2020	California Warm Temperate Marsh/Seep														
13	5	27	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	35	none	Y	N	N - CASGEM Well 35633 (13N 05E34P001M) avg DTW =49 (95 points, 2000-2020)	none														
13	5	28	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	30-35	none	Y	N	N - CASGEM Well 35633 (13N 05E34P001M) avg DTW =49 (95 points, 2000-2020)	none														
13	5	29	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	25-35	none	Flat	N	N - CASGEM Well 17208 (13N05E17R001 M) avg DTW = 31 (135 points, 2000-2021)	none														
13	5	30	Unspecified area	1	Not likely	DTW < 30 ft No Critical Species No vegetation	No GDEs	20-30	none	Y	N	Y - CASGEM Well 40137 (So Sut WD, 13N05E31K001 M) avg DTW = 29 (94 points; 2000-2020)	none														
13	5	31	Raccoon Ck	2	Less Likely	DTW < 30 ft No Critical Species Lack of Diverse Vegetation	Salix gooddingii has a maximum rooting depth of 6.89[1]	25-30	none	Y	N/N*	Y- CASGEM Well 40137 (So Sut WD, 13N05E31K001 M) avg DTW = 29 (94 points; 2000-2020) N- CASGEM Well 35632 (13N05E30A001 M) avg DTW = 43 (100 points, 2000-2019)	Palustrine, Forested, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Salix gooddingii	Goodding's Willow										

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
13	5	32	Raccoon Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	30-35	none	Y	N	Y - CASGEM Well 40137 (So Sut WD, 13N05E31K001M) avg DTW = 29 (94 points; 2000-2020) N - CASGEM Well 35633 (13N05E34P001M) avg DTW = 49 (97 points; 2000-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded	Salix gooddingii	Goodding's Willow	Populus fremontii	Fremont Cottonwood												
13	5	33	Raccoon Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated because DTW is greater than 30 ft	35	none	Y	N	Y - CASGEM Well 40137 (So Sut WD, 13N05E31K001M) avg DTW = 29 (94 points; 2000-2020) N - CASGEM Well 35633 (13N05E34P001M) avg DTW = 49 (97 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Forested, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded	Quercus lobata	Valley Oak	Typha angustifolia*	Narrowleaf Cattail	Platanus racemosa	California Sycamore	Salix gooddingii	Goodding's Willow						
13	5	34	Raccoon Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	35	none	Y/Flat	N/Flat	N - CASGEM Well 35633 (13N05E34P001M) avg DTW = 41 (97 points; 2000-2020) N - CASGEM Well 32899 (12N05E01D002M) avg DTW = 32 (115 points; 2000-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow												
13	5	35	Raccoon Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	35	none	Y/Flat	N/Flat	N - CASGEM Well 35633 (13N05E34P001M) avg DTW = 41 (97 points; 2000-2020) N - CASGEM Well 32899 (12N05E01D002M) avg DTW = 32 (115 points; 2000-2020)	Palustrine, Forested, Seasonally Flooded, Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak												
13	5	36	Raccoon Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	35	none	Flat	Flat	N - CASGEM Well 32899 (12N05E01D002M) avg DTW =32 (84 points, 2000-2020	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded	Quercus lobata	Valley Oak												
13	6	5	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	45	none	N	N	N - CASGEM Well 52555 (Spencer, 13N05E12) avg DTW = 52 (59 points; 2016-2020) N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points; 2016-2020)	California Warm Temperate Marsh/Seep												

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
13	6	6	Unspecified area	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	45	none	N	N	N - CASGEM Well 52555 (Spencer, 13N05E12) avg DTW = 52 (59 points; 2016-2020) N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points; 2016-2020)	none																
13	6	7	appears to be artificial pond - no nearby drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	45	none	N	N	N - CASGEM Well 52555 (Spencer, 13N05E12) avg DTW = 52 (59 points; 2016-2020) N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points; 2016-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Salix gooddingii	Goodding's Willow														
13	6	8	Racoon Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	50	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 52555 (Spencer, 13N05E12) avg DTW = 52 (59 points; 2016-2020) N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points; 2016-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak														
13	6	9	Racoon Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	45	none	N	N	N - CASGEM Well 52555 (Spencer, 13N05E12) avg DTW = 52 (59 points; 2016-2020) N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points; 2016-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow												
13	6	10	Most of section is outside NASb boundary - Foothills	0	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs (Himalayan Blackberry)	40	none			no representative hydrographs within contour interval	none																
13	6	15	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs - Himalayan Blackberry	40	Tricolored Blackbird			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded																
13	6	16	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	40	none	N	N	N - CASGEM Well 52555 (Spencer, 13N05E12) avg DTW = 52 (59 points; 2016-2020) N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points; 2016-2020)	California Warm Temperate Marsh/Seep, Palustrine, Emergent, Persistent, Semipermanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood												
13	6	17	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated because DTW is greater than 30 ft	50	California Black Rail Tri-Colored Blackbird	N	N	N - CASGEM Well 52555 (Spencer, 13N05E12) avg DTW = 52 (59 points; 2016-2020) N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points; 2016-2020)	Palustrine, Emergent, Persistent, Semipermanently Flooded, Palustrine, Scrub-Shrub, Seasonally Flooded, Palustrine, Forested, Seasonally Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded, California Warm	Schoenoplectus acutus*	Hardstem Bullrush	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak								

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
													Temperate Marsh/Seep															
13	6	18	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	50	Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 52555 (Spencer, 13N05E12) avg DTW = 52 (59 points; 2016-2020) N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points; 2016-2020)	Palustrine, Emergent, Persistent, Seasonally	Schoenoplectus acutus*	Hardstem Bullrush												
13	6	19	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated because DTW is greater than 30 ft	50	Tri-Colored Blackbird Vernal Pool Fairy Shrimp	N	N	N - CASGEM Well 52555 (Spencer, 13N05E12) avg DTW = 52 (59 points; 2016-2020) N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points; 2016-2020)	California Warm Temperate Marsh/Seep	Schoenoplectus acutus*	Hardstem Bullrush	Salix exigua	Narrowleaf Willow	Populus fremontii	Fremont Cottonwood	Typha angustifolia*	Narrowleaf Cattail						
13	6	20	Unnamed drainage	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	40-55	Vernal Pool Fairy Shrimp Swainson's Hawk	N	N	N - CASGEM Well 52555 (Spencer, 13N05E12) avg DTW = 52 (59 points; 2016-2020) N - CASGEM Well 51330 (MW-1, 13N05E13) avg DTW = 35 (58 points; 2016-2020)	Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded, Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded, Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak										
13	6	21	Raccoon Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated because DTW is greater than 30 ft	40	Swainson's Hawk			no representative hydrographs within contour interval	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Salix gooddingii	Goodding's Willow								
13	6	22	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Quercus lobata has a rooting depth of 24.31[1]. Other species required shallower DTW. Species likely dependent on surface water[1,2].	30-35	none			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Typha angustifolia*	Narrowleaf Cattail	Salix exigua	Narrowleaf Willow	Quercus lobata	Valley Oak	Salix gooddingii	Goodding's Willow						
13	6	26	Most of section is outside NASb boundary - Foothills	0	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	30	none			no representative hydrographs within contour interval	none														

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/21)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
13	6	27	Unnamed drainage	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Quercus lobata has a rooting depth of 24.31[1]. Other species required shallower DTW. Species likely dependent on surface water[1,2].	30	none			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Salix exigua	Narrowleaf Willow	Quercus lobata	Valley Oak								
13	6	28	Unnamed drainage & Doty Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Quercus lobata has a rooting depth of 24.31[1]. Other species required shallower DTW. Species likely dependent on surface water[1,2].	30-40	Tricolored Blackbird	Flat	Flat	N - CASGEM Well 13162 (12N06E06A001M) avg DTW = 32 (75 points; 2012-2020) Y - CASGEM Well 49931 (MW 2-1, 12N06E06) avg DTW = 13 (85 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Typha angustifolia*	Narrowleaf Cattail	Salix exigua	Narrowleaf Willow							
13	6	29	Raccoon Ck	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Quercus lobata has a rooting depth of 24.31[1]. Populus fremontii has a maximum rooting depth of 16.4[1]. Species likely dependent on surface water.	30-35	none	Flat	Flat	N - CASGEM Well 13162 (12N06E06A001M) avg DTW = 32 (75 points; 2012-2020) N - CASGEM 49933 (MW 2-3, 12N06E06) avg DTW = 33 (84 points; 2012-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood										
13	6	30	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present No vegetation	No GDEs	35-45	Vernal Pool Fairy Shrimp	Flat	Flat	N - CASGEM Well 13162 (12N06E06A001M) avg DTW = 32 (75 points; 2012-2020) N - CASGEM 49933 (MW 2-3, 12N06E06) avg DTW = 33 (84 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded														
13	6	31	Raccoon Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Quercus lobata maximum rooting depth is 24.31[1]	30-35	none	Flat	Flat	N - CASGEM Well 13162 (12N06E06A001M) avg DTW = 32 (75 points; 2012-2020) N - CASGEM 49933 (MW 2-3, 12N06E06) avg DTW = 33 (84 points; 2012-2020)	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Juglans hindsii and hybrids*	California Walnut							
13	6	32	Raccoon Ck & Doty Ck	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Quercus lobata maximum rooting depth is 24.31[1]	30-35	none	Flat	Flat	N - CASGEM Well 13162 (12N06E06A001M) avg DTW = 32 (75 points; 2012-2020) N - CASGEM 49933 (MW 2-3, 12N06E06) avg DTW = 33 (84 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded, Riverine, Unknown Perennial, Unconsolidated Bottom, Semipermanently Flooded, Palustrine, Forested, Seasonally Flooded	Quercus lobata	Valley Oak	Typha angustifolia*	Narrowleaf Cattail	Populus fremontii	Fremont Cottonwood							

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[9]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
13	6	33	Doty Ravine	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Quercus lobata maximum rooting depth is 24.312	30	Vernal Pool Fairy Shrimp	Flat	Flat	N - CASGEM Well 13162 (12N06E06A001M) avg DTW = 32 (75 points; 2012-2020) N - CASGEM 49933 (MW 2-3, 12N06E06) avg DTW = 33 (84 points; 2012-2020)	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Emergent, Persistent, Semipermanently Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Typha angustifolia*	Narrowleaf Cattail								
13	6	34	Doty Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Quercus lobata maximum rooting depth is 24.313	30	none	Flat	Flat	N - CASGEM Well 51329 (Swainson, 12N06E05) avg DTW = 30 (60 points; 2015-2020)	California Warm Temperate Marsh/Seep, Palustrine, Emergent, Persistent, Seasonally Flooded	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood	Platanus racemosa	California Sycamore								
13	6	35	Doty Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Quercus lobata maximum rooting depth is 24.314	30	none	Flat	Flat	N - CASGEM Well 51329 (Swainson, 12N06E05) avg DTW = 30 (60 points; 2015-2020)	California Warm Temperate Marsh/Seep, Palustrine, Emergent, Persistent, Semipermanently Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak										
13	6	36	Doty Ravine	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Quercus lobata maximum rooting depth is 24.315	30	none			no representative hydrographs within contour interval	none	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak										
14	5	25	Bear River - NASb - So Yuba boundary	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	35-40	none	N	N	N - CASGEM Well 47857 (PMW-27 14N05E34F003M) avg DTW = 59 (2765 points; 2007-2020)	none	Quercus lobata	Valley Oak	Populus fremontii	Fremont Cottonwood										
14	5	35	Bear River - NASb - So Yuba boundary	0	Not likely	DTW ≥ 30 ft No Critical Species No vegetation	No GDEs	40	none	N	N	N - CASGEM Well 47857 (PMW-27 14N05E34F003M) avg DTW = 59 (2765 points; 2007-2020)	none														
14	5	36	Bear River w/in NASb boundary	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	40	none	N	N	N - CASGEM Well 47857 (PMW-27 14N05E34F003M) avg DTW = 59 (2765 points; 2007-2020)	Palustrine, Scrub-Shrub, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood												
14	6	29	Bear River	0	Not likely	DTW ≥ 30 ft No Critical Species Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft	40	none			no representative hydrographs within contour interval	California Warm Temperate Marsh/Seep, Palustrine, Scrub-Shrub, Emergent, Persistent, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak										
14	6	30	Dammed section of Bear River & adjacent to Camp Far West Resv	0	Not likely	DTW ≥ 30 ft No Critical Species Diverse vegetation have rooting depths less than DTW	Can be eliminated because DTW is greater than 30 ft	40	none			no representative hydrographs within contour interval	California Warm Temperate Marsh/Seep, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded, Palustrine, Emergent, Persistent, Unconsolidated Shore, Seasonally Flooded	Quercus lobata	Valley Oak	Salix exigua	Narrowleaf Willow	Salix gooddingii	Goodding's Willow	Populus fremontii	Fremont Cottonwood	Salix lasiolepis	Arroyo Willow	Sambucus Nigra	Common Elderberry		

T	R	Sec	Location	Score	GDE - Likely, Not Likely, Less likely	Rationale	Rationale Comments	DTW Contour Interval (ft)[7]	Critical species[8]	Water Levels Declining (all data points)	Water Levels Declining (2015-2020/2021)	GW - SW Connection (verified by Hydrograph within 3.1 mi)	Wetland Designation[9]	Plants-dominant[0]		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant		Plants-sub-dominant	
14	6	31	Dammed section of Bear River & adjacent to Camp Far West Resv	1	Not likely	DTW ≥ 30 ft Critical Species may be present Diverse vegetation have rooting depths less than DTW	Can be eliminated because DTW is greater than 30 ft.	40	Bank Swallow			no representative hydrographs within contour interval	Palustrine, Emergent, Persistent, Seasonally Flooded, Palustrine, Emergent, Persistent, Unconsolidated Shore, Seasonally Flooded, Riverine, Lower Perennial, Unconsolidated Shore, Seasonally Flooded	Populus fremontii	Fremont Cottonwood	Quercus lobata	Valley Oak	Salix lasiolepis	Arroyo Willow	Schoenoplectus acutus*	Hardstem Bulrush	Salix exigua	Narrowleaf Willow						
14	6	32	Unspecified area	1	Not likely	DTW ≥ 30 ft Critical Species may be present Lack of diverse vegetation	Can be eliminated because DTW is greater than 30 ft.	40	Vernal Pool Fairy Shrimp			no representative hydrographs within contour interval	none	Schoenoplectus acutus*	Hardstem Bulrush														

Scoring:

DTW < 30 ft = 2

Critical Species Identified = 1

Diverse vegetation (3 or more plant species) = 1

DTW ≥ 30 ft = 0

No vegetation present = -1

Lack of diverse vegetation = 0

Diverse vegetation with rooting depths less than DTW = 0

"Vegetation" = vegetation listed in the NCCAG dataset

*Data does not extend to 2020/2021

Used avg static DTW

Proposed GSP monitoring wells

May not be dependent on groundwater

May be dependent on groundwater

*Not on TNC CA Phreatophyte Rooting List; on Comprehensive Root Depth List

**Not on TNC CA Phreatophyte Rooting List or Comprehensive Root Depth List

[1] TNC Plant Rooting Depth Database (Acer negundo, Fraxinus latifolia (used F.velutin), Populus fremontii, Quercus lobata, Salix gooddingii, Salix exigua (used rooting depth for S. gooddingii, Salix lasiolepis)

[2] CalFlora.org (Heterotheca oregona, Typha angustifolia)

[3] USDA FEIS Database (Alnus rhombifolia, Sambucus nigra, Schoenoplectus acutus, Vitas californica)

[4] https://www.fws.gov/sacramento/es_species/Accounts/Invertebrates/valley_elderberry_longhorn_beetle/

[5] https://plants.usda.gov (Platanus racemosa)

[6] https://www.habitatmatters.org/narrow-leaf-cattail.html)

[7] NASb Spring 2019 DTW

[8] https://wildlife.ca.gov/Data/CNDDB/Maps-and-Data - RareFind 5

[9] https://gis.water.ca.gov/app/NCDatasetViewer/

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Table O-2. Groundwater Contouring Monitoring Well Construction Details

CASGEM SITE_CODE	LATITUDE	LONGITUDE	CommonName	MSMT_DATE	WSE	WLM_ORG_NAME	Screened Interval (ft bgs)	Total Depth (ft bgs)
388893N1212847W001	38.889283	-121.28468	MW 4	4/15/2020 7:57	162.28	Sacramento Groundwater Authority	15-25	25
389774N1213728W001	38.977408	-121.372844	MW-3	4/15/2020 8:56	76.69	Placer County	19.5-34.5	35
387515N1212725W001	38.751494	-121.272511	WPMW-10A	4/15/2020 12:05	137.21	City of Roseville	26-36	36
387517N1212727W001	38.751667	-121.272656	WPMW-9A	4/15/2020 12:05	140.66	City of Roseville	26-36	36
389785N1213713W001	38.97846	-121.37132	MW-1	4/15/2020 8:36	77.47	Placer County	30-40	40
389764N1213710W001	38.976427	-121.371001	MW-2	4/15/2020 8:42	77.17	Placer County	24.3-44.3	45
	38.639539	-121.561543	URS71000-700+00F	3/19/2020 9:30	6.53	Sacramento Groundwater Authority	Unknown	45
	38.639704	-121.562435	URS71000-700+00C	3/19/2020 9:15	7.47	Sacramento Groundwater Authority	Unknown	45
	38.774911	-121.597535	SREL-1-27-F1	3/19/2020 8:00	14.06	Sacramento Groundwater Authority	Unknown	46
389950N1214148W002	38.994987	-121.414793	RDMW-103	3/19/2020 12:00	68.09	Placer County	28-43	48
389919N1214141W002	38.991944	-121.414066	RDMW-104	3/19/2020 12:00	67.2	Placer County	28-43	48
386160N1215054W001	38.61603	-121.5054	Bannon Creek Park	4/8/2020 9:54	1.66	Sacramento Groundwater Authority	33-48	48
389857N1214880W004	38.9857	-121.488	BR-1A	3/11/2020 11:05	47.25	Yuba County Water Agency	28-48	48
	38.882937	-121.611051	RDMW-101	3/19/2020	19.65	Sutter County	28-43	48
	38.879869	-121.588533	RDMW-102	3/19/2020	19.43	Sutter County	28-43	48
387510N1212390W001	38.750989	-121.23895	WPMW-8A	4/15/2020 12:52	203.57	City of Roseville	30-50	50
386292N1214877W001	38.62921	-121.4877	Chuckwagon Park	4/8/2020 10:11	-7.19	Sacramento Groundwater Authority	27-37	52
388476N1212872W001	38.847609	-121.28719	WPMW-3A	4/15/2020 10:13	147.57	City of Roseville	48-53	53
388826N1213078W002	38.882583	-121.30775	MW 5-2	4/15/2020 8:19	110.51	City of Lincoln	52-62	62
385841N1214185W001	38.58414	-121.41852	SGA_MW04	4/8/2020 9:11	2.59	Sacramento Groundwater Authority	55-65	65
385841N1214185W001	38.58414	-121.41852	SGA_MW04	4/8/2020 9:11	2.59	Sacramento Groundwater Authority	55-65	65
385828N1213385W001	38.58281	-121.33846	SGA_MW06	4/8/2020 8:36	12.59	Sacramento Groundwater Authority	62-72	72
388971N1213301W002	38.897133	-121.330083	MW 3-2	4/15/2020 7:46	77.25	City of Lincoln	65-75	75
389669N1214897W001	38.9669	-121.4897	13N04E23A002M	3/2/2020 0:00	45.28	Department of Water Resources	Unknown	83
389255N1213566W003	38.925467	-121.356633	MW 2-3	4/15/2020 7:19	95.19	City of Lincoln	75-85	85
388604N1213544W004	38.860383	-121.354383	MW 1-4	4/15/2020 10:00	58.17	City of Lincoln	82-92	92
389185N1213268W001	38.918461	-121.326842	Swainson	4/15/2020 9:58	112.59	Placer County	44.1-91.9	92
389867N1213654W002	38.9867	-121.365	Spencer	4/15/2020 9:36	84.66	Placer County	96-107	107
387218N1214677W001	38.72178	-121.46771	SGA_MW01	4/8/2020 10:52	-15.66	Sacramento Groundwater Authority	100-110	110
386836N1214536W001	38.68362	-121.45363	SGA_MW02	4/8/2020 10:40	-13.36	Sacramento Groundwater Authority	100-110	110
389740N1213606W001	38.974027	-121.360615	Cemetery	4/15/2020 9:17	78.66	Placer County	70-111	111
387786N1213737W001	38.778603	-121.373698	WPMW-1A	4/15/2020 9:27	-0.07	City of Roseville	110-120	120
388260N1215394W004	38.826	-121.5394	SUT-P1	3/10/2020 10:49	19.23	Sutter County	110-120	120
387626N1213651W001	38.762629	-121.365099	SVMW East-2A	4/15/2020 9:44	2.02	City of Roseville	125-135	140
387000N1212180W001	38.69998	-121.21795	SGA_MW08	4/8/2020 14:17	107.21	Sacramento Groundwater Authority	130-140	140
387623N1213915W001	38.762324	-121.39153	SVMW West - 1A	4/15/2020 8:36	-12.35	City of Roseville	120-140	145
388235N1216079W001	38.823235	-121.60763	Sutter County MW-5A	4/23/2020 8:20	17.15	Department of Water Resources	130-160	160
386874N1212206W001	38.68739	-121.22058	SGA_MW09	4/8/2020 14:26	109.92	Sacramento Groundwater Authority	150-160	160
388882N1214005W002	38.888164	-121.400463	WPMW-11A	4/15/2020 7:31	22.47	Placer County	132-152	162
387216N1213842W001	38.72163	-121.38417	Lone Oak Park	4/8/2020 11:12	-10.53	Sacramento Groundwater Authority	151-161	166
386280N1213493W001	38.628	-121.349	WCMSS	4/8/2020 8:15	-15.26	Sacramento Groundwater Authority	130-150	170
388116N1213054W001	38.811594	-121.305387	Tinker MW	4/15/2020 9:40	61.14	City of Roseville	117-177	177
389116N1215238W003	38.9116	-121.5238	AB-1 shallow	3/11/2020 11:45	34.32	Department of Water Resources	170-180	190
386964N1213120W001	38.6964	-121.31203	Twin Creeks Park	4/8/2020 13:37	-6.4	Sacramento Groundwater Authority	183-193	193
386547N1215320W001	38.6547	-121.532	386547N1215320W001	3/2/2020 0:00	4.21	Department of Water Resources	140-200	200
389791N1213727W001	38.979133	-121.372694	Old Well #2	4/15/2020 8:24	78.3	Placer County	144-209	209
386635N1213486W001	38.66347	-121.34859	SGA_MW05	4/8/2020 12:01	-13.68	Sacramento Groundwater Authority	205-215	215
388145N1213491W001	38.814497	-121.349144	WPMW-2A	4/15/2020 10:15	29.25	City of Roseville	215-225	225
387222N1212920W001	38.7222	-121.292	Whyte A	4/8/2020 13:21	10.21	Sacramento Groundwater Authority	200-220	226
386016N1213761W001	38.6016	-121.3761	DWR_SGA_004	3/5/2020 0:00	-19.10	Department of Water Resources	Unknown	238
388406N1215627W001	38.840601	-121.562699	S&O #17	4/25/2020 0:00	18.17	Sutter County	152-240	240
386038N1214357W001	38.6038	-121.4357	DWR_SGA_005	3/5/2020 0:00	-21.86	Department of Water Resources	Unknown	250
387511N1213389W001	38.7511	-121.3389		3/4/2020 0:00	5.02	Department of Water Resources	150-256	256
386310N1213864W001	38.63101	-121.38641	Well 10	4/28/2020 9:00	-25.91	Sacramento Groundwater Authority	210-262	265
386038N1213882W002	38.6038	-121.38815	MW11B	4/3/2020 12:30	-20.09	Sacramento Groundwater Authority	258-268	278
387957N1213813W001	38.795655	-121.38126	CVMW-1A	4/15/2020 9:14	1.61	City of Roseville	260-280	285
385947N1213985W001	38.59472	-121.39847	WPMW12A	4/3/2020 9:20	-16.3	Sacramento Groundwater Authority	260-280	300
388029N1214145W001	38.8029	-121.4145		3/4/2020 0:00	-10.04	Department of Water Resources	135-460	460
389292N1214056W001	38.9292	-121.4056		3/2/2020 0:00	50.50	Department of Water Resources	NA	NA
388667N1214513W001	38.8667	-121.4513	12N05E29D001M	3/4/2020 0:00	8.52	Department of Water Resources	NA	NA
387859N1216565W001	38.7859	-121.6565	RD 1500 Karnak	3/10/2020 0:00	17.03	Department of Water Resources	Unknown	Unknown

Appendix P: Groundwater Model Documentation

NORTH AMERICAN SUBBASIN GROUNDWATER SUSTAINABILITY PLAN

APPENDIX P
CoSANA Groundwater Model Documentation

December 2021

CoSANA

An Integrated Water Resources Model of the Cosumnes, South American, and North American Groundwater Subbasins

NOVEMBER 2021

WOODARD &CURRAN

CoSANA:
An Integrated Water Resources Model
of the
Cosumnes, South American, and North American
Groundwater Subbasins

November 2021

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COMMITMENT & INTEGRITY DRIVE RESULTS

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ABBREVIATIONS

2070CT	2070 Central Tendency
2070HD	2070 Hot and Dry
AFY	acre-feet per year
ARBS	American River Basin Study
ASR	aquifer storage and recovery
ASTM	American Standard Testing Method
AWMP	Agricultural Water Management Plan
C2VSimFG	California Central Valley Groundwater-Surface Water Simulation Model
Cal Am	California American Water Company
CalSIMETAW	California Simulation of Evapotranspiration of Applied Water
CASGEM	California Statewide Groundwater Elevation Monitoring
CDEC	California Data Exchange Center
cfs	cubic feet per second
CIMIS	California Irrigation Management Information System
CoSANA	Cosumnes-South American-North American Integrated Water Resources Model
CoSb	Cosumnes Subbasin
CSD	Community Services District
CWD	community water district
DEM	digital elevation model
DWR	California Department of Water Resources
ESJ	Eastern San Joaquin Groundwater Subbasin
ET	evapotranspiration
ET_o	reference ET
ET_c	crop coefficient
GSA	groundwater sustainability agency
GSP	groundwater sustainability plan
GWMP	City of Sacramento's 2017 Groundwater Master Plan
ID	irrigation district; identifier
IDC	IWFM Demand Calculator
IGSM	Integrated Groundwater and Surface Water Model
IWFM	Integrated Water Flow Model
JVID	Jackson Valley Irrigation District
METRIC	Mapping Evapotranspiration at High Resolution with Internalized Calibration
NASb	North American Subbasin
NRCS	Natural Resource Conservation Service
PCWA	Placer County Water Agency
PRISM	Precipitation-Elevation Regressions on Independent Slopes Model
Reclamation	United States Bureau of Reclamation
RMCSD	Rancho Murieta Community Services District
RMSE	root mean square error
RWA	Regional Water Authority
SacIWRM	Sacramento Area Integrated Water Resources Model
SAFCA	Sacramento Area Flood Control Agency
SASb	South American Subbasin
SCGA	Sacramento Central Groundwater Authority
SCWA	Sacramento County Water Agency
SGA	Sacramento Groundwater Authority
SGMA	Sustainable Groundwater Management Act

SMUD	Sacramento Municipal Utility District
SSCAWA	Southeast Sacramento County Agricultural Water Authority
SSURGO	Soil Survey Geographic Database
STATSGO2	Digital General Soil Map of the United States
SVSim	Sacramento Valley Groundwater-Surface Water Simulation Model
TNC	The Nature Conservancy
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
WA	water agency
WC	water company
WD	water district
WDL	Water Data Library
WY	water year
YGM	Yuba Groundwater Model

ACKNOWLEDGEMENTS

The Cosumnes-South American-North American Integrated Water Resources Model (CoSANA) was developed in a collaborative effort with representatives of the North American Subbasin (NASb), South American Subbasin (SASb), and the Cosumnes Subbasin (CoSb). This collaborative approach spanning three subbasins improves the ability for local water managers and stakeholders to use CoSANA to for a range of regional planning efforts.

Funding of the CoSANA model was also a collaborative effort, with contributions from the Sacramento Groundwater Authority (SGA), Regional Water Authority (RWA), Sacramento Central Groundwater Authority (SCGA), Sacramento Area Flood Control District (SAFCA), and Southeast Sacramento County Agricultural Water Authority (SSCAWA). Contributions from SGA, SSCAWA, Sacramento Water Forum, Sacramento County, and the seven groundwater sustainability agencies (GSAs) represented by the Cosumnes Subbasin Sustainable Groundwater Management Act (SGMA) Working Group supported by grants from the California Department of Water Resources' Proposition 1, Round 2 Sustainable Groundwater Planning Grant Program

A technical committee consisting of working groups from each of the three subbasins provided technical support and quality assurance throughout the model development. Working groups included agencies and consultant teams representing the NASb, SASb, and CoSb with knowledge of the area. Participation by representatives of regional water agencies and GSA representatives, including SGA, RWA, SCGA, SAFCA, SSCAWA and the Sacramento Water Forum, allowed for incorporation of information related to stakeholders within those organizations and beyond. Further progress was shared at meetings associated with development of groundwater sustainability plans (GSPs) to gain additional input and information.

Model development was led by RWA and supported by input and efforts of many entities and their consultants, including:

- RWA/SGA
  - Rob Swartz
  - Monica Garcia
- SCGA
  - John Woodling
  - Ramon Roybal
  - Bob Gardner
- The Sacramento Water Forum
  - Tom Gohring
- SAFCA
  - Gary Bardini
- Department of Water Resources
  - Can Dogrul
  - Tyler Hatch
  - Tariq Kadir
- Each GSA within the North American, South American, and Cosumnes Subbasins and their representatives
- Many other water purveyor and remediation site representatives that provided information to better simulate their areas and operations.

Woodard & Curran was the lead consultant for development of the CoSANA model with substantial assistance from stakeholders, subbasin representatives, and their consultants. The Woodard & Curran project team included:

- Ali Taghavi
- Jim Blanke
- Sebastien Poore
- Sara Miller
- Sevim Onsoy
- Brian Van Lienden
- Sercan Ceyhan
- Mesut Cayar

Other consultants who contributed to the model development included:

- EKI Environment and Water
  - John Fio
  - Dave Leighton
  - Christina Lucero
- GEI Consultants
  - Jonathan Goetz
  - Richard Shatz
- Larry Walker Associates
  - Laura Foglia
  - Rich Pauloo
- MBK Engineers
  - Lee Bergfeld
  - Angela Bezzone
  - Kyle Knutson

The CoSANA team is grateful for the many entities that provided assistance or data to characterize the groundwater and surface water systems in the greater Sacramento region, including many urban water purveyors, agricultural entities, environmental groups, GSA representatives, managers of contamination remediation operations, project proponents, private domestic and rural residential well owners. The team is also appreciative of the California Department of Water Resources for their assistance in implementing the CoSANA model on the Integrated Water Flow Model (IWFM) platform.

EXECUTIVE SUMMARY

CoSANA, the Cosumnes-South American-North American, Integrated Water Resources Model, is a regional integrated water resources model developed as an upgrade and enhancement of the existing Sacramento Area Integrated Water Resources Model (SacIWRM). The enhanced integrated groundwater and surface water simulation capabilities afforded by CoSANA are intended to assist in a broad range of water management activities in the Sacramento Region. CoSANA is built on the Integrated Water Flow Model (IWFM) framework, which is specifically designated in Sustainable Groundwater Management Act (SGMA) Groundwater Sustainability Plans (GSP) regulations as being supported by the California Department of Water Resources for water budget development within GSPs. The model is developed with specific features to support development of sustainable groundwater management strategies and policies and compliance with SGMA, as well as to support the planning and implementation of regional conjunctive use and water banking efforts and other water management activities.

CoSANA at a Glance

Model area: North American, South American, and Cosumnes Groundwater Subbasins

Modeling Platform: IWFM

Layering: 5 layers representing major formations to the base of fresh water

Elements: 24,171 elements with an average element area of 37 acres

Stream system: 27 simulated streams with 51 reaches

Land Use: 24 land use types, including 20 agricultural crops

Water Supply: Surface water, groundwater, and recycled water supply to agricultural and urban water purveyors

Remediation Pumping: Groundwater extraction and cleanup at 4 remediation sites

Hydrologic period: Water Years 1970-2019 on a monthly time step

Stakeholder participation was a key component in the development of CoSANA, which enabled the model development team to work in a collaborative and transparent environment and to obtain the local data necessary to develop a detailed model, gain input and insight from those most knowledgeable about the subbasins, and to gain stakeholder buy-in, which is necessary for broad regional acceptance. Outreach activities included coordination with representatives of regional water agencies and groundwater sustainability agencies, including the Regional Water Authority, Sacramento Groundwater Authority, Sacramento Central Groundwater Authority, Sacramento Area Flood Control Agency, Southeast Sacramento County Agricultural Water Authority, and the Sacramento Water Forum. Further, progress was shared at meetings associated with development of GSPs for each of the three subbasins to gain additional input and information.

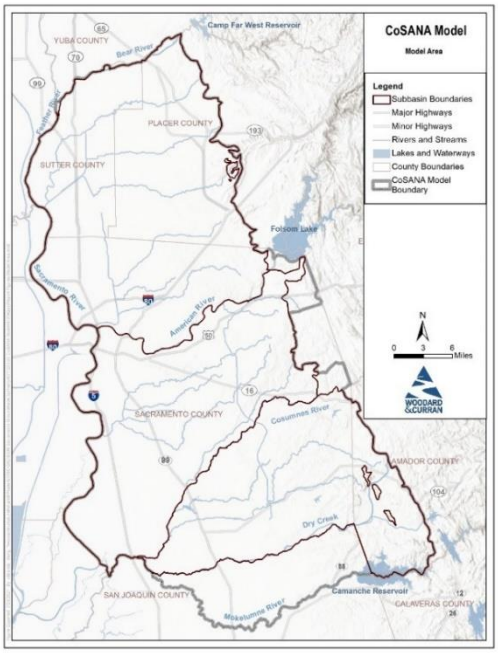


Figure ES-1: Model Area

ES.1 Model Area

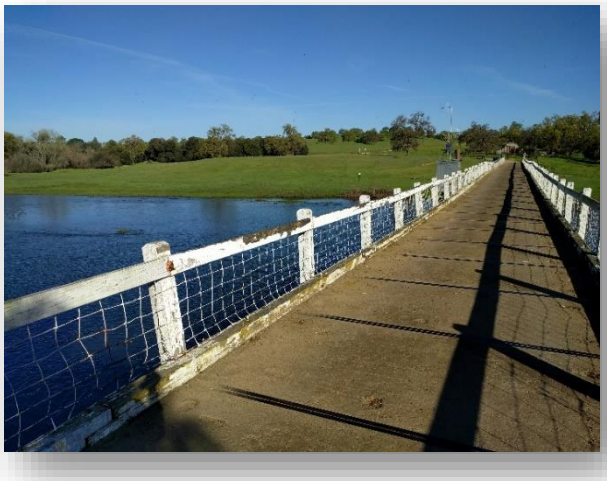
The model area covers nearly 900,000 acres (approximately 1,400 square miles) and is bounded in the north by the Bear River, in the south by the Mokelumne River, in the west by the Sacramento River, and in the east by the Sierra Nevada foothills. This area includes the entirety of the North American, South American, and Cosumnes Groundwater Subbasins. Portions of the Eastern San Joaquin Subbasin are included for consistency with past efforts but are not updated or calibrated to the same level as the North American, South American, and Cosumnes Subbasins. The physical model boundaries are shown in Figure ES-1.

CoSANA performs calculations related to water flow by breaking down the model area into smaller areas both horizontally and with depth. This is known as discretization. Smaller areas and more layers allow for more detailed modeling, but optimal discretization is found by weighing these benefits against limitations of data availability and computational power. The CoSANA model grid contains 24,171 finite elements and 22,274 nodes with an average element area of 37 acres. The overall node spacing is 1,170 feet on average with a maximum of 2,210 feet and a minimum of 300 feet. Smaller node spacing is present near streams and near areas of significant groundwater contamination, where more accurate calculations are called for. The subsurface is characterized by five model layers representing the different geologic conditions from the ground surface to the shallower of the bedrock or base of fresh water. These layers represent:

- Layer 1: Recent alluvium and the Riverbank Formation
- Layer 2: Laguna Formation
- Layer 3 Mehrten Formation
- Layer 4: Valley Springs Formation
- Layer 5: Ione Formation

The development of CoSANA included collection and compilation of a broad range of data related to land use, water use, hydrologic conditions, and hydrogeologic conditions, including:

- Geologic stratification
- Aquifer parameters
- Stream configuration
- Stream flows
- Small watersheds
- Precipitation
- Land use
- Evapotranspiration
- Soil properties
- Population
- Per capita water use
- Groundwater pumping
- Groundwater levels
- Surface water deliveries
- Boundary conditions
- Initial conditions



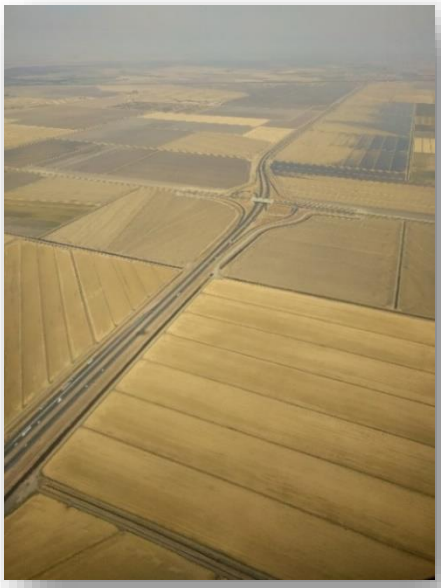
These and other datasets were developed based on local data, state databases, and federal databases and provided as input to CoSANA, on a monthly time step.

ES.2 Historical Simulation and Model Calibration

The CoSANA model simulates historical conditions in the basin for the period of water years 1970 through 2018 (October 1, 1969 through September 30, 2018). While the modeling time period begins in water year 1970, consistent with the SacIWRM, the focus of this modeling effort was water years 1990 – 2018, which includes substantially more refined data than the earlier years. Water years 1990 – 1994 are used as a warm-up period for the model, and water years 1995-2018 are used for model calibration. Additionally, the entire period of water year 1970-2018 is then used to perform a verification of the model performance over longer hydrologic period.

The simulation of historical conditions is intended to both help better understand and quantify the groundwater flow system and to calibrate the overall groundwater model. The calibration process involves comparison of simulated and observed data combined with adjustments to certain parameters. Data related to groundwater levels, streamflows, and water budgets were incorporated into the calibration process. Parameter adjustments were made within certain tolerance ranges that are reflective of the uncertainties associated with each parameter. The calibration process included both manual calibration by reviewing results and making appropriate adjustments as needed to reflect the long-term trends and short-term seasonal changes in observed data. Additionally, the PEST software package was employed to refine the calibration results by adjusting the soil, aquifer, and stream parameters within a reasonable range and distribution to achieve a better match between observed and simulated data. In this manner, the model is able to improve estimates for parameters lacking comprehensive data, such as agricultural groundwater production or certain aquifer parameters, resulting in better overall model performance.

ES.3 Baseline Simulations



Baseline simulations were developed to represent a set of pre-established hydrologic, land and water use, water demand, water supply, and basin operational conditions. In addition to providing valuable information on the groundwater flow system, these baselines can be implemented to evaluate effects of particular projects or management actions. The baselines incorporate 50 years of hydrology (water years 1970 – 2019) to meet SGMA requirements and to provide climatic variability necessary to assess future projects and management actions. Baseline simulations were developed for four different conditions:

- **Current Conditions:** The CoSANA Current Conditions Baseline (CCBL) is a representation of long-term average conditions assuming that a recent level of development and water demand persists over a long-term period of hydrologic conditions.
- **Projected Conditions:** The CoSANA Projected Conditions Baseline (PCBL) is a representation of the projected land and water use conditions of 2040, applied to the same long-term hydrologic conditions. Projected conditions are generally based on information from land use agencies and from Urban Water Management Plans or other planning documents from water purveyors.
- **Projected Conditions with Climate Change:** The CoSANA Projected Conditions Baseline with Climate Change (PCBL with Climate Change) shares many of the same inputs as the PCBL, but with additional factors to incorporate potential climate change conditions. Climate change conditions are represented through incorporation of information on 2070 Central Tendency (2070CT) conditions as documented by the US Bureau of Reclamation in the American River Basin Study (ARBS). In addition to the 2070CT, sensitivity of the model results and groundwater levels and storage was evaluated using a 2070 Hot and Dry (2070HD) climate scenario from the ARBS.

ES.4 Simulated Groundwater Conditions

Groundwater conditions associated with the historical simulation and the baseline simulations are presented in the report as contour maps, hydrographs, and water budgets. A summary-level groundwater budget for the three groundwater subbasins in the model area is presented in Table ES-1, below. This groundwater budget shows positive change in storage for the historical conditions, Current Conditions Baseline, and Projected Conditions Baseline, and a negative change in storage for the Projected Conditions with Climate Change Baseline (based on 2070CT). Generally, positive change in storage is associated with rising groundwater levels as the system seeks a new equilibrium with the surface water system and surrounding subbasins, while negative change in storage is associated with declining groundwater levels.

Table ES-1: Groundwater Budgets for the Combined North American, South American, and Cosumnes Subbasins

Model Version	Pumping (AFY)	Deep Percolation (AFY)	Gain from Stream (AFY)	Recharge from Canals (AFY)	Boundary Flows (AFY)	Subsurface Inflow (AFY)	Change in Storage (AFY)
Historical (1995–2018)	667,460	428,359	206,837	18,335	7,003*	11,302	26,702
CCBL	643,595	413,447	188,397	16,758	33,656	8,147	16,768
PCBL	685,501	396,714	230,109	16,402	36,561	8,726	2,969
PCBL+ Climate Change	726,028	377,207	261,089	16,427	40,481	11,378	-19,486

Note: all values presented in acre-feet per year (AFY)

CoSANA provides substantial detail that can allow for disaggregating these results spatially and temporally. For instance, as shown in Table ES-2, the North American Subbasin shows the most positive change in storage and the Cosumnes Subbasin shows the most negative change in storage, with values for the South American Subbasin in the middle. Similar differences exist within the subbasins as well, with areas receiving surface water and/or using little groundwater having generally more positive change in storage and groundwater levels and areas using more groundwater and/or receiving little surface water having generally more negative change in storage and groundwater levels. Groundwater conditions and model output are complex, and substantial detail is presented in the main report.

Table ES-2: Estimates of Average Change in Groundwater Storage by Subbasin

Model Version	North American Subbasin (AFY)	South American Subbasin (AFY)	Cosumnes Subbasin (AFY)	Total (AFY)
Historical (1995–2018)	26,661	5,551	-5,510	26,702
CCBL	14,843	2,158	-233	16,768
PCBL	5,390	-1,128	-1,293	2,969
PCBL+ Climate Change	-3,502	-6,222	-9,762	-19,486

ES.5 Recommendations

Like the SacIWRM before it, the CoSANA model is intended to be a living model, with refinements and updates occurring over time to meet the changing needs of the region and to incorporate the latest conditions, data, and modeling platforms. During the development of the model, several items were identified for future refinements to improve the capability of CoSANA to be a long-term defensible and reliable water resources model for the area, as listed below with additional detail in the main report.

- Continue collaboration and engagement with local GSAs, water purveyors, groundwater users, and water managers
- Collaborate with DWR
- Develop a model update schedule
- Enhance representation of variability of potential evapotranspiration
- Map Soil Survey Geographic Database (SSURGO) rootzone parameters directly to CoSANA
- Refine surface water deliveries in the North American and South American Subbasins
- Improve inflow estimates for tributary streams
- Improve return flow routing within IFWM and CoSANA
- Improve data and simulation of Auburn Ravine flows
- Develop improved rating tables for major streams
- Improve simulation of complex water systems
- Improve data for Mather AFB remediation operations
- Improve model information and data sets on the eastern areas

ES.6 Summary

The CoSANA model is built upon the previous SacIWRM by migrating to the IWFM platform, providing finer resolution spatially and with depth, and by refining and extending the data incorporated into the model. CoSANA provides a robust, comprehensive, defensible model for assessing water resources conditions in the Sacramento Region through integrated modeling of land surface, groundwater, and surface water conditions using detailed local and regional data and the most widely accepted modeling platform. This includes simulation under historical, current, projected, and projected with climate change conditions. The tool is well calibrated and ready to be used in various water supply and management studies and is flexible enough to be updated and refined to meet future needs of the region, including implementation of sustainable groundwater management strategies, regional water accounting and allocation frameworks, evaluation of well protection plans and programs, and regional conjunctive use and projects assessments, including the regional water bank.

1. INTRODUCTION

The North American, South American, and Cosumnes Groundwater Subbasins are simulated under a unified model to provide a regional integrated water resources model suitable for a variety of regional water management needs. With a comprehensive long-term hydrologic period, robust and accurate water supply and use data for urban water purveyors, land use and cropping patterns based on the latest statewide and regional land use surveys, geologic and hydrogeologic information based on the statewide numerical and texture models, and surface water hydrologic data, The Cosumnes-South American-North American Integrated Water Resource Model, or CoSANA, is a comprehensive integrated water resources model to serve the North and South American and Cosumnes groundwater subbasins. CoSANA incorporates all relevant data from the Sacramento Area Integrated Water Resources Model (SacIWRM).

1.1 Goals of Model Development

The primary goal of development of CoSANA is to have a robust, technically sound, publicly accepted analytical computer tool that simulates the details of the integrated land surface system; stream and river system; and groundwater hydrologic and hydrogeologic system in the model area for use in regional water management.

This goal represents continuation of successful use of the SacIWRM, which was implemented for numerous diverse water management efforts over three decades. Updating, refining, and modernizing SacIWRM into the new state-of-the-art CoSANA platform has a goal of providing a technical and analytical tool through conducting the work in a collaborative and open environment to gain regional acceptance in the water community of the greater Sacramento region. Together, the tool and regional acceptance can allow for a broad, regional, consistent modeling approach that can provide defensible, robust, consistent results in a more efficient manner.

While CoSANA is intended to assist in a broad range of water management activities in the area, the model is developed with specific features to support development of sustainable groundwater management strategies and policies and compliance with the Sustainable Groundwater Management Act (SGMA), as well as to support the planning and implementation of regional conjunctive use and water banking efforts.

CoSANA is used for the development of the groundwater sustainability plans (GSPs) for North American Subbasin (NASb), South American Subbasin (SASb), and Cosumnes Subbasin (CoSb), including work related to:

- Hydrogeologic conceptual model
- Sustainable management criteria
- Water budgets and sustainable yield
- Monitoring networks
- Projects and management actions to achieve sustainability
- Outreach, reporting, and ongoing analysis

CoSANA is also intended to support work associated with a Sacramento regional water bank, including:

- Identification of benefits and impacts
- Water bank accounting
- Quantification of losses
- Integration with surface water reservoir operations models
- FloodMAR opportunities assessment and design
- Outreach, reporting, and ongoing analysis

CoSANA is developed to support analysis of a broad range of regional water management efforts.

1.2 Cosumnes, South American, and North American Subbasins

CoSANA simulates the North American (5-021.64), South American (5-021.65), and Cosumnes (5-022.16) Groundwater Subbasins, along with a small portion of the Eastern San Joaquin (ESJ) (5-022.01) Groundwater Subbasin. The focus of the model is the NASb, SASb, and CoSb subbasins, with less detail provided for the ESJ Subbasin. Figure 1-1 shows the model domain and the boundaries of the associated subbasins. Portions outside of the groundwater subbasins were included in the model area to avoid breaking up larger urban areas, including the City of Folsom and Rancho Murieta Community Services District (RMCSD). The model area includes portions of Amador, Placer, Sacramento, San Joaquin, and Sutter Counties. The CoSANA model domain is similar to the SacIWRM model domain, with some differences due to changes in groundwater subbasin boundaries.

NASb and SASb are categorized as high priority groundwater subbasins and CoSb is categorized as a medium priority groundwater subbasin under the California Statewide Groundwater Elevation Monitoring (CASGEM) program. None of these three subbasins are identified by the California Department of Water Resources (DWR) as critically overdrafted. As such, groundwater sustainability agencies (GSAs) in these three subbasins must develop GSPs by January 31, 2022 that detail how each subbasin will be managed in a sustainable manner by 2042. CoSANA is developed to assist in that process.

Table 1-1 lists 17 GSAs covering the NASb, SASb, and CoSb Subbasins. The GSAs include the major urban water purveyors, agricultural water purveyors, or other agencies which supply water or have land use authority within the subbasin. The water purveyors are shown in Figure 1-2 and the GSAs are shown in Figure 1-3.

Table 1-1: Groundwater Sustainability Agencies by Subbasin

Subbasin	GSA
North American Subbasin	Reclamation District 1001
	Sacramento Groundwater Authority
	South Sutter Water District
	Sutter County
	West Placer County
South American Subbasin	Sacramento County
	Northern Delta
	Omochumne-Hartnell Water District
	Sacramento Central Groundwater Authority
	Sloughhouse Resource Conservation District
Cosumnes Subbasin	Amador County Groundwater Management Authority
	City of Galt
	Clay Irrigation District
	Galt Irrigation District
	Omochumne-Hartnell Water District
	Sacramento County
	Sloughhouse Resource Conservation District

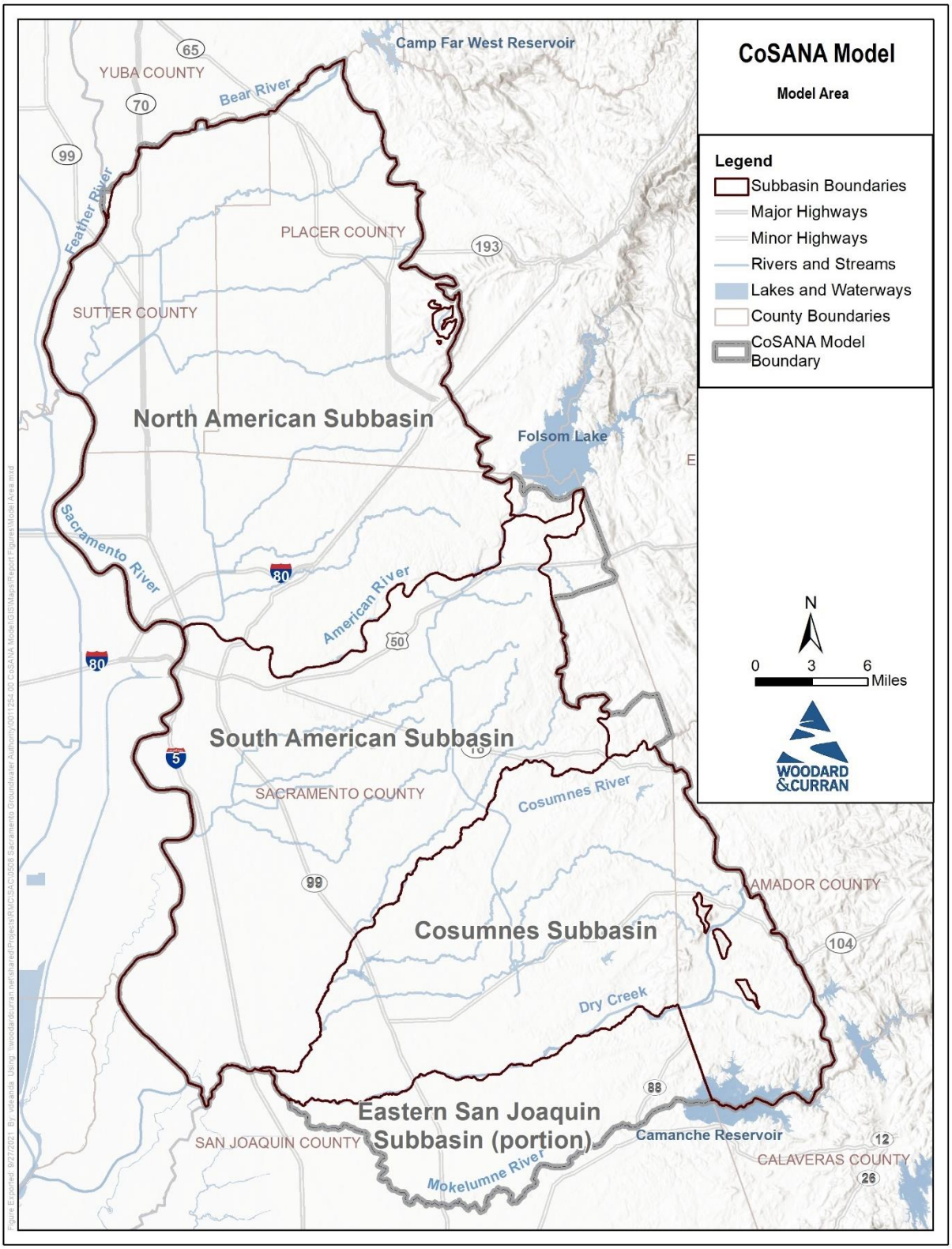


Figure 1-1: Model Area and Groundwater Subbasin Boundaries

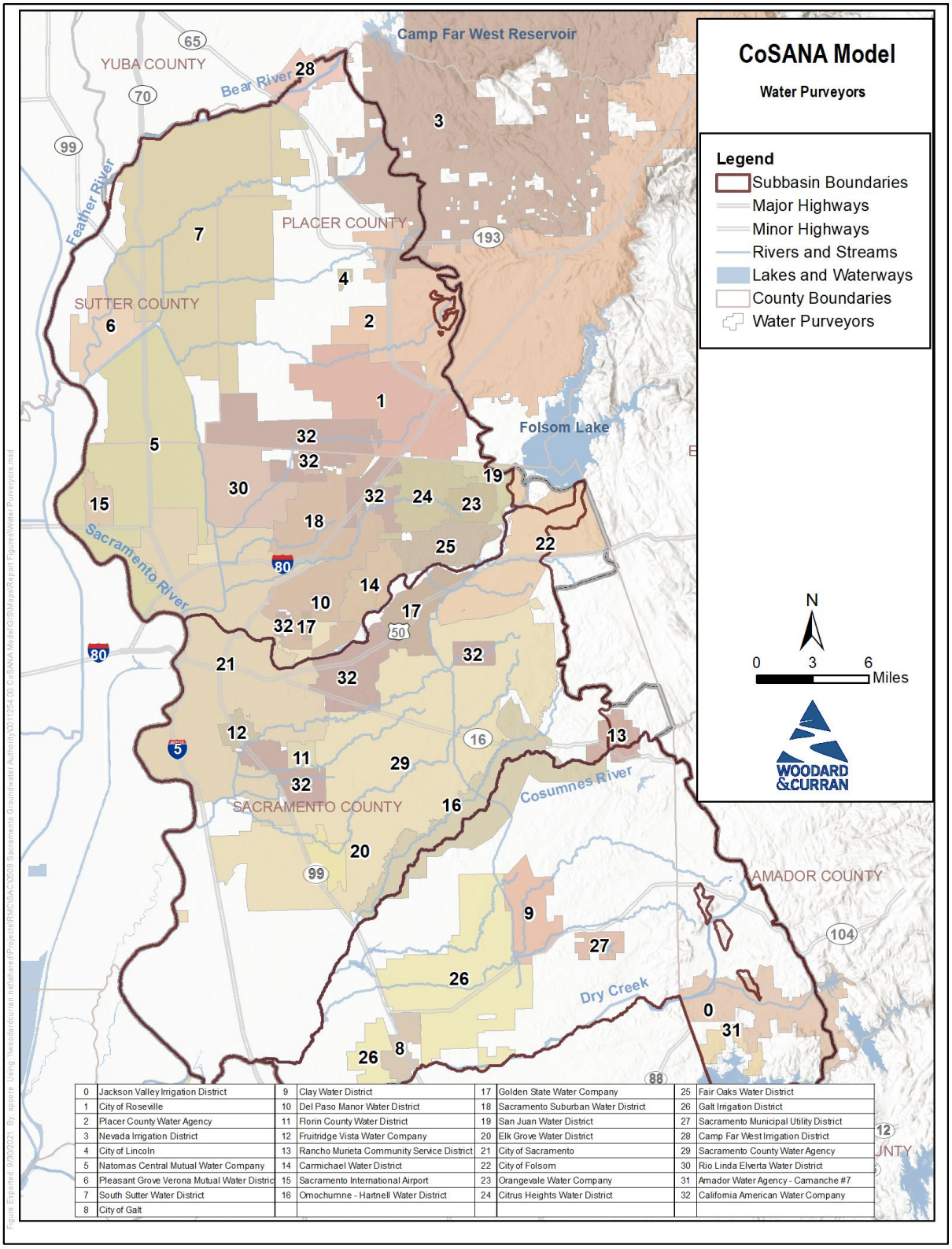


Figure 1-2: Major Water Purveyors

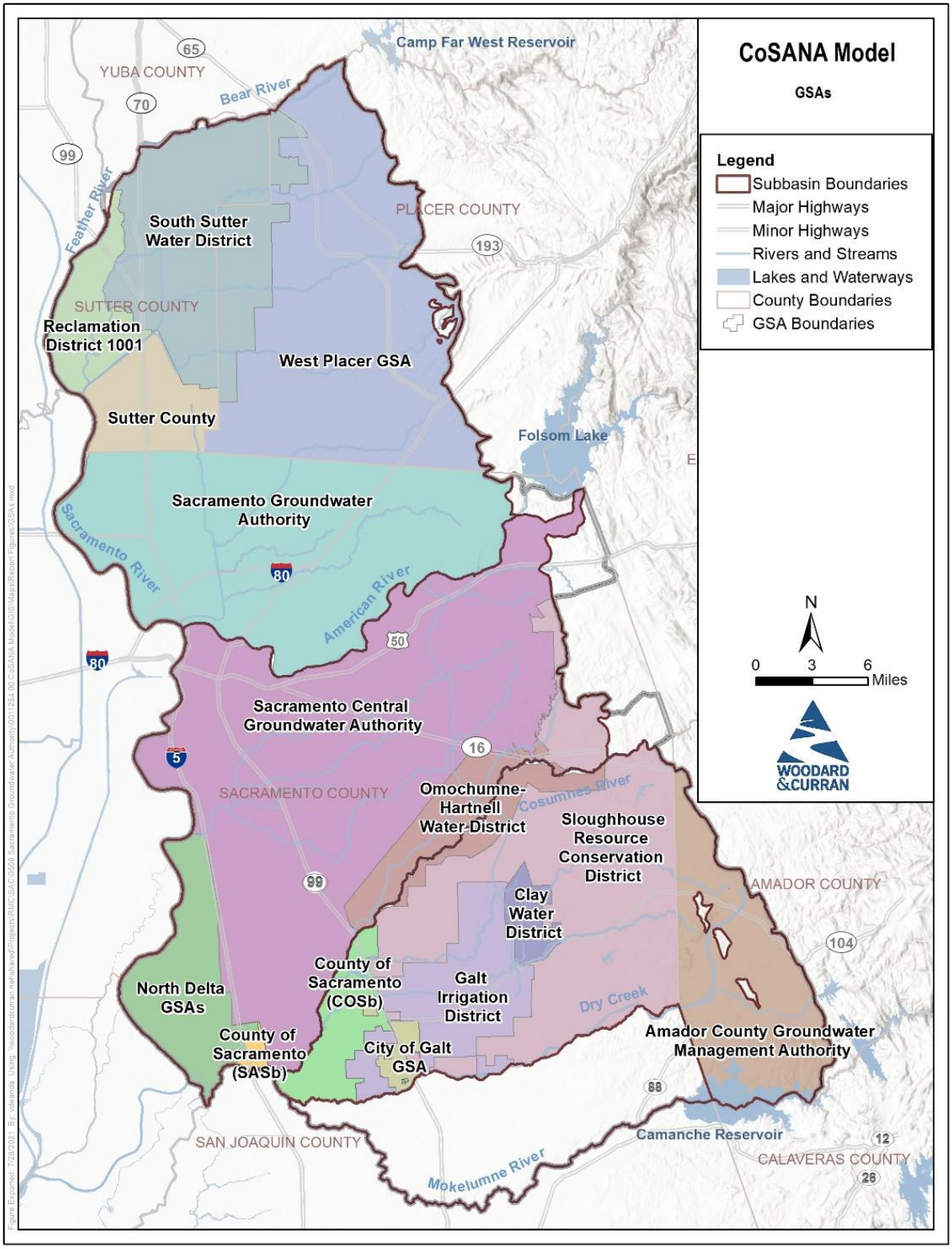


Figure 1-3: Groundwater Sustainability Agencies

1.3 Collaborative and Open Environment

Model development was conducted in a collaborative and open environment and was coordinated with various entities representing the three groundwater subbasins, including Sacramento Groundwater Authority (SGA), Sacramento Central Groundwater Authority (SCGA), Sacramento Area Flood Control Agency (SAFCA), Sacramento County, Regional Water Authority (RWA), the Sacramento Water Forum, the Cosumnes Subbasin SGMA Working Group (referred to as the "Working Group"), GSAs, and associated consultants.

The development of CoSANA took place in an open and transparent process and in a collaborative environment, with regular meetings between technical and working group members discussing model technical specifics and sharing model data, assumptions, data analysis and development, calibration approach and process, as well as interim and final results. The modeling team additionally met with local agencies individually to review model data and gather additional information to support refining model and data assumptions during model development.

Participation by representatives of regional water agencies and GSA representatives, including SGA, RWA, SCGA, SAFCA, Southeast Sacramento County Agricultural Water Authority (SSCAWA), the Sacramento Water Forum, and the Cosumnes Subbasin Working Group allowed for incorporation of information related to stakeholders within those organizations and associated subbasins. Further, progress was shared at meetings associated with development of GSPs for each of the three subbasins to gain additional input and information. These presentations provided details on the goals and progress of CoSANA development and also served as a method to request information and data from stakeholders.

In addition to coordination activities during development of the CoSANA model, the completed model was compared to models in the surrounding subbasins to assess consistency. The assessment focused primarily on subsurface flows, although other components, including stream seepage, were also reviewed. The assessment included meetings with modeling representatives from surrounding subbasins, including the Yolo, Yuba, and Solano Subbasins. Subsurface flows were found to be similar in magnitude, although in some cases in opposite directions. These differences were not considered substantial enough to impact the ability to use model results for management purposes within the GSP. This is due to the relatively small differences in comparison to other components of the groundwater budget and due to the calibrated nature of the models, where small differences in subsurface flows may be balanced out by similar differences in other calibrated components of the model. Coordination is expected to continue in the future, where information gained by recent modeling in the various subbasins can be incorporated into future refinements of CoSANA and the neighboring models to reduce the differences and improve model performance.

1.4 Model Platform and Historical Modeling of the Region

SacIWRM and predecessor models have been used to simulate and analyze the North American, South American, and Cosumnes Subbasins since 1992. The models have contributed to many regional and local studies, including supporting the Water Forum Agreement and implementation of groundwater management plans (Table 1-2). SacIWRM was developed based on the Integrated Groundwater and Surface Water Model (IGSM) code, developed in the early 1990s by DWR and the United States Bureau of Reclamation (Reclamation) to simulate Central Valley operations. SacIWRM underwent six major upgrades since first being developed, with the last major update to the northern portion of the model in 2007 and to the central portion in 2016. SacIWRM includes data from 1970 through 2011 and is still in active use for various projects.

CoSANA is developed by porting and refining the data from the older model SacIWRM into the newer DWR code that replaced IGSM in the early 2000s, called Integrated Water Flow Model (IWFM). IWFM is an open-source, finite element simulation code that supports triangular and quadrilateral elements (Dogrul et al., 2017a). It is specifically designated in the GSP regulations as being supported by DWR for water budget development within GSPs. It is also the code used for DWR's California Central Valley Groundwater-Surface Water Simulation Model (C2VSimFG), which supports SGMA activities throughout the Central Valley at the regional scale (Brush et al., 2013; DWR, 2020). The IWFM Demand Calculator (IDC) is the stand-alone root zone component of IWFM that simulates land surface and root zone

flow processes (Dogrul et al., 2017b). It calculates agricultural and urban water demands using inputs including climate conditions, soil parameters, and land use types and distribution. It can be run separately or combined with IWFM. IDC was run combined with IWFM, and data development and results in this documentation are included as part of overall IWFM datasets and results.

The model area covers 888,548 acres and is bounded in the north by the Bear River, in the south by the Mokelumne River, in the west by the Sacramento River, and in the east by the Sierra Nevada foothills. The physical model boundaries are shown in Figure 1-1.

Table 1-2: SacIWRM History and Application

Year	Study
1992	City-wide Model
1993	County-wide Model
1996	American River Water Resources Investigation
1996	Northridge Conjunctive Use Study
1996	Rio Linda Water Supply Analysis
1996	Hydrology Update
1996	Water Forum- Basin Yield
1999	Sunrise Douglas Water Supply Analysis
1999	Zone 40 (North Vineyard Well Field)
2000	American River Basin Cooperating Agencies Studies
2002	Aerojet Surface Water Discharge Permit
2004	Zone 40 Water Supply Master Plan Update
2005	Natomas Central Mutual Water Company Impacts Assessment
2005	Rio Del Oro Impacts Study
2007	Sutter Measure M Impact Study
2007	Sun Creek Development
2008	Model Comprehensive Update
2009	SCGA Well Protection Program
2009	Cosumnes River Hydrologic Study
2010	RWA Water Accounting Framework
2011	The Nature Conservancy (TNC) Reservoir Re-Operation Study
2012	South County Recycled Water Feasibility Study
2012	TNC Conjunctive Use Study
2012	TNC/California Water Foundation Central Valley Hydrologic Study
2014	TNC Groundwater Banking Feasibility
2015	SCGA Biennial Groundwater Management Plan Report
2016	Sacramento Regional County Sanitation District Climate Change Assessment & Environmental Impact Report Support
2017	Harvest Water, Water Storage Investment Program, City of Sacramento Groundwater Master Plan
2018	Dynamic linkage with the Yolo IGSM
2020	Grandpark Specific Plan Development

1.5 Report Organization

The remainder of this report is organized as follows:

- Chapter 1 is this introductory chapter.
- Chapter 2 describes the historical model development, including the design of the model grid, layering, and input data for the root zone, groundwater, surface water, and land surface modules.
- Chapter 3 describes model input data for water supply and demand. Assumptions associated with agricultural and urban water use are described in this chapter.
- Chapter 4 describes the methodology used for the calibration of model parameters. Final parameters used in the model are provided along with model results and comparisons to observed data. This chapter also includes a sensitivity analysis of model results with perturbed input parameters.
- Chapter 5 describes the baseline conditions. The Current Conditions Baseline (including the input data for water supply and demand and the model results), Projected Conditions Baseline (including the land use, water supply and demand data used and the model results), and Projected Conditions with Climate Change Baseline (including the hydrologic data used and the model results) are described in this chapter.
- Chapter 6 presents a summary of the report and provides recommendations for future activities.
- Chapter 7 presents a list of references used in this report.

2. MODEL DEVELOPMENT

This section presents the source and analysis of input data used in the development of CoSANA. This includes spatial and temporal information for hydrologic, hydrogeologic, water use, water supply, and operations data sets included in the model, as well as physical settings, parameters, and assumptions.

2.1 Model Input Data

IWFM model files and corresponding major data sources used in the development of CoSANA are presented in Table 2-1 along with the report sections where the model data and data sources are described.

Table 2-1: CoSANA Input Data

Major Data Category	Minor Data Category	Data Source	Report Section
Hydrogeological Data	Geologic Stratification	Local information	2.10
	Aquifer Parameters	USGS texture model	4.5.3
Stream Data	Stream Configuration	C2VSim SVSim SacIWRM Local information	2.4
	Stream Inflow	USGS & CDEC stream gages Local information	2.4
	Calibration Gages	USGS & CDEC stream gages	4.2.3
Hydrological Data	Precipitation	PRISM & CalSIMETAW	2.6
Agricultural Water Demand	Land Use	DWR county surveys CropScape DWR statewide mapping Local information	2.7
	Evapotranspiration	C2VSim METRIC Local information	2.8
	Soil Properties	SSURGO STATSGO2	2.9
Urban Water Demand	Population	U.S. Census Bureau tract data	3.3.1
	Per Capita Water Use	Local information California Water Plan	3.2
Water Supply	Groundwater Pumping	Local information SacIWRM	3.1.2
	Surface Water Deliveries	Local information SacIWRM	3.1.1
Other	Boundary Conditions	C2VSim Local information	2.12
	Initial Conditions	Water Data Library	2.13
	Small Watersheds	C2VSim	2.11
	Calibration Wells	DWR Local information	4.2.2

Abbreviations: C2VSim: California Central Valley Groundwater-Surface Water Simulation Model; CalSIMETAW: California Simulation of Evapotranspiration of Applied Water; CDEC: California Data Exchange Center; DWR: California Department of Water Resources; METRIC: Mapping Evapotranspiration at High Resolution with Internalized Calibration; SacIWRM: Sacramento Integrated Water Resources Mode; PRISM: Precipitation-Elevation Regressions on Independent Slopes Model; SSURGO: Soil Survey Geographic Database; STATSGO2:Digital General Soil Map of the United States; SVSim: Sacramento Valley Groundwater-Surface Water Simulation Model; USGS: United States Geological Survey

2.2 Simulation Period and Temporal Discretization

The CoSANA model simulates the historical conditions in the basin for the period of water years (WY) 1970 through 2018 (October 1, 1969 through September 30, 2018). Monthly data was used as model input, and the model simulation uses a monthly time step. Model output can be reported on a monthly or annual time increment, as needed.

Model data development efforts were divided into two periods, as follows:

- WY 1970-1989 – The data for this period is primarily mapped over from SacIWRM. As such, CoSANA inherits the spatial and temporal resolution of SacIWRM. As much of the source data for land use, water use, and water supply are not readily available in digital form, the mapped data from SacIWRM was used without substantial refinement. However, the hydrologic data sets, including rainfall and streamflows, are refined based on the latest sources of data.
- WY 1990-2018 – The data for this period is much more refined, as digital source data are used in development of the model input data. Additionally, the groundwater level and streamflow observation data are available in a more consistent quality and format. Therefore, this period is used for the WY 1995-2018 model calibration period, plus a WY 1990-1994 warm up period. Further discussion on calibration period selection is provided in the model calibration section of the report.

Beyond the two time periods, the entirely of the WY 1970-2018 period is used for verification of consistency of model simulation, long-term water budgets, long-term trends in groundwater levels and stream-aquifer interaction, and long-term trends in the groundwater storage changes. WY 2019 is added to the baselines to achieve 50 years of hydrology as required by SGMA (see Section 5).

2.3 Model Grid and Subregions

A model grid provides a discrete geographic representation of the physical, hydrologic, hydrogeologic, jurisdictional, land use, water use, and water supply features at a small enough size to support the basis for robust mathematical representation of the features and the inter-relationship between various components of the system.

A grid network was developed for the CoSANA model, based on principles of finite element numerical analysis, to reflect hydrological, hydrogeological, physical, jurisdictional, and operational conditions in the groundwater subbasins represented in CoSANA. The finite element grid for CoSANA was developed using Aquaveo's GMS-Groundwater Modeling System software with spatial processing using Esri's ArcGIS. The grid includes quadrilateral and triangular elements based on selected input lines and control points. Features included in the development of the model grid are shown in Figure 2-1 and include:

- Streams
- GSA boundaries
- Water purveyor boundaries
- County boundaries
- Areas of groundwater contamination
- Geological features
- Model grids in neighboring subbasins

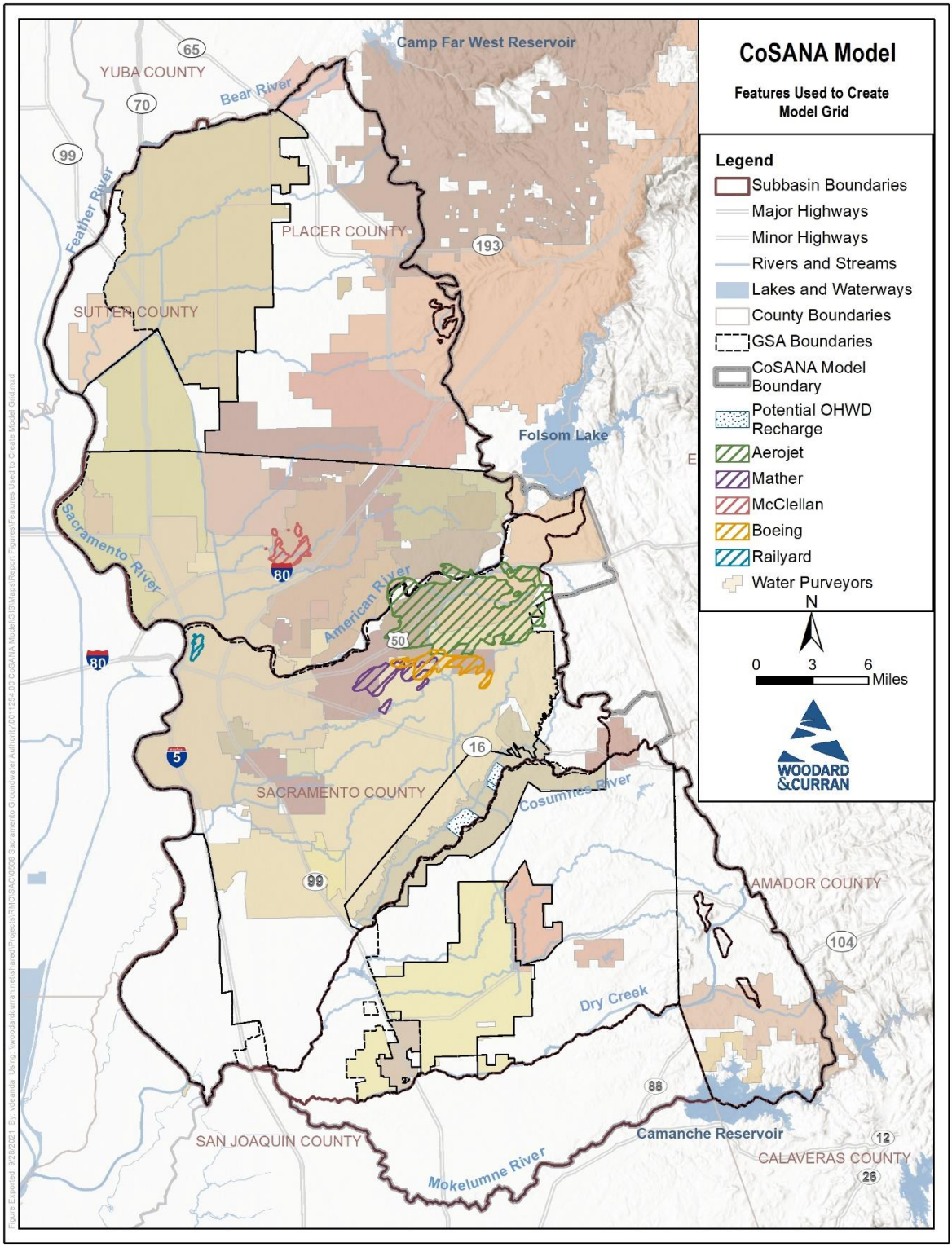


Figure 2-1: Features Used to Create Model Grid

The CoSANA model grid contains 24,171 elements and 22,274 nodes with an average element area of 37 acres (Figure 2-2). The node discretization interval for most features was set at 2,000 feet with more refined spacing in specific areas, such as near streams (described below) and areas of significant groundwater contamination (1,000 feet spacing for the Mather, Aerojet, and McClellan areas). The overall node spacing was 1,170 feet on average with a maximum of 2,210 feet and a minimum of 300 feet.

Streams in the model domain were separated into three tiers, described further in Section 2.4. The first two tiers are simulated in the model. Tier 3 streams are minor streams that are included in the model grid for drainage routes but are not directly modeled in CoSANA.

Border model nodes were aligned with the model grids for the Yuba Groundwater Model (YGM), which is directly adjacent and also uses the IWFM platform, to improve the potential for future direct interaction with this model (Figure 2-3). Node spacing along other boundaries for other neighboring models, including the Yolo and Eastern San Joaquin models were used as guidelines, however, CoSANA provides smaller node spacing along these boundaries compared to the neighboring models. There was no direct coordination on node spacing along the boundaries bordering the Solano or Sutter Subbasins.

The southern boundary of CoSANA is the Mokelumne River, which provides coverage for the Cosumnes Subbasin and a portion of the Eastern San Joaquin Subbasin, as well as a hydrologic boundary. The Cosumnes Subbasin is covered by both CoSANA and the Eastern San Joaquin Subbasin model (Eastern San Joaquin Water Resources Model). Generally, the CoSANA model has limited focus on the Eastern San Joaquin Subbasin, and the Eastern San Joaquin model has limited focus on the Cosumnes Subbasin. The CoSANA node spacing is refined along the Mokelumne River and the data and information in CoSANA's representation of the Cosumnes Subbasin is refined by the Cosumnes Subbasin GSAs and consultants. The Cosumnes Subbasin GSAs used CoSANA in development of their GSP.

The model elements are grouped into 87 model subregions (Figure 2-4) that are used to organize input data and to report standard model water budget output. Subregions were delineated using boundaries of cities, water agencies, GSAs, subbasins, and counties. A listing of model subregions, including the associated subbasin and the number of model elements they contain, is provided in Table 2-2.

Table 2-2: CoSANA Subregions

Subregion Number	Subregion Name	Groundwater Subbasin	Number of Elements
1	Camp Far West ID	North American	142
2	Sutter Co. 1	North American	12
3	South Sutter WD GSA	North American	1296
4	Placer County WA	North American	997
5	Nevada ID	North American	161
6	Lincoln	North American	235
7	RD1001	North American	359
8	Pleasant Grove Verona MWC	North American	162
9	Sutter Co. 2	North American	60
10	Natomas MWC (Sutter Co.)	North American	252
11	Sutter Co. 3	North American	76
12	Roseville SOI	North American	42
13	City of Roseville	North American	478
14	Cal Am (West Placer)	North American	166
15	Natomas MWC (Sacramento Co.)	North American	423

Subregion Number	Subregion Name	Groundwater Subbasin	Number of Elements
16	Sacramento International Airport	North American	48
17	Metro Air Park	North American	26
18	Sac Co. 1	North American	63
19	Sac Co. 2	North American	27
20	Sac County WA (Northgate 880)	North American	13
21	Rio Linda Elverta	North American	221
22	Sac Co. 3	North American	16
23	Cal Am (Antelope)	North American	55
24	Cal Am (Lincoln Oaks)	North American	92
25	Citrus Heights WD	North American	171
26	San Juan WD (Placer Co.)	North American	29
27	San Juan WD (Sacramento Co.)	North American	88
28	Orange Vale WC	North American	73
29	Lake Natoma/Mississippi Bar	North American	116
30	Fair Oaks WD	North American	354
31	Carmichael WD	North American	297
32	Sacramento Suburban WD (North)	North American	471
33	Sacramento Suburban WD (South)	North American	293
34	Del Paso Manor WD	North American	18
35	Golden State WC Arden	North American	21
36	Cal Am (Arden)	North American	27
37	Sac County WA (Arden Park Vista)	North American	76
38	City of Sacramento (North)	North American	777
39	City of Sacramento (South)	South American	1212
40	Cal Am (Suburban Rosemont)	South American	410
41	Sac Co. 4	South American	33
42	Golden State WC (Cordova)	South American	548
43	Sac Co. 5	South American	111
44	City of Folsom	South American (partial)	869
45	Cal Am (Security Park)	South American	76
46	Fruitridge Vista WC	South American	46
47	Florin County WD	South American	31
48	Cal Am (Parkway)	South American	98
49	Sac Co. 6	South American	104
50	Sac County WA (North/Central)	South American	1451
51	Sac County WA (South)	South American	240
52	Elk Grove WD (Service Area 2 - Intertie)	South American	97
53	Elk Grove WD (Service Area 1 - GW)	South American	62
54	Cosumnes River West	South American	734
55	RD744	South American	76
56	Franklin Drainage District	South American	197

Subregion Number	Subregion Name	Groundwater Subbasin	Number of Elements
57	RD813	South American	70
58	RD755	South American	22
59	RD1002	South American	94
60	RD551	South American	272
61	RD369	South American	36
62	RD2110	South American	88
63	Sac Co. 7	South American	54
64	Rancho Murieta (North)	South American (partial)	244
65	Sloughhouse RCD (North)	South American	422
66	OHWD (South American Subbasin)	South American	990
67	OHWD (Cosumnes Subbasin)	Cosumnes	601
68	Rancho Murieta (South)	Cosumnes	87
69	Sloughhouse RCD (East)	Cosumnes	1219
70	Wilton	Cosumnes	255
71	Sloughhouse RCD (West)	Cosumnes	254
72	Galt ID (East)	Cosumnes	615
73	Clay WD	Cosumnes	125
74	Clay	Cosumnes	67
75	SMUD Rancho Seco	Cosumnes	50
76	Cosumnes River South	Cosumnes	308
77	Galt ID (West)	Cosumnes	78
78	Sac Co. 8	Cosumnes	408
79	City of Galt	Cosumnes	86
80	Sloughhouse RCD (South)	Cosumnes	35
81	Amador Co. 1	Cosumnes	443
82	Ione	Cosumnes	44
83	Jackson ID	Cosumnes	213
84	Camanche	Cosumnes	355
85	Amador County WA	Cosumnes	57
86	Mokelumne	Eastern San Joaquin	1944
87	City of Galt WWTP	Cosumnes	7

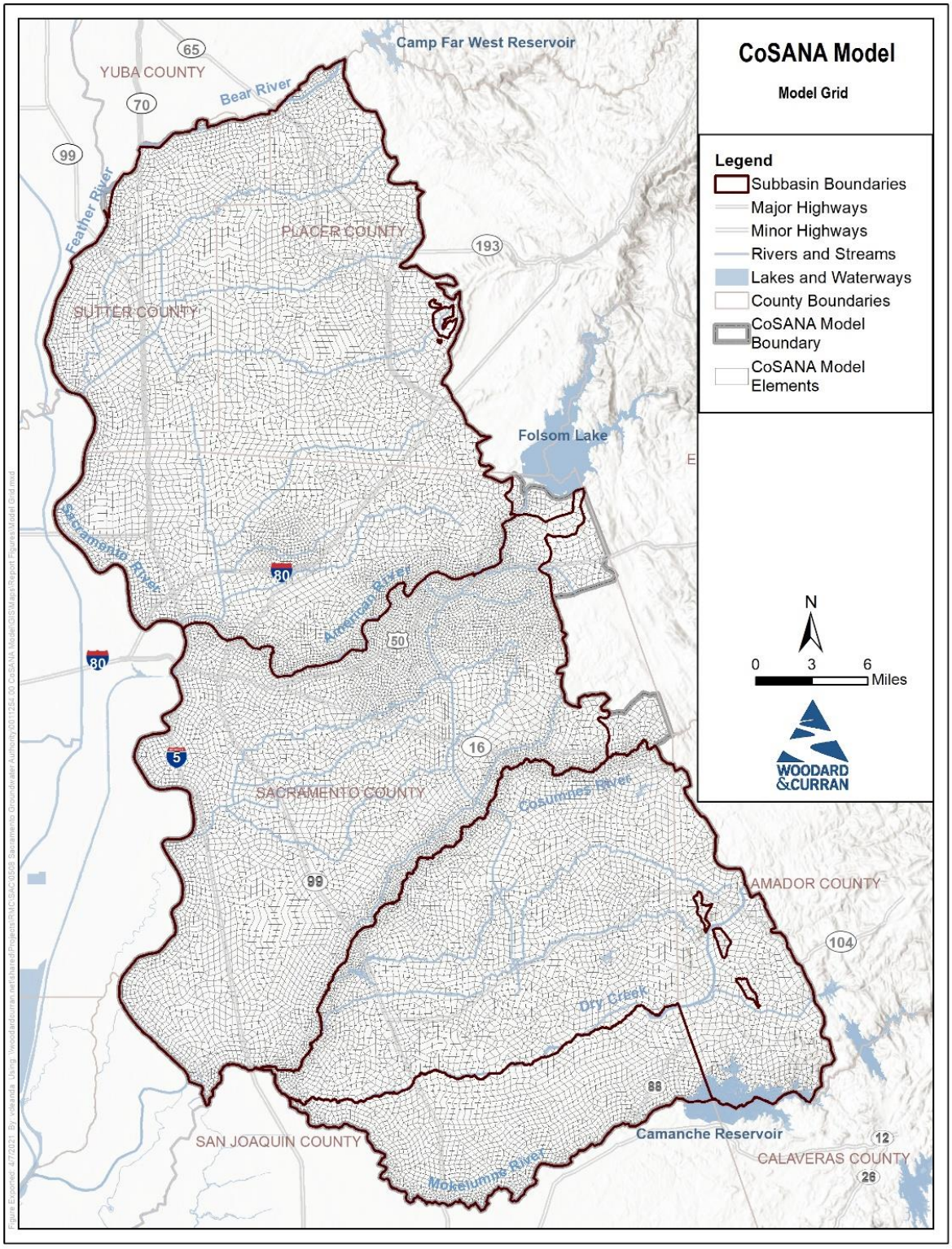


Figure 2-2: CoSANA Model Grid

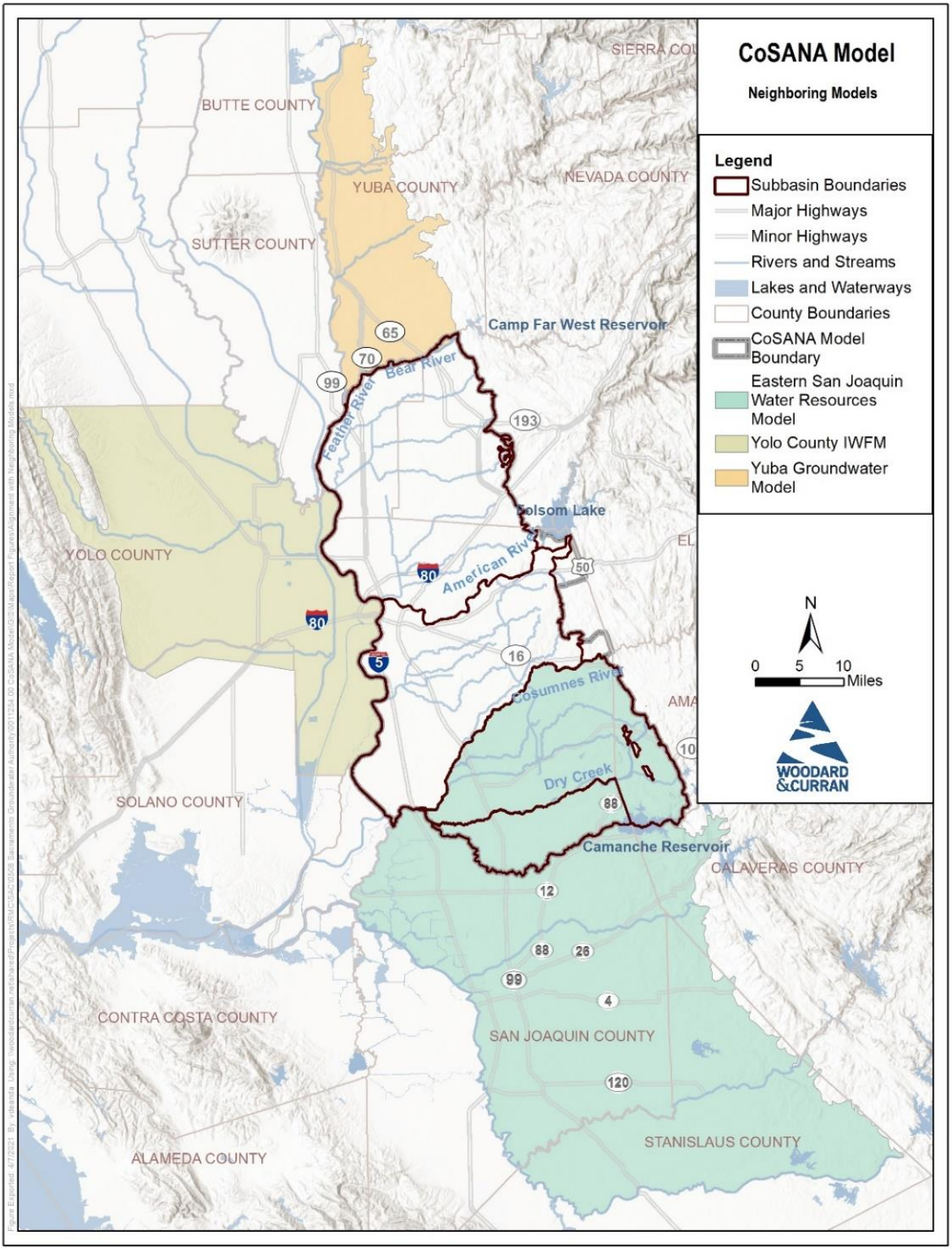


Figure 2-3: Alignment with Neighboring Model Grids

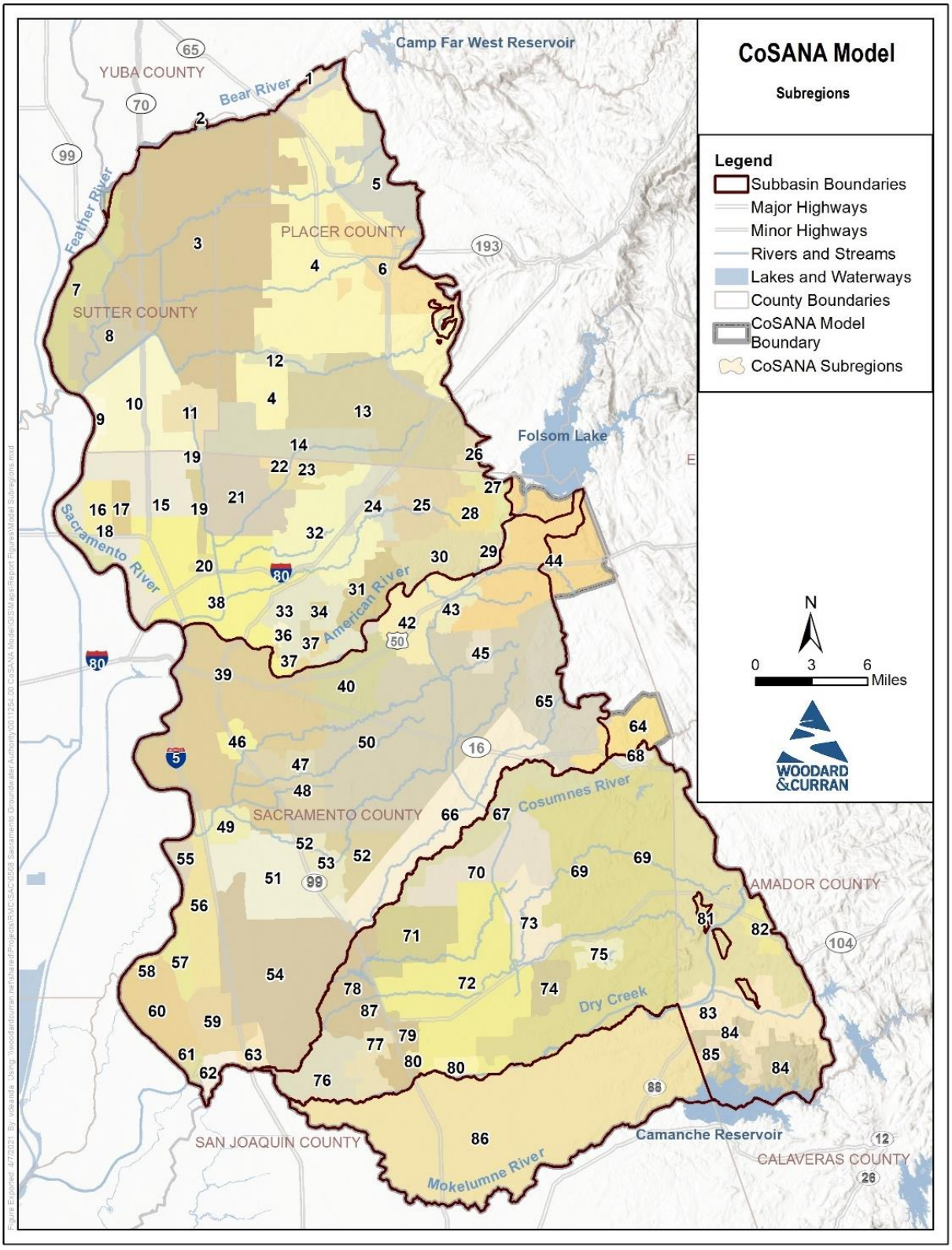


Figure 2-4: CoSANA Subregions

2.4 Stream Configuration and Inflow

Model hydrology is represented by 51 modeled stream reaches representing 27 streams, rivers, and canals, which are largely defined to start and/or end at confluences. Streams in the model domain are separated into three tiers, as shown in Table 2-3 and Figure 2-5. The discretization interval for stream node spacing and buffers included around the streams to transition from the finer to coarser node spacing vary based on the tier, as follows:

- Tier 1 includes major streams and were discretized to 750 feet (Cosumnes and American Rivers) or 1,000 feet (Sacramento, Feather, Bear, and Mokelumne Rivers). The fine level of discretization allows for better representation of surface water-groundwater interaction. A buffer, the distance within which the finer discretization is applied, of 5,280 feet (1 mile) was applied.
- Tier 2 represents important streams with standard feature discretization intervals (largely 2,000 feet). Exceptions included Deer Creek with discretization of 1,250 feet and a 2,640 feet (0.5 mile) buffer and Folsom South Canal with discretization of 1,500 feet and a 5,280 feet (1 mile) buffer.
- Tier 3 includes minor streams and drainages, and were not simulated as streams, but included for drainage routes (discussed further in section 2.5). Discretization for these streams was standard (largely 2,000 feet). While these hydrologic features represent drainage and conveyance water courses in the model, they are not directly used as simulated streams in the model due to lack of sufficient information such as channel geometry and streamflow records.

The streams and creeks are represented in the model by 2,388 stream nodes. The number of stream nodes and their refined resolution provide an increased level of accuracy when depicting stream-groundwater interaction. Physical channel characteristics, including the stream invert elevation, channel width, and stream flow rating tables, were obtained from the closest C2VSimFG stream nodes, SacIWRM, and United States Geological Survey (USGS) digital elevation models (DEM).

Time series of stream inflow data is available from 7 USGS gaging stations, additionally several tier 2 streams in the NASb use inflows developed by MBK Engineers or model derived flows from C2VSimFG or YGM. Table 2-4 presents stream input data and Figure 2-6 shows available stream gage locations.

Table 2-3: CoSANA Streams and Tiers

Stream	Groundwater Subbasin	Stream Tier
American River	North American	1
Arcade Creek	North American	2
Auburn Ravine	North American	2
Bear River	North American	1
Cross Canal	North American	2
Curry Creek	North American	3
Dry Creek	North American	2
East Side Canal	North American	2
Feather River	North American	1
Magpie Creek	North American	2
Natomas East Drain	North American	2
Ping Slough	North American	3
Pleasant Grove Creek	North American	2
Racoon Creek	North American	2
Sacramento River	North American	1
South Branch Pleasant Grove Creek	North American	3
Alder Creek	South American	2
American River	South American	1
Beacon Creek	South American	2
Buffalo Creek	South American	2
Cosumnes River	South American	1
Deer Creek	South American	2
Elder Creek	South American	2
Folsom South Canal	South American	2
Laguna Creek	South American	2
Morrison Creek	South American	2
Sacramento River	South American	1
Arkansas Creek	Cosumnes	3
Badger Creek	Cosumnes	2
Brown's Creek	Cosumnes	3
Cosumnes River	Cosumnes	1
Deadman Gulch	Cosumnes	3
Dry Creek	Cosumnes	2
Folsom South Canal	Cosumnes	2
Griffith Creek	Cosumnes	3
Hadselville Creek	Cosumnes	2
Jackson Creek	Cosumnes	2
Laguna Creek	Cosumnes	2
Mokelumne River	Cosumnes	1
North Fork Badger Creek	Cosumnes	3
Rolling Draw	Cosumnes	3
Skunk Creek	Cosumnes	3
Sutter Creek	Cosumnes	3
Willow Creek	Cosumnes	3
Windmill Draw	Cosumnes	3

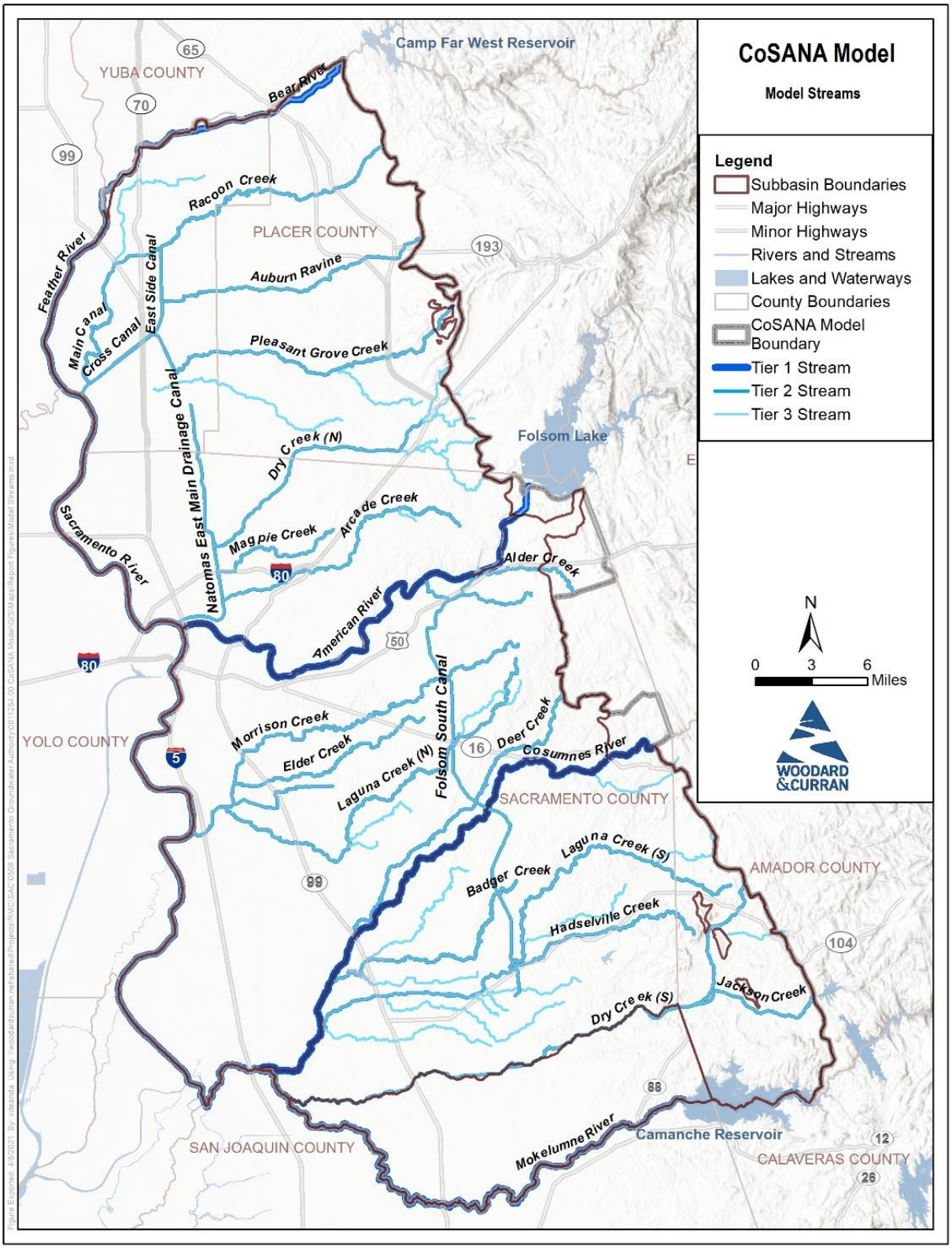


Figure 2-5: CoSANA Streams

Table 2-4: Stream Inflows

Stream	Stream Node	Source	Gage Name	Period of Record (WY)	Average Annual Streamflow (acre-feet)
Sacramento River	155	USGS	Sacramento River near Verona (USGS Gage 11425500)	1929 - 2021	14,461,848
American River	734	USGS	American River at Fair Oaks (USGS Gage 11446500)	1904 - 2021	2,745,469
Cosumnes River	1490	USGS	Cosumnes River at Michigan Bar (USGS Gage 11335000)	1907 - 2021	396,807
Mokelumne River	2080	USGS	Mokelumne River below Camanche Dam (USGS Gage 11323500)	1905 - 2020	568,754
Bear River	1	USGS	Bear River near Wheatland (USGS Gage 11424000)	1928 - 2021	325,546
Raccoon Creek	158	MBK Engineers	Raccoon Creek	1976 - 2018	28,848
Auburn Ravine	248	MBK Engineers	Auburn Ravine	1976 - 2018	19,353
Pleasant Grove Creek	301	MBK Engineers	Pleasant Grove Creek	1976 - 2018	28,827
Dry Creek[1]	502	MBK Engineers	Dry Creek (North American Subbasin)	1976 - 2018	35,944
Feather River	86	YGM	Feather River	1987 - 2015	5,314,464
Dry Creek[1]	1911	C2VSimFG	Dry Creek (Cosumnes Subbasin)	1970 - 2015	30,020
Jackson Creek	1936	JVID	Jackson Creek below Lake Amador Dam	1980 – 2009, 2017 – 2019	7,198
Morrison Creek	1024	USGS	Morrison Cr near Sacramento	1997 - 2017	15,158
Laguna Creek (SASb)	1169	USGS	Laguna Cr. near Elk Grove	1995 - 2018	8,336

C2VSimFG = California Central Valley Groundwater-Surface Water Simulation Fine Grid Model
JVID = Jackson Valley Irrigation District
USGS = United States Geological Survey
YGM = Yuba Groundwater Model
[1] There are two distinct streams named "Dry Creek" within the model domain: one in the North American Subbasin, and one in the Cosumnes Subbasin

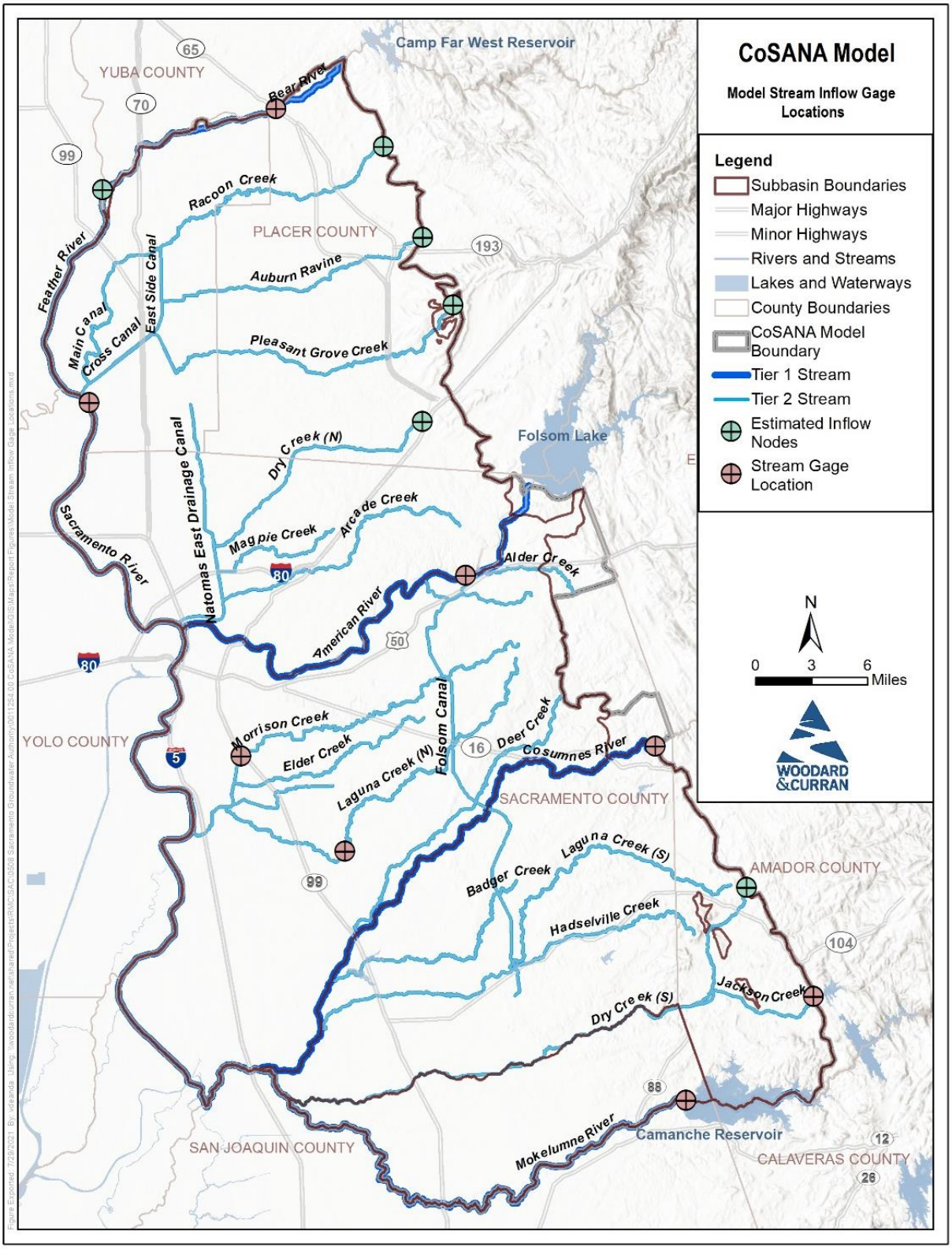


Figure 2-6: CoSANA Stream Inflow Gage Locations

2.5 Surface Drainage Pattern

Surface water drainage (e.g., runoff from rainfall and excess applied water) for each model element is assigned to a stream node representing where the drainage ultimately flows to. These drainage patterns were delineated using the USGS Watershed Boundary Dataset for 12-digit hydrologic units, also called subwatersheds. Each 12-digit hydrologic unit located within the model boundaries was associated with the model stream node it ultimately drained into through both visual analysis as well as information provided on the subwatersheds. Elements falling within the hydrologic units were assigned to the model stream node indicating the ultimate surface water drainage direction. Additional refinement was done along the Cosumnes River to simulate where agricultural return flow would return to the stream with more precision. A total of 62 unique stream nodes receive surface water drainage in CoSANA from 58 subwatersheds. Figure 2-7 shows these stream nodes and the subwatersheds mapped to the model elements.

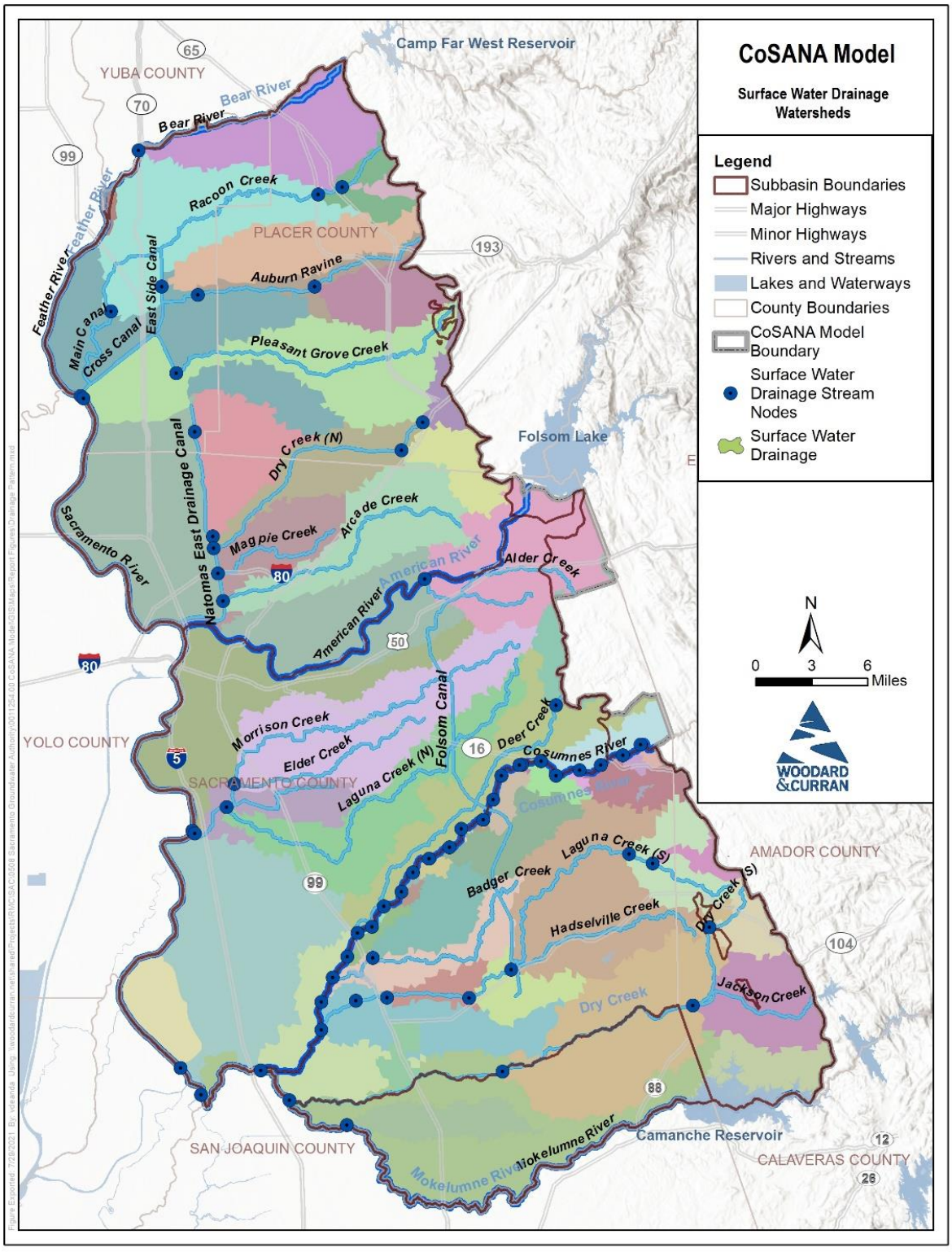


Figure 2-7: CoSANA Drainage Network

2.6 Precipitation

Rainfall data for the model area was derived from the PRISM (Precipitation-Elevation Regressions on Independent Slopes Model) database used in the DWR's CALSIMETAW (California Simulation of Evapotranspiration of Applied Water) model. The database contains daily precipitation data from October 1, 1921, to September 30, 2018, on an 800-meter grid throughout the model area. CoSANA has monthly rainfall data defined for every model element in order to preserve the spatial distribution of the monthly rainfall. Each of the model elements was mapped to the nearest PRISM reference node and the resulting average annual precipitation is shown in Figure 2-8.

Figure 2-9 shows the annual rainfall in the model area and the cumulative departure from mean, which is an indication of long-term rainfall trends in the area. For the 1995-2018 calibration period, the minimum precipitation was in 2007 with 11.0 inches, while the maximum occurred in 1998 with 34.4 inches, the average annual precipitation over this period was 20.1 inches. Based on the Sacramento Valley Water Year Index, there were 3 critical, 5 dry, 5 below normal, 3 above normal, and 8 wet years.

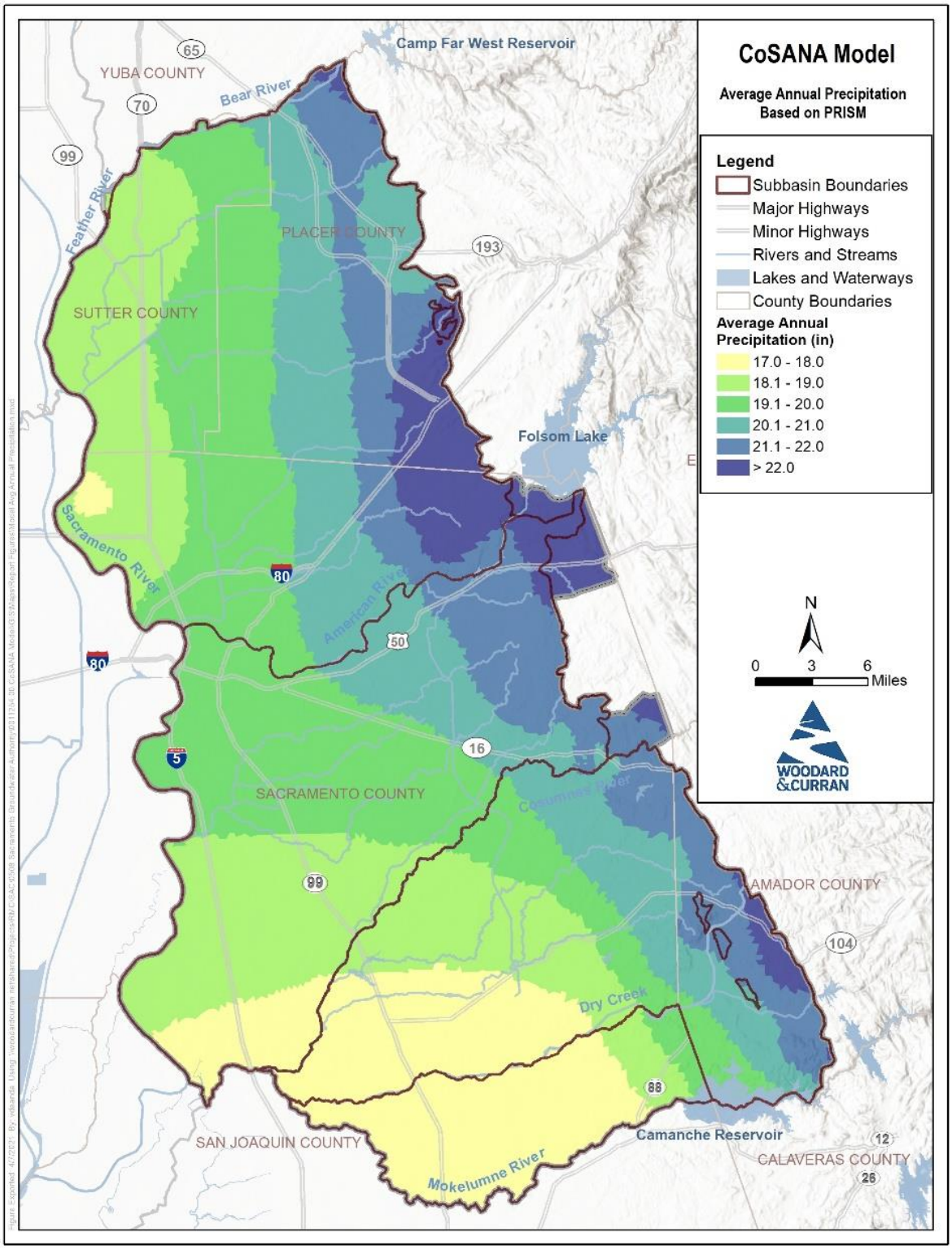


Figure 2-8: CoSANA Average Annual Precipitation

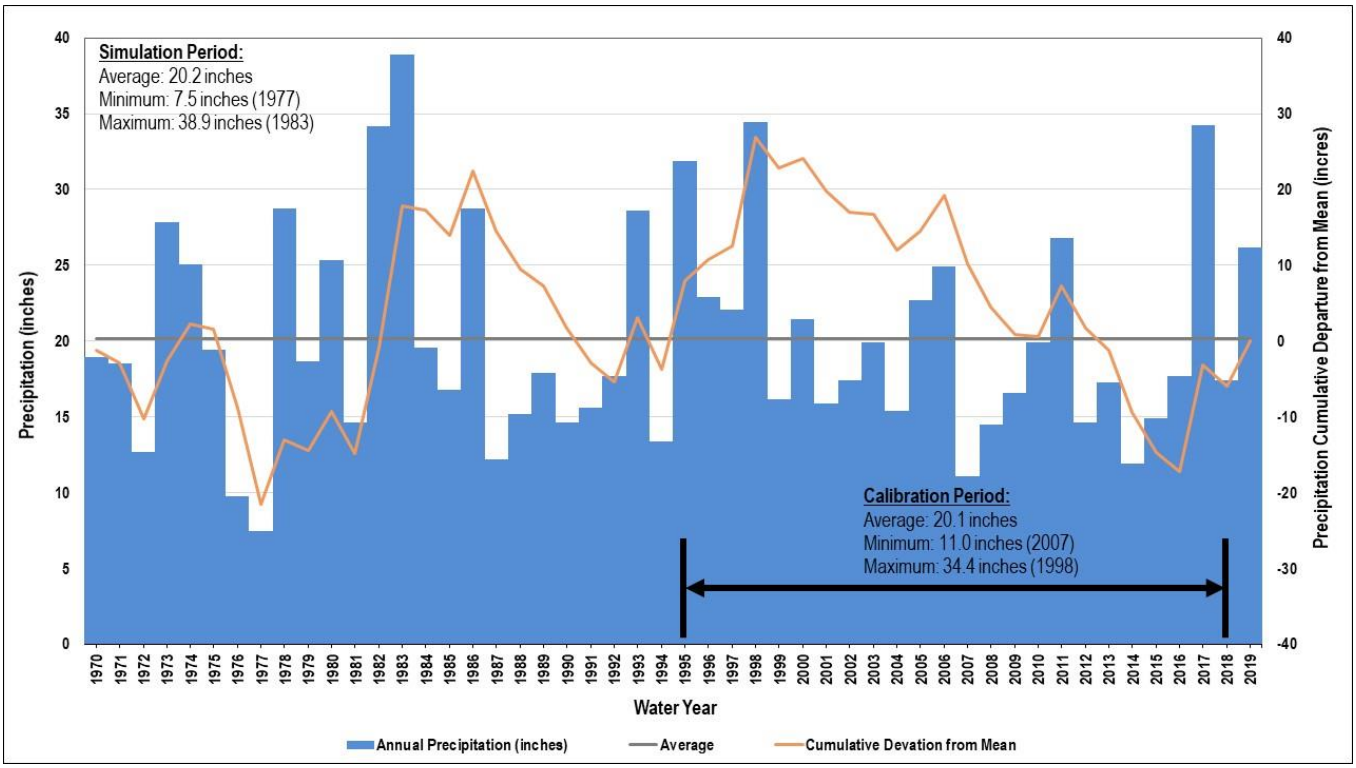


Figure 2-9: CoSANA Average Annual Precipitation with Statistics

2.7 Land Use and Cropping Patterns

Land use and cropping patterns are major data sets that drive the estimation of water demand for agricultural water use as well as rainfall runoff and deep percolation conditions throughout the model area. Land use surveys were used to map the agricultural crops into 4 general land use types and 20 irrigated crop categories, consistent with C2VSimFG, and as shown in Table 2-5. The digital land use surveys were mapped to each of the model elements, so as each model element contains all information to estimate the agricultural, native, and riparian water demand on a monthly time step. All irrigated crop categories except for rice are simulated as non-ponded crops, meaning they are grown without standing water. Rice is simulated as both no decomposition and flooded decomposition to represent the current understanding of local rice growing practices. Assumptions of rice decomposition practices were based on local information and estimated as proportion of rice acreage each year that underwent no decomposition or flooded decomposition. This information aligns with rice practices simulated in other models, including the Yuba Groundwater Model and C2VSimFG. Table 2-5 lists the land use categories. The crop categories are nearly identical to those in C2VSimFG, the only difference being CoSANA has one category of tomatoes, whereas C2VSimFG has two.

Table 2-5: Land Use Categories

Land Use Type	Model Category
Irrigated Crops	Grain
	Cotton
	Sugar Beets
	Corn
	Dry Beans
	Safflower
	Other Field Crops
	Alfalfa
	Pasture
	Tomato
	Cucurbits
	Onions & Garlic
	Potatoes
	Other Truck Crops
	Almonds & Pistachios
	Other Deciduous
	Citrus & Subtropical
	Vineyards
	Idle
	Rice
Other Land Use	Urban Landscape Water Surface Riparian Vegetation Native Vegetation

Spatial land use data were used to specify land use types and crop acreages for each model element for each year. The three major reference sources include DWR county land use surveys, DWR Statewide Crop Mapping, and CropScape. As crop categories were not consistent across all the land use data sources, individual mappings matched up each crop type to the appropriate model land use category. These data were available for different years for different counties. To approximate the land use across the entire model area, digital land use coverages were created from multiple datasets covering different years. These three snapshot years of land use coverage are assumed to represent conditions for 1995, 2005, and 2015 using data from a year close to that snapshot year (see Table 2-6). Linear interpolation was used represent land use for years between snapshot years. As no land use data for 2005 was available for Amador and San Joaquin Counties, land use in elements in those areas was linearly interpolated between 1995 and 2015.

Table 2-6: Sources of Data for Land Use Coverages

Data Source	Coverage Area	Year
1995 Land Use Coverage		
DWR Land Use Survey	Sutter County	1998
DWR Land Use Survey	Placer County	1994
DWR Land Use Survey	Sacramento County	1993
DWR Land Use Survey	San Joaquin County	1996
DWR Land Use Survey	Amador County	1997
2005 Land Use Coverage		
DWR Land Use Survey	Sutter County	2004
Local Information	Placer County	2009
DWR Land Use Survey	Sacramento County	2000
2015 Land Use Coverage		
DWR Statewide Crop Mapping	Sutter and Placer Counties (except for urban in Placer County)	2014
CropScape	Urban extent for Roseville-Lincoln	2015
DWR Land Use Survey	Sacramento County	2015
DWR Statewide Crop Mapping	San Joaquin and Amador Counties	2014

Land use development methodologies differed between DWR county land use surveys and DWR statewide crop mapping for 2014. Because the 2014 survey focused only on irrigated and urban areas, areas such as roads or strips between fields or buildings were assumed to be undeveloped or unirrigated land. This created issues in interpolation where longstanding rice fields would be shown as growing smaller and developed urban footprints were decreasing in acreage. In order to preserve the accuracy and refinement of the 2014 dataset, a reduction of 5% was applied to land use acreages developed from DWR county surveys assumed to represent 1995 and 2005. This 5% was estimated based on analysis of differences in estimated crop acreages for parcels known to be cultivated in both 1995 and 2015. Additionally, interpolation in dense urban areas was adjusted to have urban acreage remain the same or increase over time, to avoid erroneous reductions in urban land due to survey methodologies. Further refinement was also performed in the Elk Grove area to more accurately capture the timing of some of the large-scale agricultural-to-urban land use conversions in that area.

Refinement was also performed to capture drought-period fallowing. Growers indicated they fallowed fields in areas of Sutter and Placer Counties during 2014 in response to drought; these same fields were mostly returned to crops after the drought. The 2014 statewide survey categories for these idle plots were overwritten with 2016 and 2017 CropScape data to better reflect the total crop acreage in Sutter and Placer Counties for interpolation purposes. The idled acreage was added back in for the year 2014 after interpolation between the compositive areas was performed.

Figure 2-10, Figure 2-11, and Figure 2-12 show the spatial distribution of the land use coverages for CoSANA for 1995, 2005, and 2015. Figure 2-13 through Figure 2-16 show the annual cropping patterns for the entire CoSANA and individual subbasins.

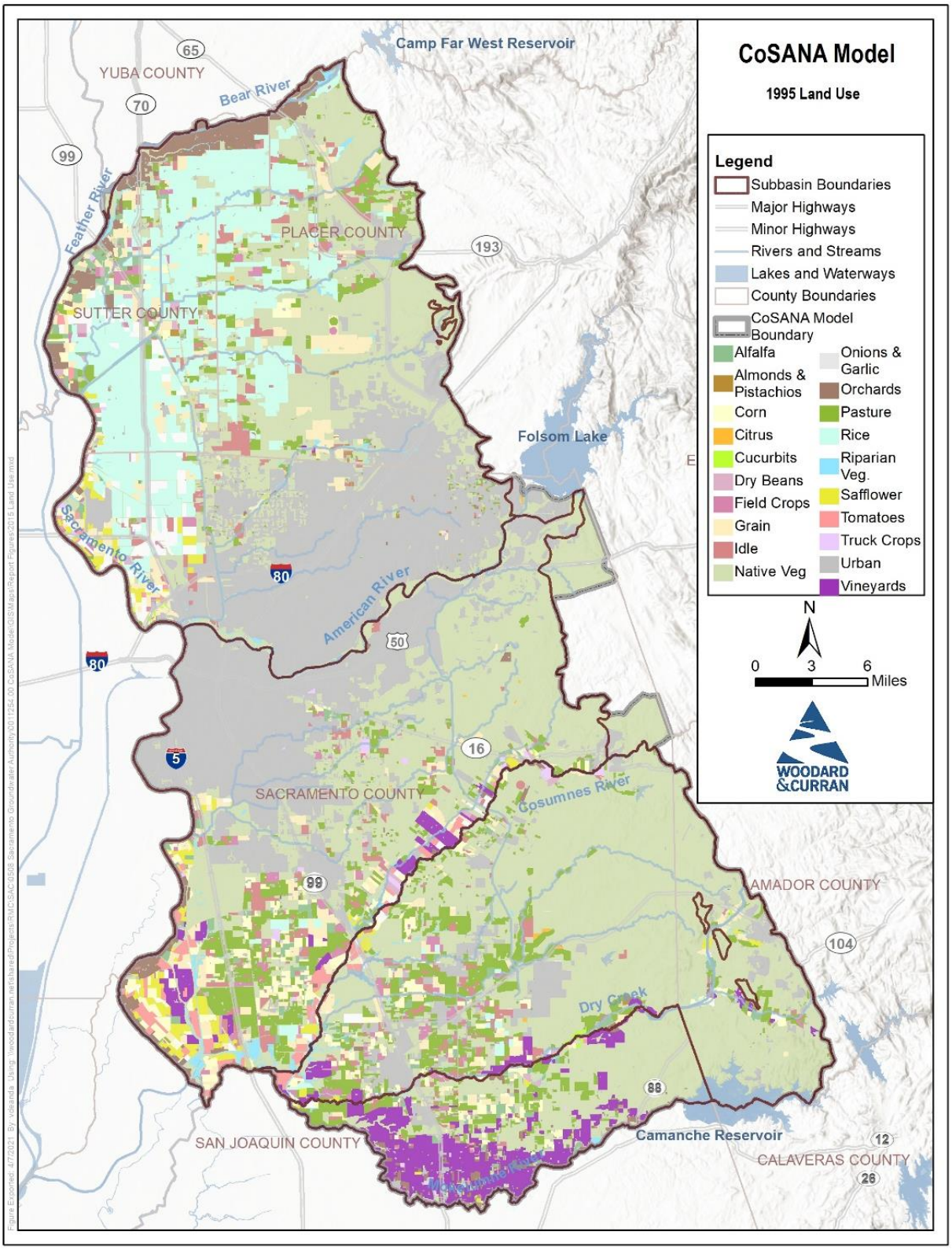


Figure 2-10: 1995 Land Use Coverage

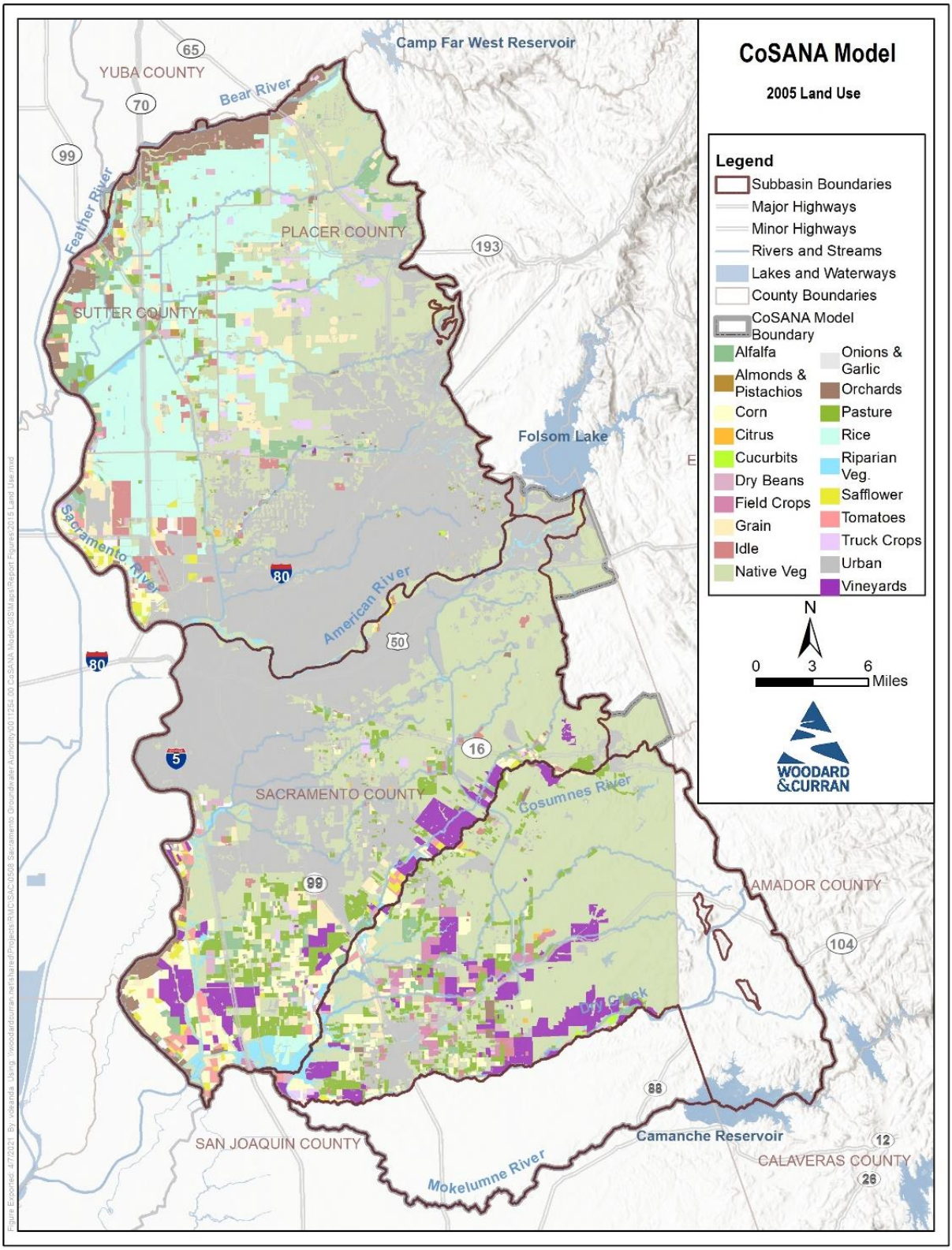


Figure 2-11: 2005 Land Use Coverage

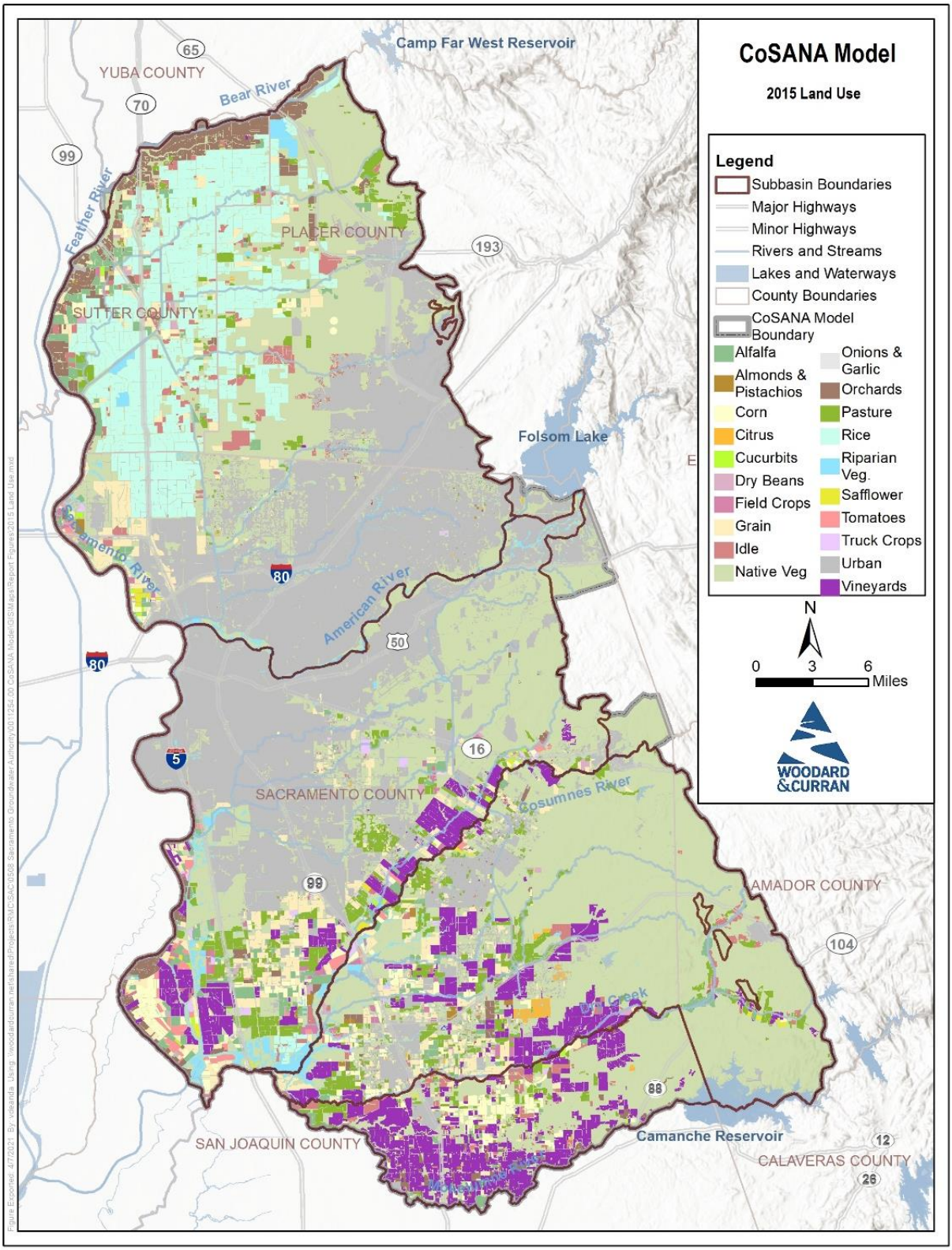


Figure 2-12: 2015 Land Use Coverage

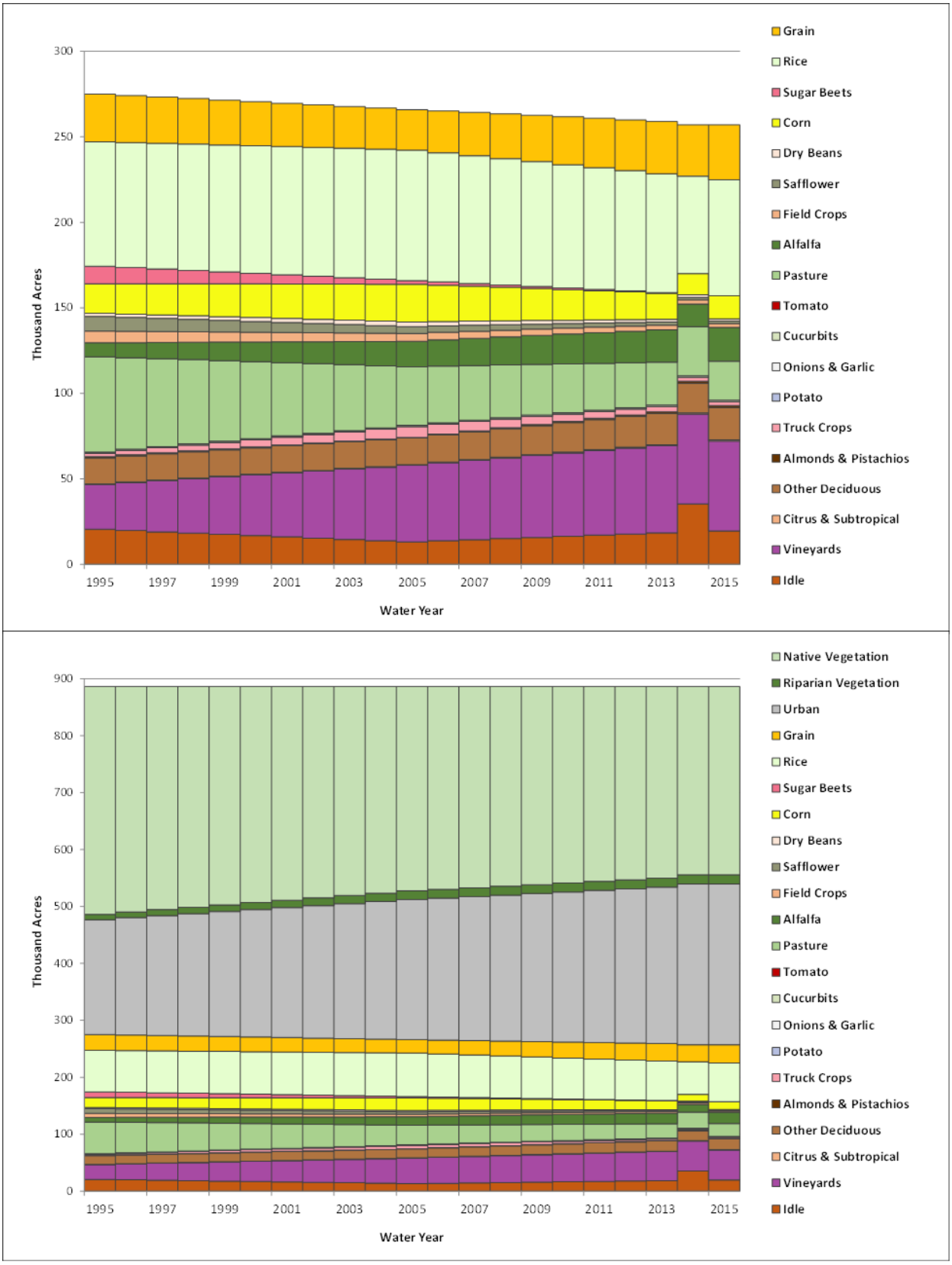


Figure 2-13: Annual Land Use for CoSANA

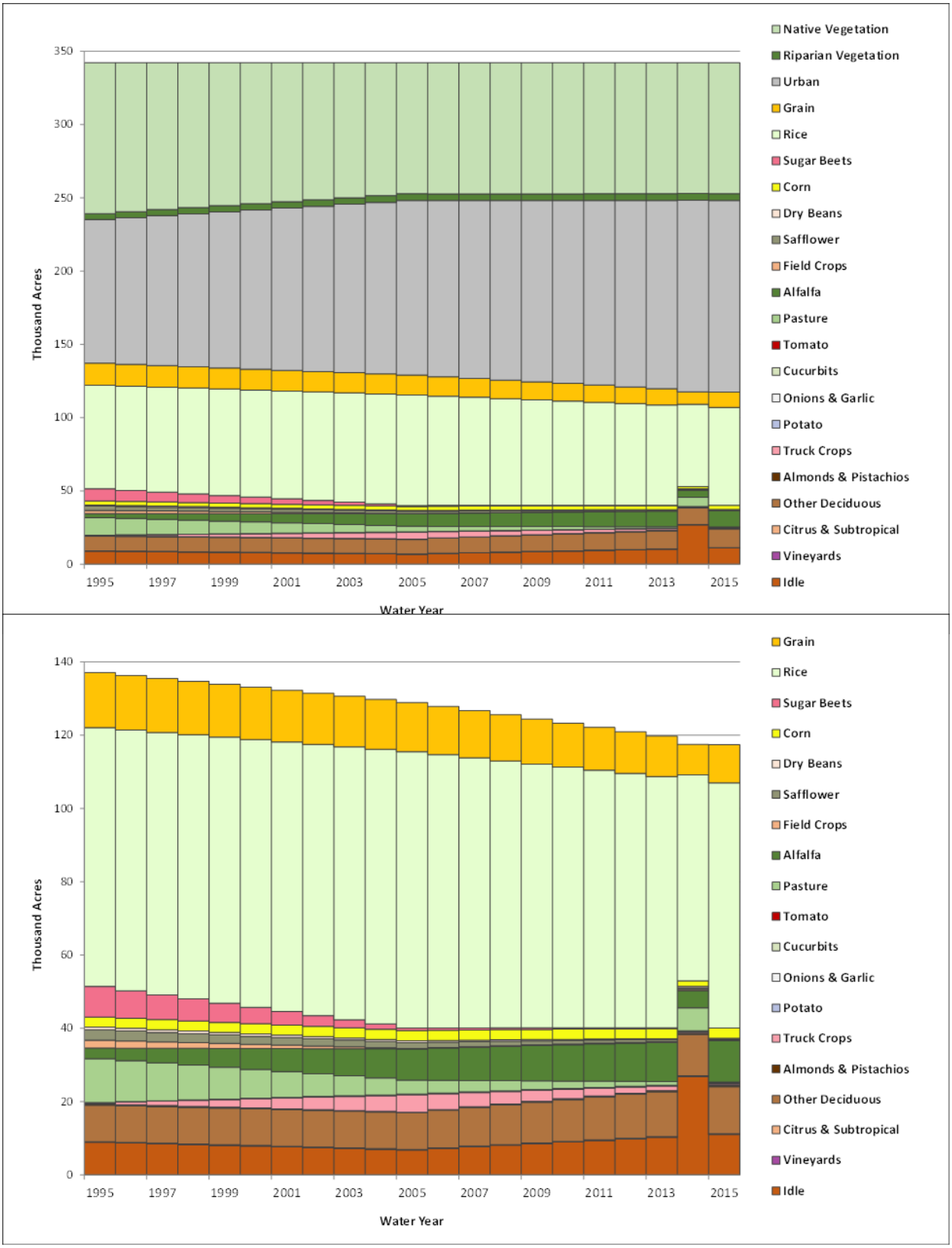


Figure 2-14: Annual Land Use for North American Subbasin

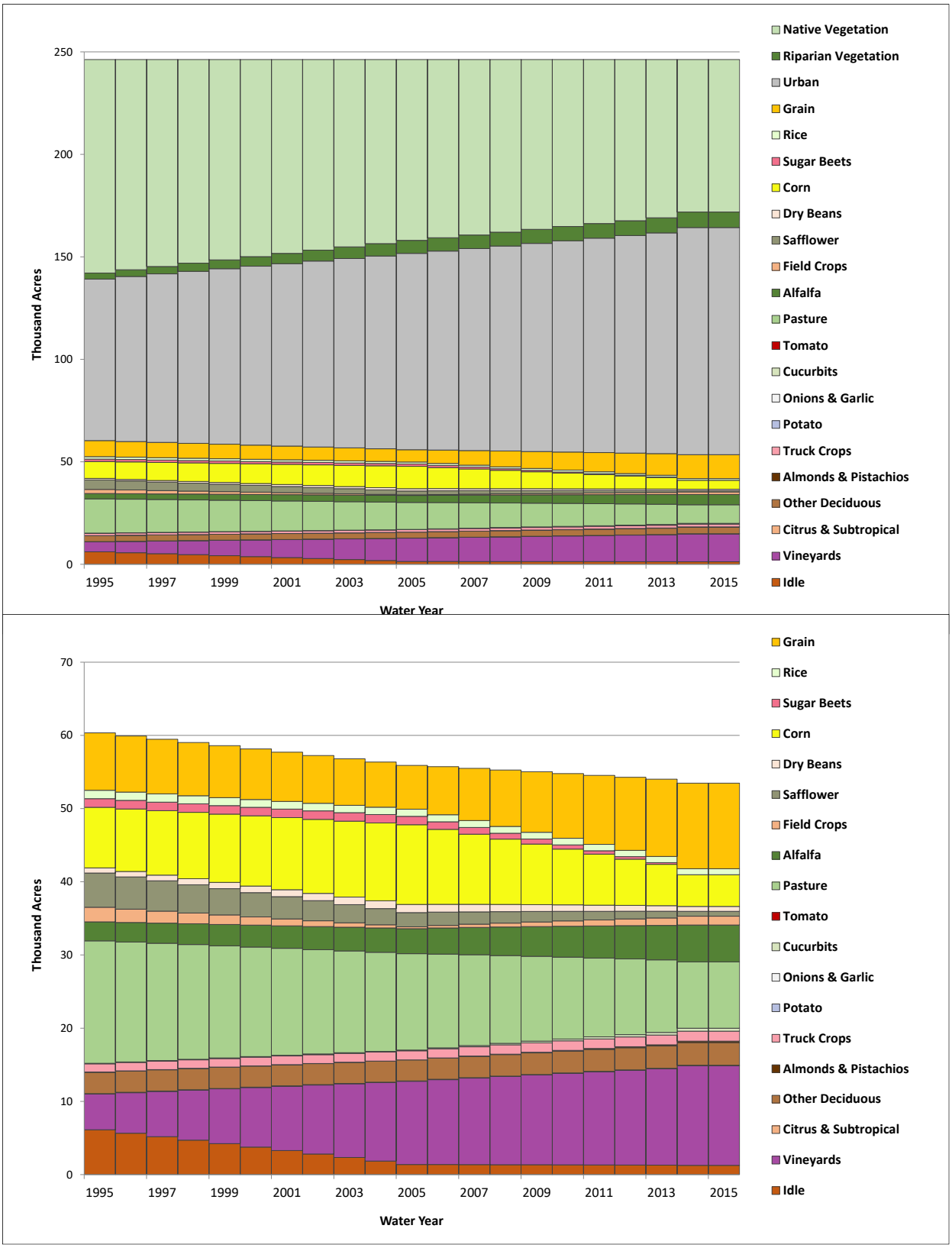


Figure 2-15: Annual Land Use for South American Subbasin

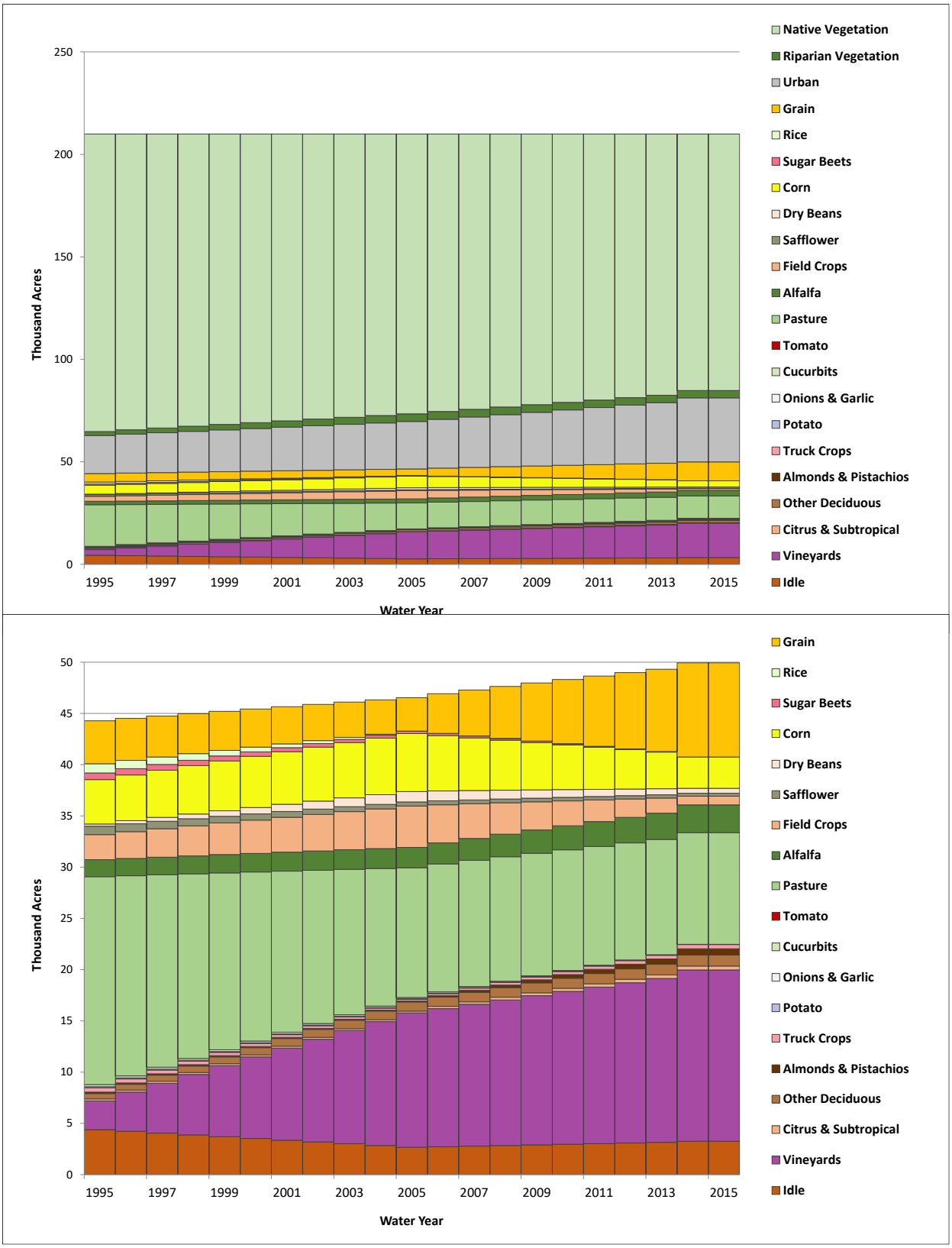


Figure 2-16: Annual Land Use for Cosumnes Subbasin

Land use trends in the North American Subbasin for 1995 through 2015 show decreases in total and irrigated agricultural acreage, with about 137,900 irrigated acres in 1995 and about 117,700 acres in 2015. During this same period, urban area increases from about 98,000 acres to about 130,800 acres. The increased urban area is due to both conversion of agricultural lands to urban areas, as well as conversion of native vegetation areas to urban. Most of the urban growth occurs in the Placer County area of the subbasin. In terms of irrigated acreages, decreases are observed in grain, rice, sugar beets, safflower, other field crops, and alfalfa/pasture. These decreases are due to urbanization and grower crop choices. The only irrigated crop showing substantial increases in acreage are orchards.

Land use trends in the South American Subbasin for 1995 through 2015 show decreases in total and irrigated agricultural acreage, with about 65,000 irrigated acres in 1995 and about 55,800 acres in 2015. During this same period, urban area increases from about 78,800 acres to about 110,800 acres. Increased urban area is due to both conversion of agricultural lands to urban areas, as well as conversion of native vegetation areas to urban. Most urban growth is observed to occur in the Elk Grove and Rancho Cordova areas. In terms of irrigated acreage, decreases are observed in corn, safflower, alfalfa/pasture, and tomatoes. These decreases are due to urbanization and grower crop choices. The largest increases in agricultural acreage are seen with the growth of grain and vineyards.

Land use trends in the Cosumnes Subbasin for 1995 through 2015 show increases in total and irrigated agricultural acreage, with about 45,200 irrigated acres in 1995 and about 50,200 acres in 2015. During this same period, urban area increases from about 18,500 acres to about 31,300 acres. Both urban and agricultural growth occur largely as a result of conversion of native vegetation areas. The majority of urban growth occurs as rural residential development in the Wilton area. In terms of irrigated acreage, decreases are observed in field crops (sugar beets, corn, safflower, and other field crops), and alfalfa/pasture. These decreases are due to urbanization and grower crop choices. Increases are observed in grain and permanent crops such as orchards and vineyards.

2.8 Evapotranspiration

Evapotranspiration (ET) is an important factor in demand estimation for crops and native vegetation. Every CoSANA land use type and crop category, as well as the small-stream watersheds, are assigned monthly values for the entire simulation period, which provides the monthly and annual hydrologic variability in ET estimates for the period of simulation.

The starting ET values through September 2015 were derived from C2VSimFG values for the C2VSimFG Subregion 7, which represents the NASb and was chosen as being most representative of the agricultural practices of the greater Sacramento region as modeled in CoSANA. Additional modifications were made during model calibration to the rice ET based on local information. Also, grain, vineyards, field crops, and safflower ET was updated using typical year monthly crop evapotranspiration information developed by the Irrigation Training and Research Center (ITRC) at California Polytechnic State University, San Luis Obispo by DWR's CIMIS (California Irrigation Management Information System) Zone. CIMIS zones represent areas with similar long-term average reference ET (ET_o) values, there are in total 18 zones to represent ET variability across California (https://cimis.water.ca.gov/App_Themes/images/ etozonemap.jpg). CoSANA uses average data for both Zone 12 and Zone 14.

To extend this data to 2018, ET_o data were downloaded for CIMIS station 131 (Fair Oaks). Monthly crop coefficient (ET_c) data for the extended period were estimated using the ratio of ET_o between annual data and the 2015 data.

Of 20 agricultural land uses in CoSANA, 7 crop types account for nearly 95% of irrigated cropland (for the 2015 land use survey). The monthly ET requirements of these crops are shown in Figure 2-17, Figure 2-18, and Figure 2-19, as well as for urban, riparian vegetation, and native vegetation land use types. Annual ET demands for the major land use types are 19.0 inches/year for grain, 29.7 inches/year for corn, 47.6 inches/year for alfalfa, 49.8 inches/year for pasture, 45.6 inches/year for orchards, 30.4 inches/year for vineyards, 32.3 inches/year for rice, 42.9 inches/year for urban, 18.2 inches/year for native vegetation, and 63.4 inches/year for riparian vegetation.

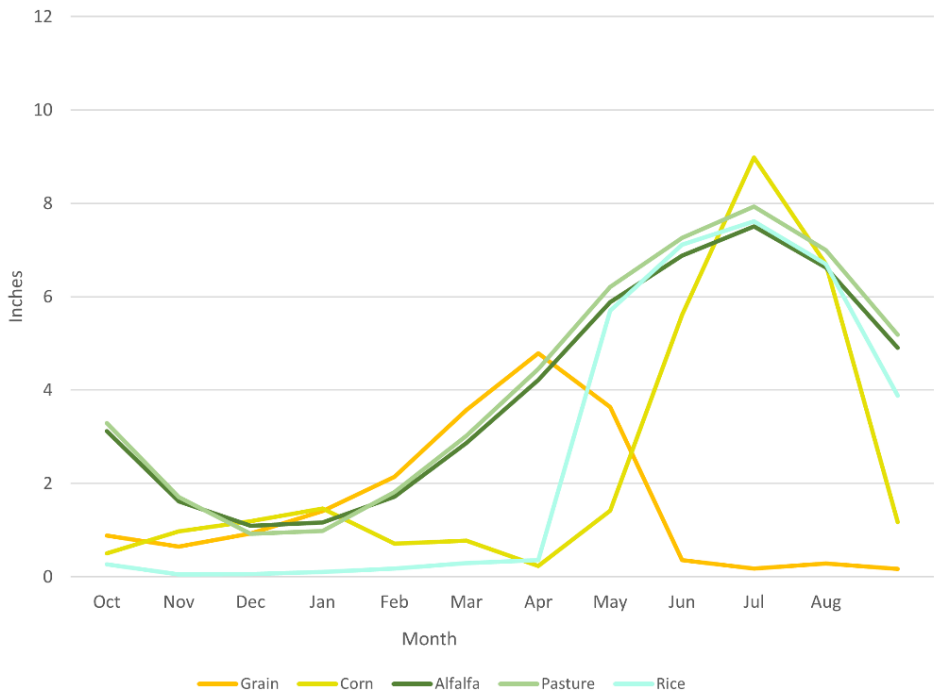


Figure 2-17: Average Monthly Evapotranspiration by Land Use Type, Major Field and Row Crops

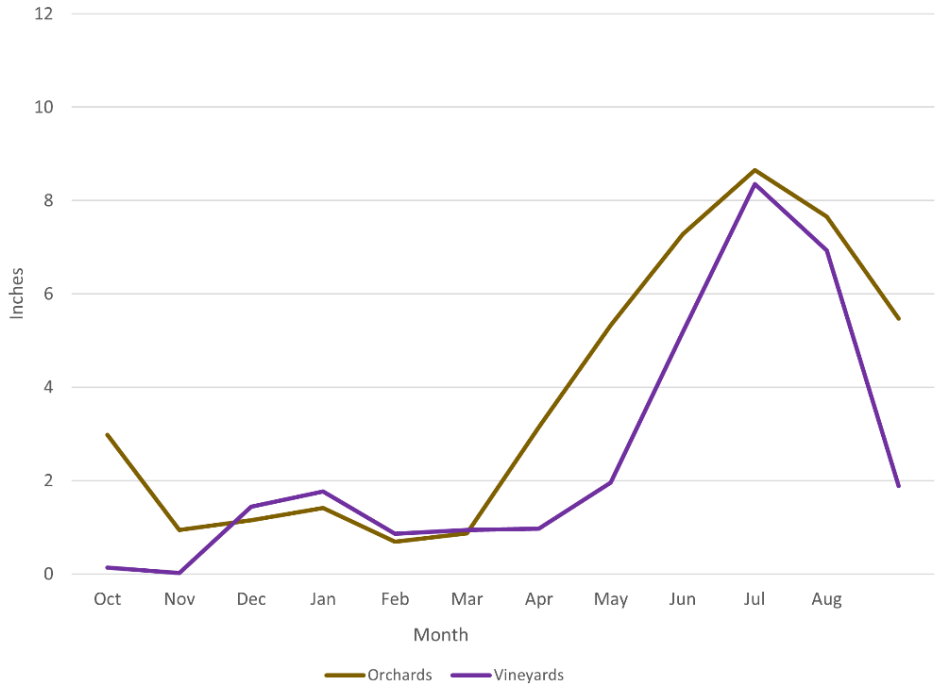


Figure 2-18: Average Monthly Evapotranspiration by Land Use Type, Orchards and Vineyards

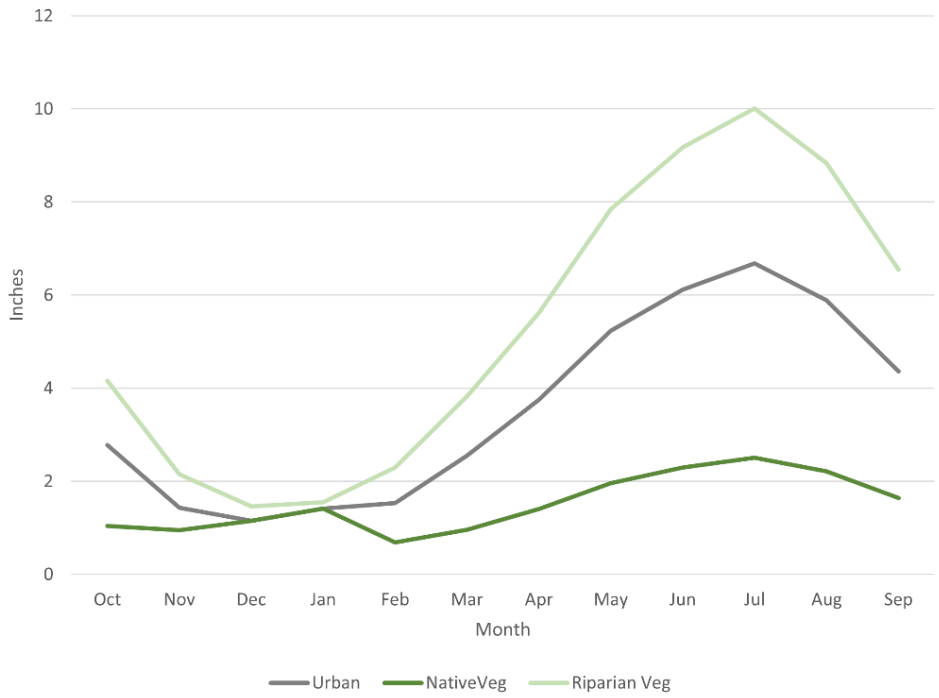


Figure 2-19: Average Monthly Evapotranspiration by Land Use Type, Urban, Native, and Riparian

2.9 Root Zone Soil Parameters

The soil properties specified in CoSANA are field capacity, wilting point, total porosity, saturated hydraulic conductivity, and pore size distribution index. The soil properties are used to calculate rainfall runoff and infiltration through the soil zone for each model element. Data from C2VSimFG was used to populate the five soil properties for each model element. The soil parameters were modified during the calibration process; the final soil parameter values and their spatial distributions are discussed and shown in figures in Section 0.

Model elements are also associated with the four hydrologic soil groups according to their runoff potential and infiltration characteristics. CoSANA elements with their corresponding hydrologic soil group are shown in Figure 2-20. The United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS; USDA NRCS, 2007) defines these hydrological soil groups as follows:

- Soils in Group A have low runoff potential when thoroughly wet. Water is transmitted freely through the soil. Group A soils typically have less than 10 percent clay and more than 90 percent sand or gravel and have gravel or sand textures. Some soils having loamy sand, sandy loam, loam, or silt loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments.
- Soils in Group B have moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded. Group B soils typically have between 10 percent and 20 percent clay and 50 percent to 90 percent sand and have loamy sand or sandy loam textures. Some soils having loam, silt loam, silt, or sandy clay loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments.

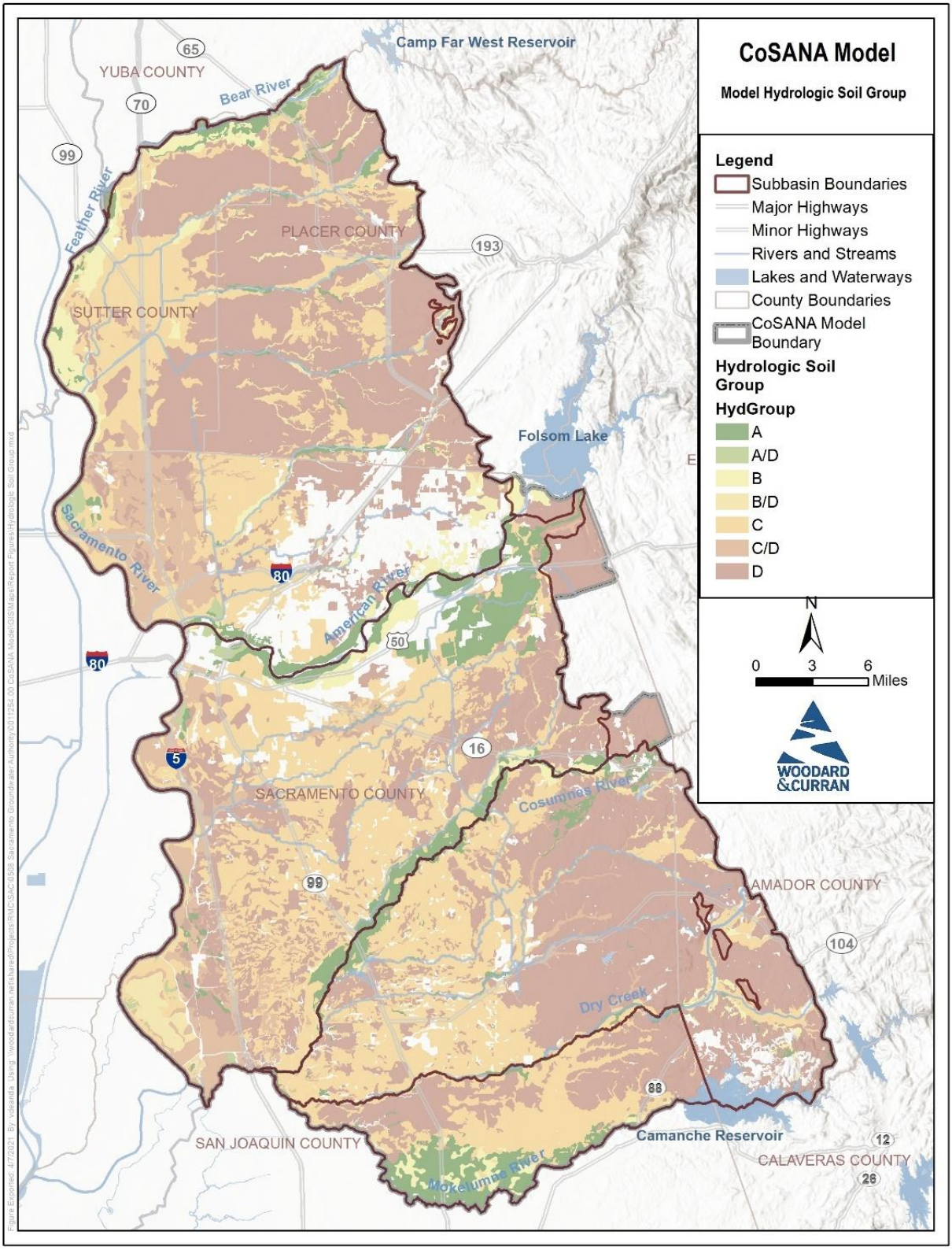


Figure 2-20: USDA Hydrologic Soil Groups

- Soils in Group C have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted. Group C soils typically have between 20 percent and 40 percent clay and less than 50 percent sand and have loam, silt loam, sandy clay loam, clay loam, and silty clay loam textures. Some soils having clay, silty clay, or sandy clay textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments.
- Soils in Group D have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted. Group D soils typically have greater than 40 percent clay, less than 50 percent sand, and have clayey textures. In some areas, they also have high shrink-swell potential.

2.10 Geologic Structure and Model Layering

The following section highlights development and refinement of CoSANA stratigraphy.

2.10.1 Model Layer Development and Approach

Layering for a groundwater model is guided by many factors, several of which are described as follows:

- Hydrostratigraphy of the study area. The thickness and extent of model layers and the overall extent and depth of the model was developed based on available geologic and hydrogeologic reports, including available maps and cross-sections, to reflect the physical system being simulated. Information from neighboring subbasins was also considered for consistency with the modeling efforts in those areas.
- Stream-aquifer interaction. CoSANA will support the investigation of stream-aquifer interaction in the modeled subbasins, notably for the American, Sacramento, and Cosumnes Rivers. This requires a realistic and accurate representation of the aquifer, pumping volumes, and pumping locations and a grid that is discretized sufficiently fine horizontally and vertically. Representing the recent alluvium and Riverbank Formation as a separate layer provided a finer vertical discretization underneath and around the streams.
- Available information on screen/perforation depths for monitoring and production wells. If available, information on the vertical distribution of pumping is used to layer the model such that it corresponds to the depths at which those stresses occur. At present, there is limited information on the vertical distribution of well screens and perforations in the study area, particularly for private agricultural and domestic wells. Furthermore, many wells in the area were constructed with long sections of perforation or open boring, making it difficult to determine the elevations of greatest groundwater production.
- Importance of vertical gradients and the availability of vertically distributed head data. There are several multi-completion monitoring wells installed in the study area. At the most there are only five completions in an individual well cluster. Vertical discretization beyond that level would require estimation of parameters that control vertical movement of water (e.g., vertical hydraulic conductivity) that could not be evaluated by comparison of simulated and observed data.
- Model run time. All other considerations being equal, model run times will increase with the number of layers that are used. Run time was identified as an important consideration early in the planning process for CoSANA due to the benefits seen from faster model run time for SacIWRM. The ability to perform many model runs quickly is a desired outcome in the model development, particularly when iterative modeling scenarios are performed.

The selection of the number of layers and their elevations requires balancing these factors and the overall objectives of the project.

2.10.2 Model Layer Definition

The subsurface is characterized in CoSANA by five model layers representing the different geology from the ground surface to the shallower of bedrock or the base of fresh water. The ground surface elevation, the upper boundary of the topmost layer, is based on the USGS DEM at a resolution of 30 meters. Descriptions of each of the model layers are listed below, from top to bottom. DWR's Bulletin 118-3 (1974) and data from the Western Placer County Groundwater Management Plan (Roseville, City of, et al., 2007) provided cross sections that were used to support development of all layers, while surficial geology maps (California Geological Survey 2009, 2011) were used primarily to support the extent of layers at the surface. Figures 23-27 show the extent and thickness of each model layer as described below.

- Layer 1 represents the recent alluvium and Riverbank Formation. Layer 1 is up to 188 feet thick and is generally constrained to be at least 30 feet thick. This layer was developed using California Geological Survey (2009; 2011), DWR's Bulletin 118-3 (1974), and data from the Western Placer County Groundwater Management Plan (Roseville, City of, et al., 2007) (Figure 2-21).
- Layer 2 corresponds to the Laguna Formation. Layer 2 is up to 502 feet thick and is generally constrained to be at least 50 feet thick (Figure 2-22).
- Layer 3 corresponds to the Mehrten Formation. Layer 3 is up to 1,487 feet thick and is generally constrained to be at least 50 feet thick (Figure 2-23).
- Layer 4 corresponds to the Valley Springs Formation. Layer 4 is up to 824 feet thick and is generally constrained to be at least 50 feet thick (Figure 2-24). The bottom of the Valley Springs Formation was supported by the work of Page (1974) in addition to the sources described earlier.
- Layer 5 corresponds to the portion of the Ione Formation that is above the base of fresh groundwater. Base of fresh water is defined based on Berkstresser (1973) and represents the depth where electrical conductivity is approximately 3,000 microsiemens per centimeter. Very few borings penetrate far below the base of freshwater, and it is expected that very little pumping occurs from this depth. Layer 5 is up to 795 feet thick and is generally constrained to be at least 50 feet thick (Figure 2-25).

A set of cross-sections were developed to show model stratigraphy in various locations and are presented as an overview map and 12 cross sections in Figure 2-26 through Figure 2-38.

Within each model layer, CoSANA aquifer parameters were estimated based on the texture dataset of the Sacramento Valley (DWR, 2018a). Aquifer parameters assigned to pilot point locations covering the model domain were distributed to model nodes using the sediment-based texture information to provide the spatial variability of parameters.

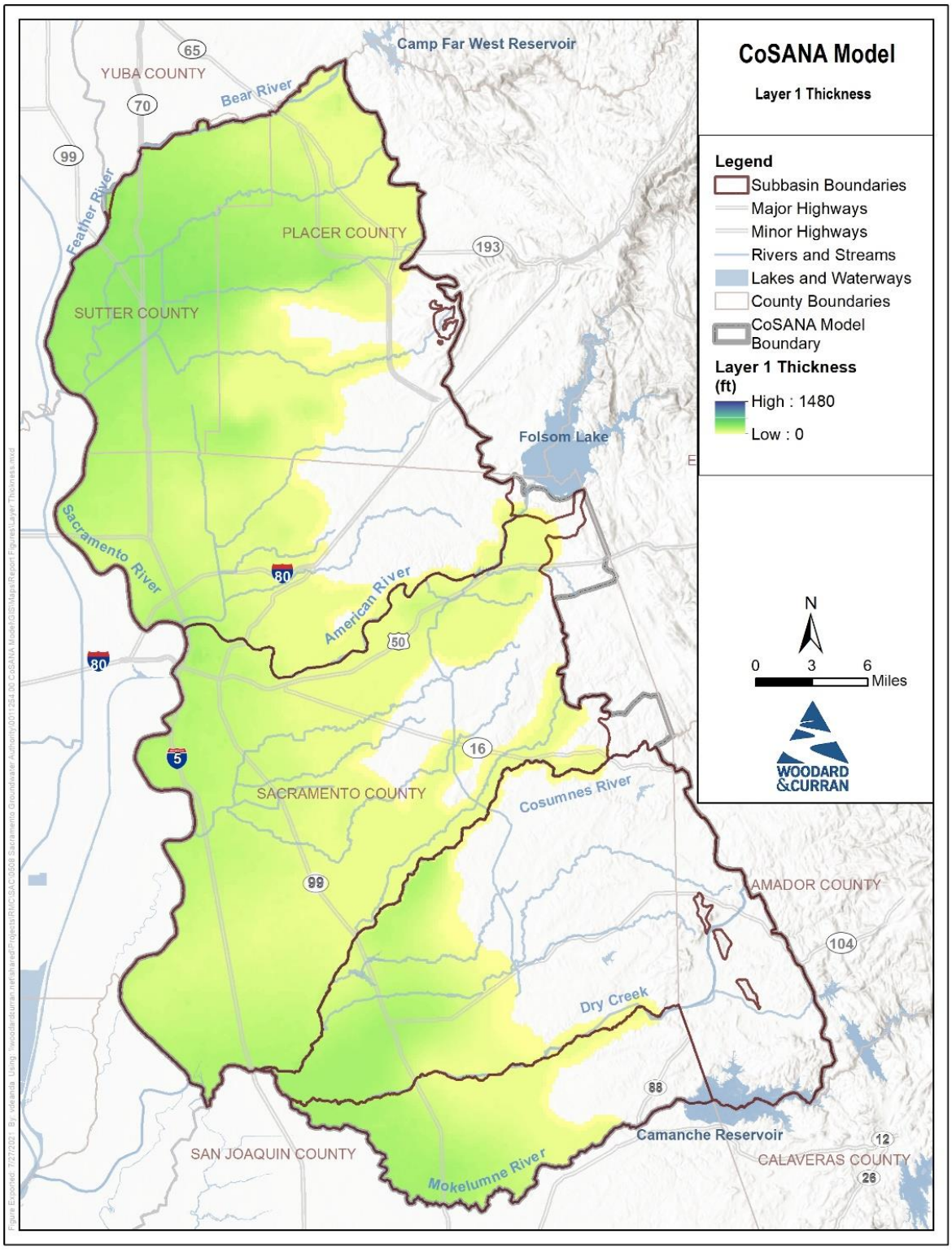


Figure 2-21: Thickness of Layer 1

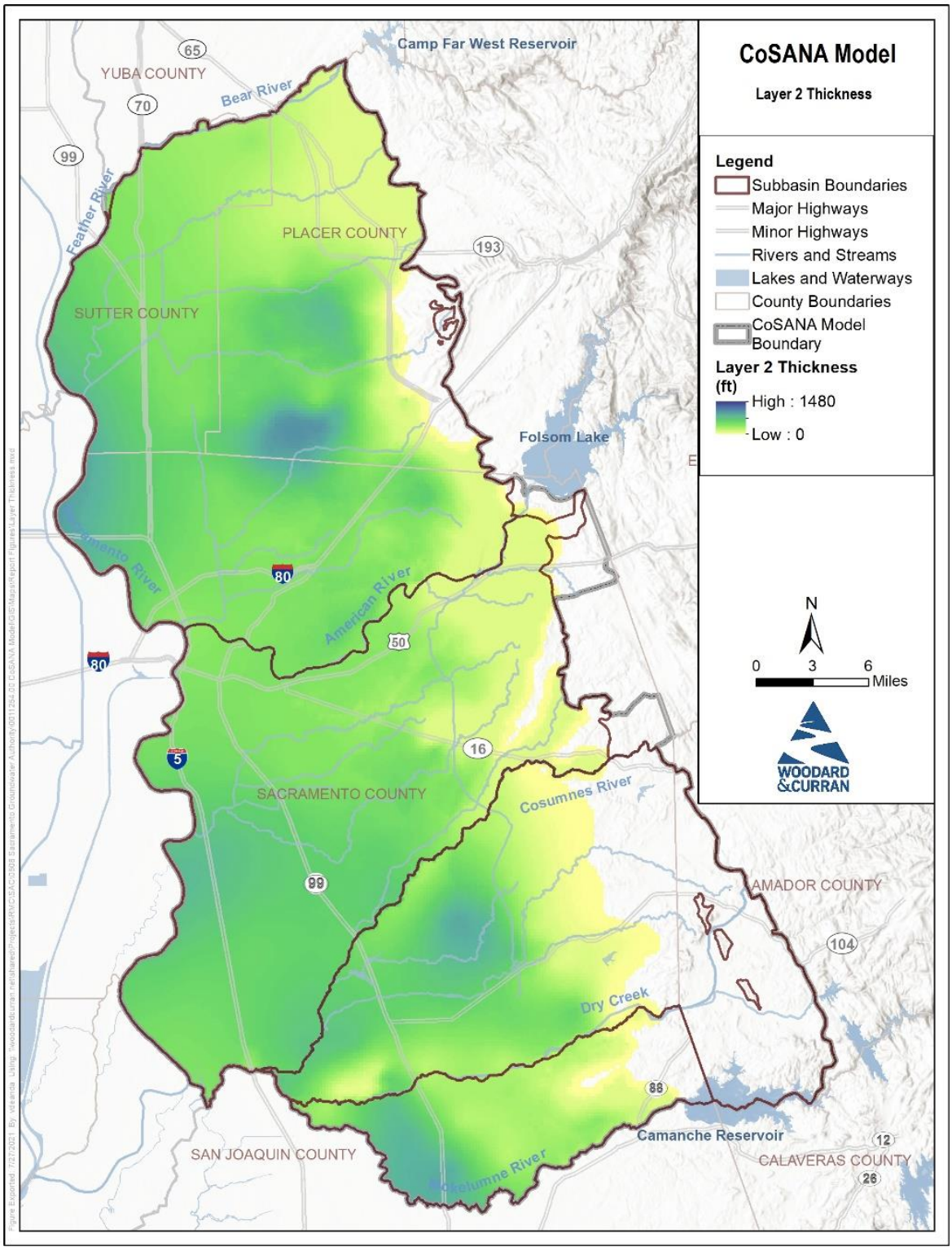


Figure 2-22: Thickness of Layer 2

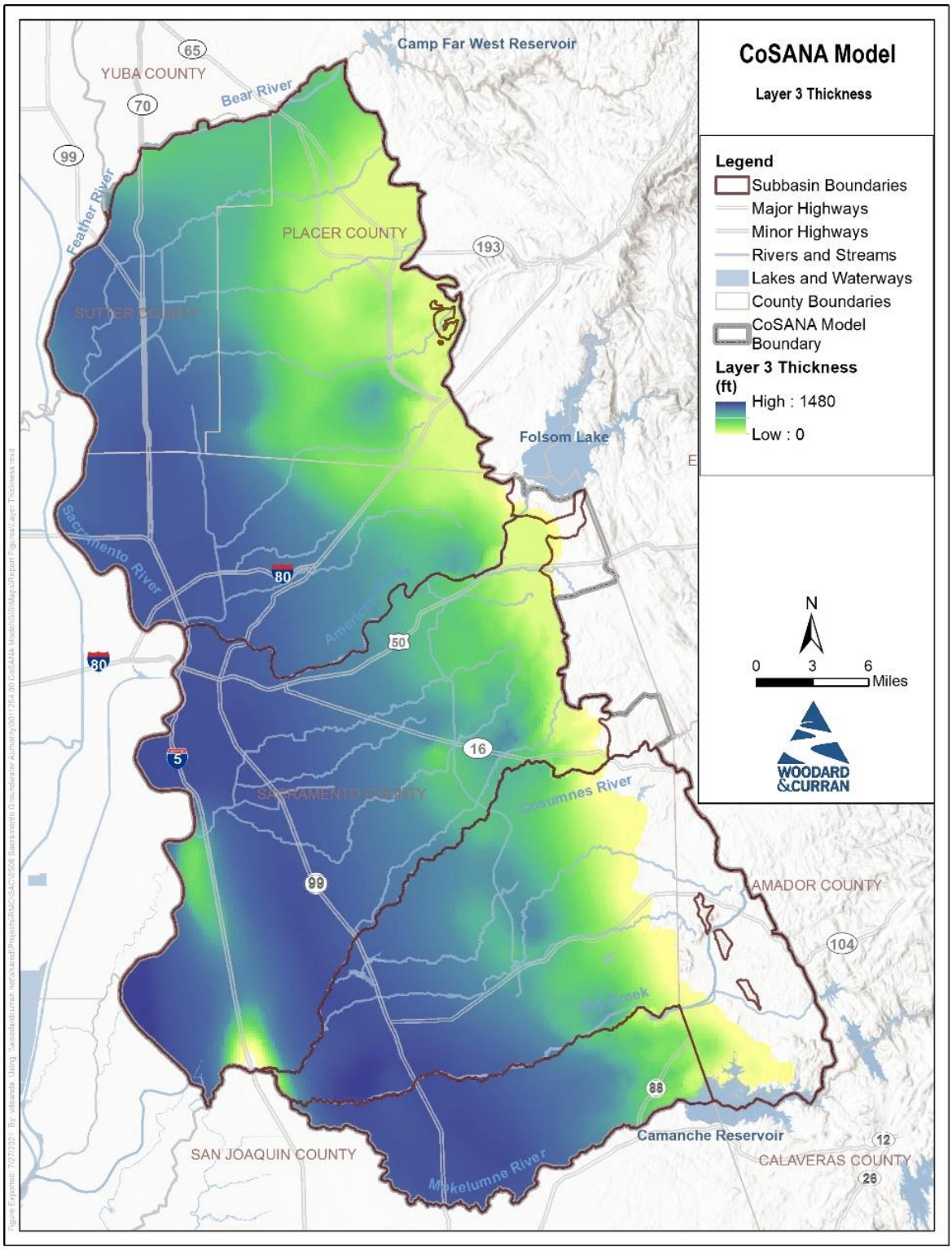


Figure 2-23: Thickness of Layer 3

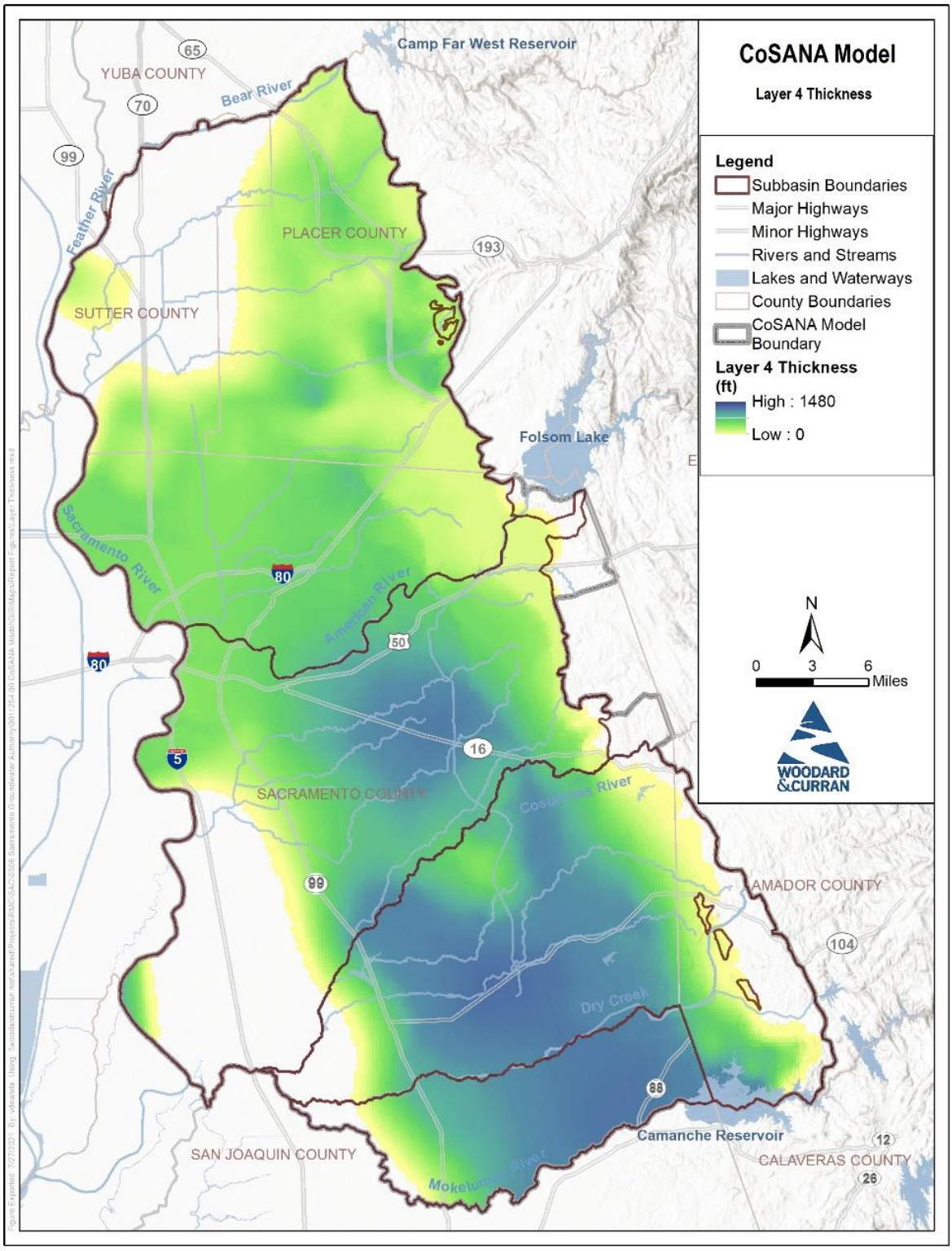


Figure 2-24: Thickness of Layer 4

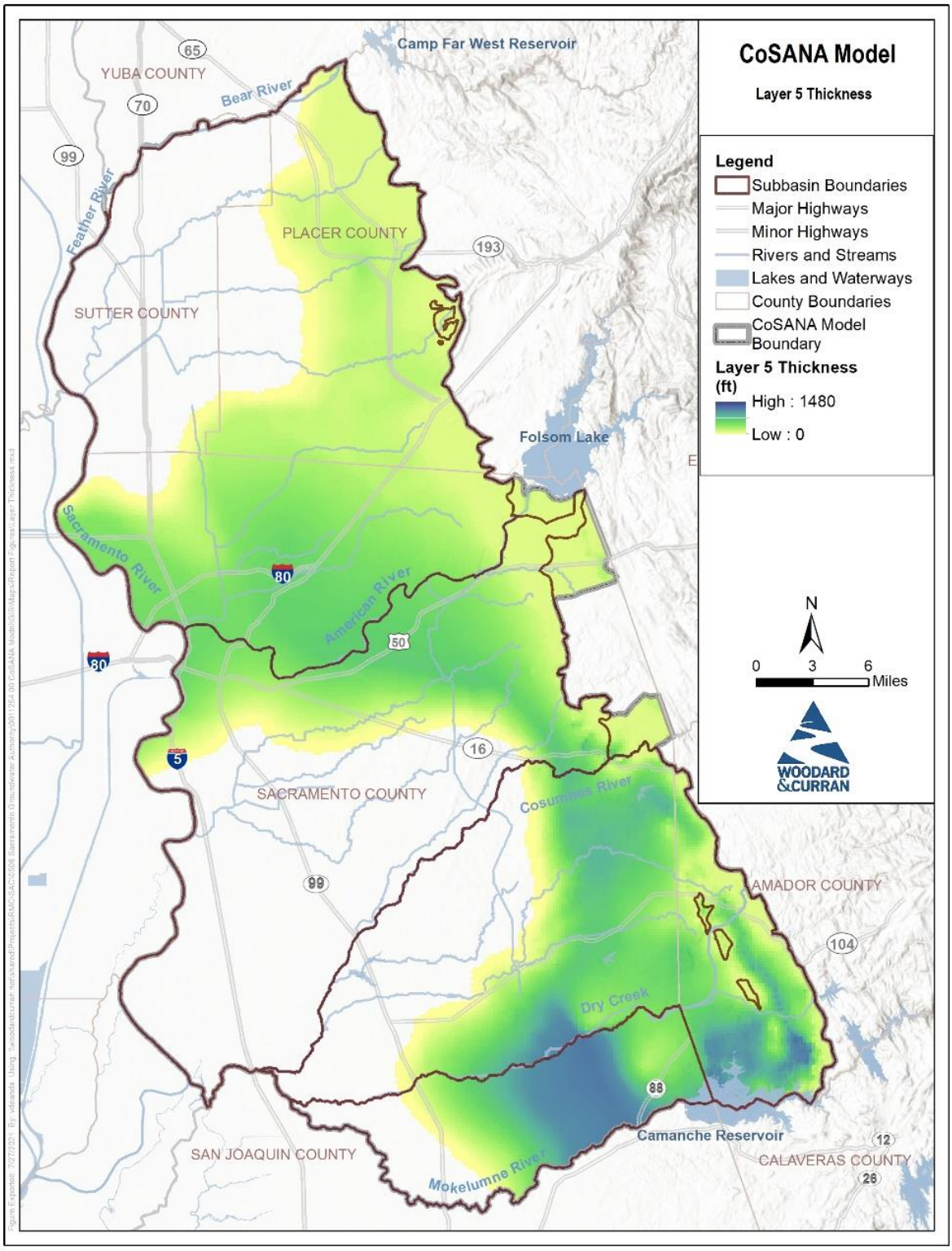


Figure 2-25: Thickness of Layer 5

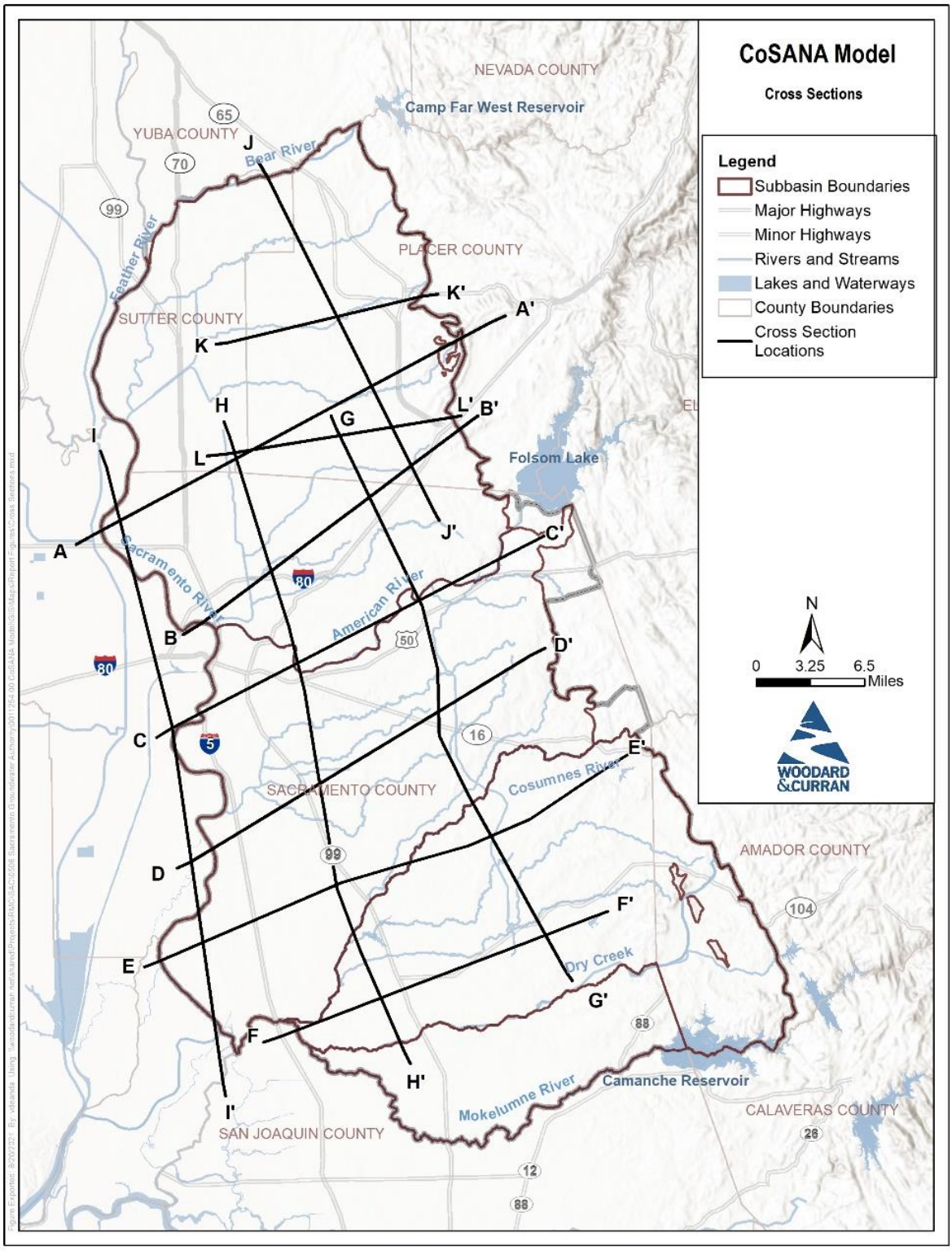


Figure 2-26: CoSANA Cross Sections

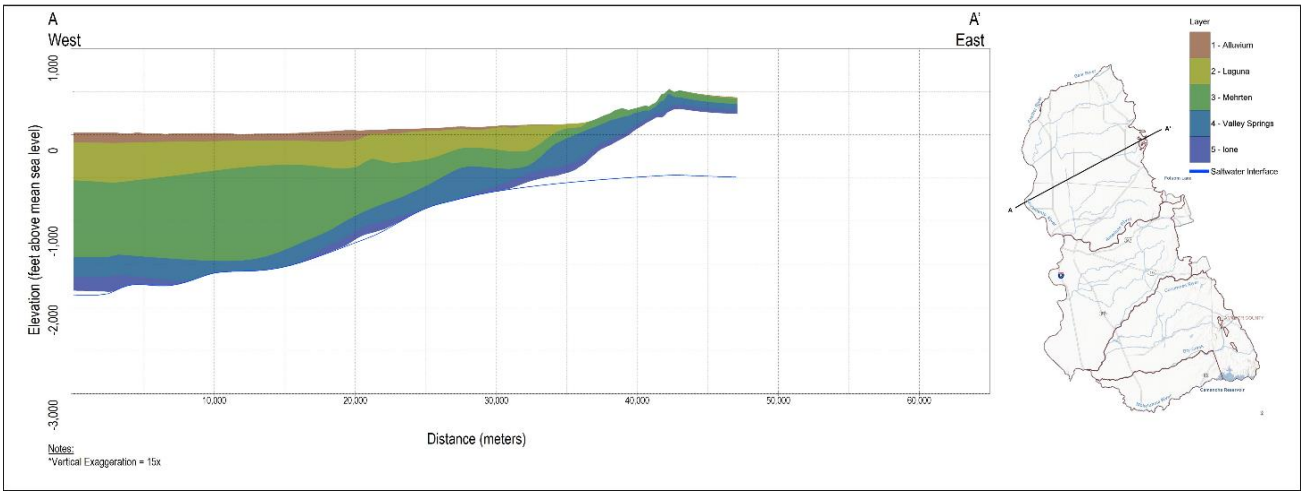


Figure 2-27: CoSANA Cross Section A-A'

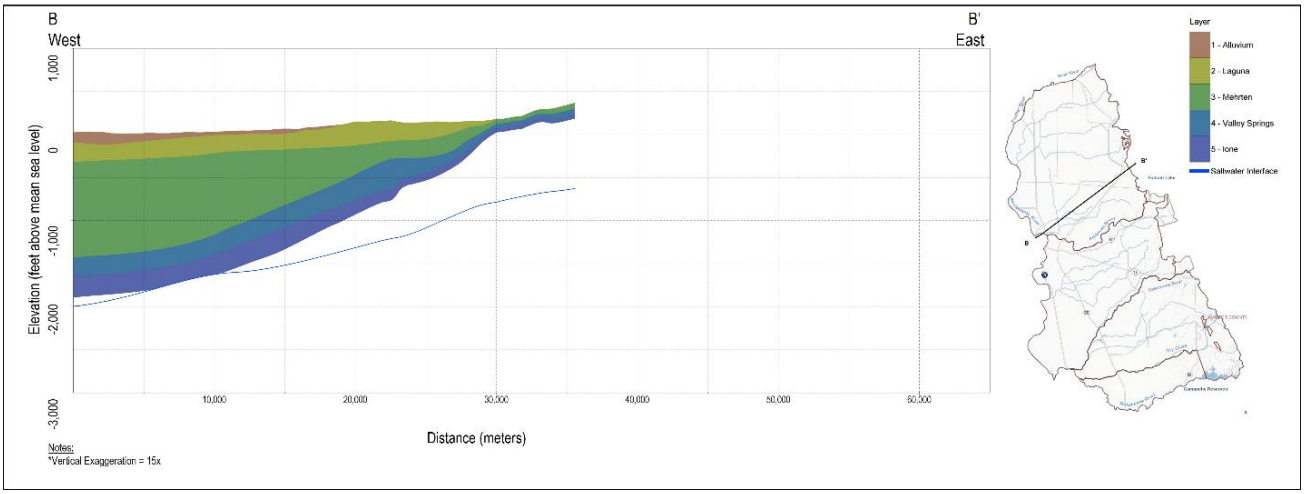


Figure 2-28: CoSANA Cross Section B-B'

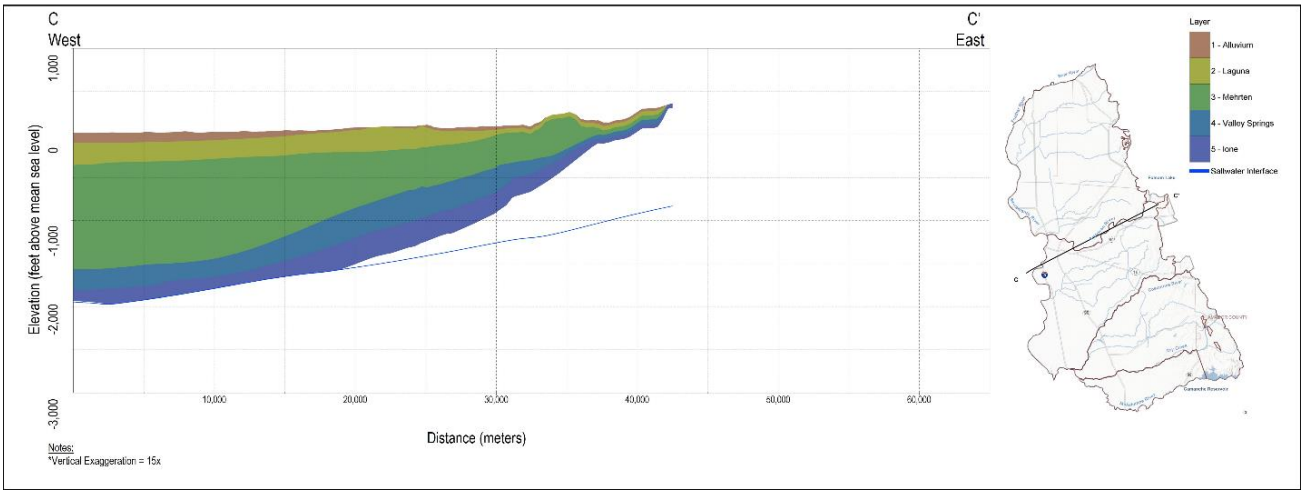


Figure 2-29: CoSANA Cross Section C-C'

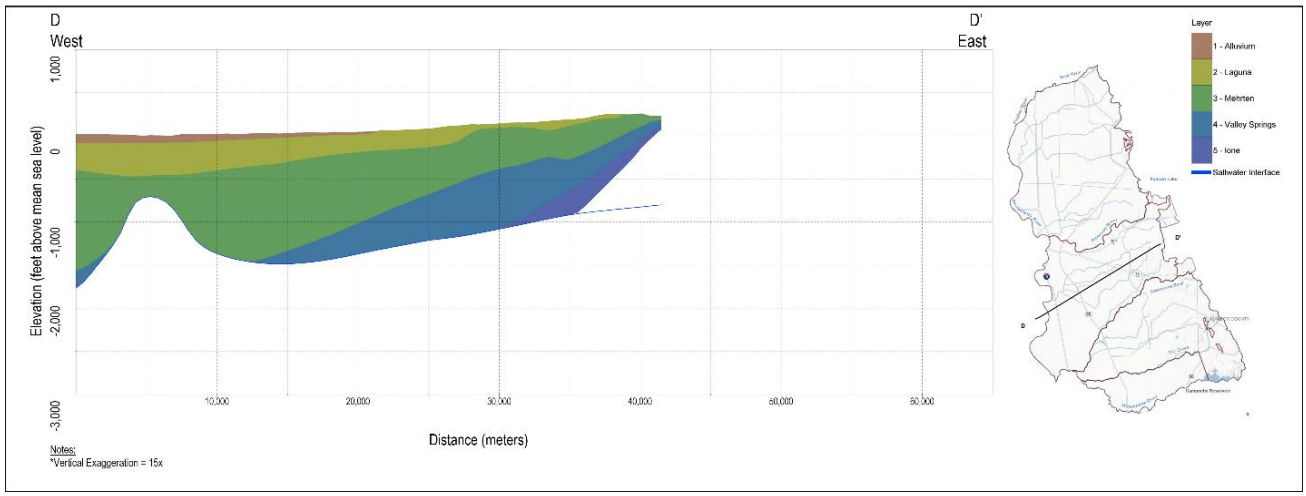


Figure 2-30: CoSANA Cross Section D-D'

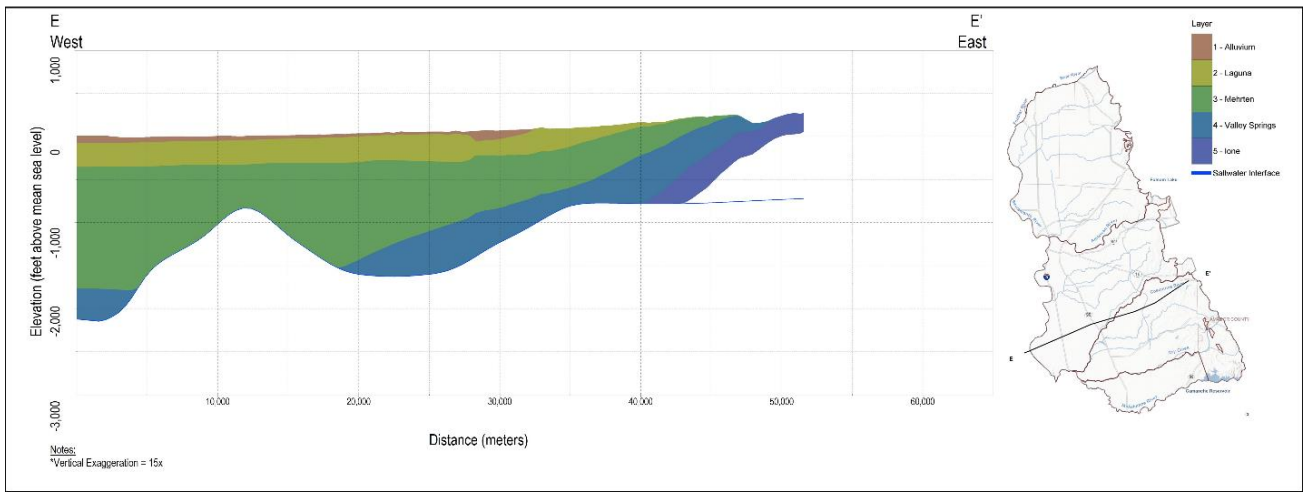


Figure 2-31: CoSANA Cross Section E-E'

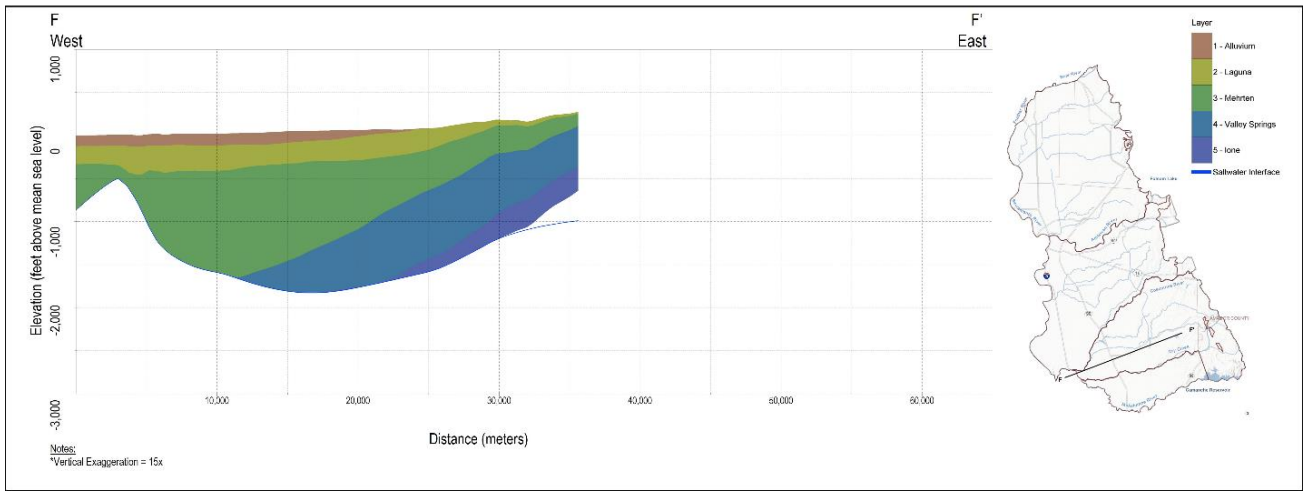


Figure 2-32: CoSANA Cross Section F-F'

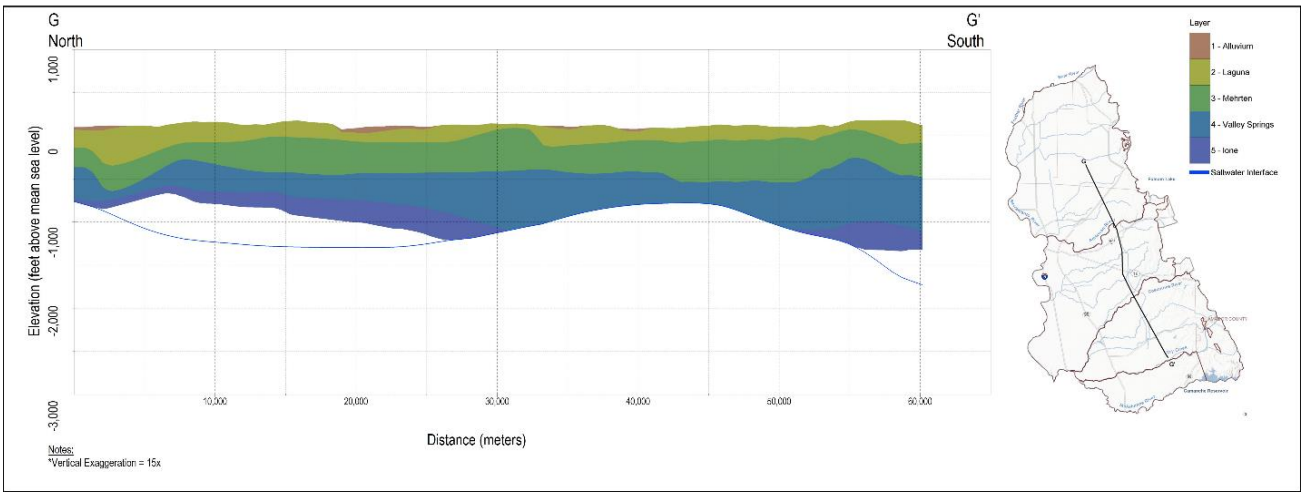


Figure 2-33: CoSANA Cross Section G-G'

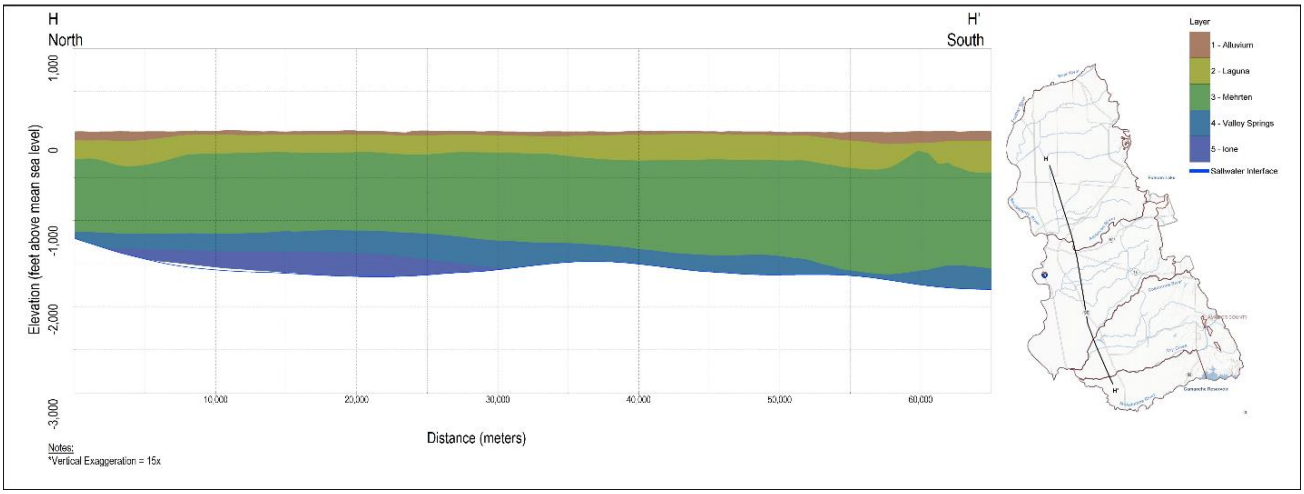


Figure 2-34: CoSANA Cross Section H-H'

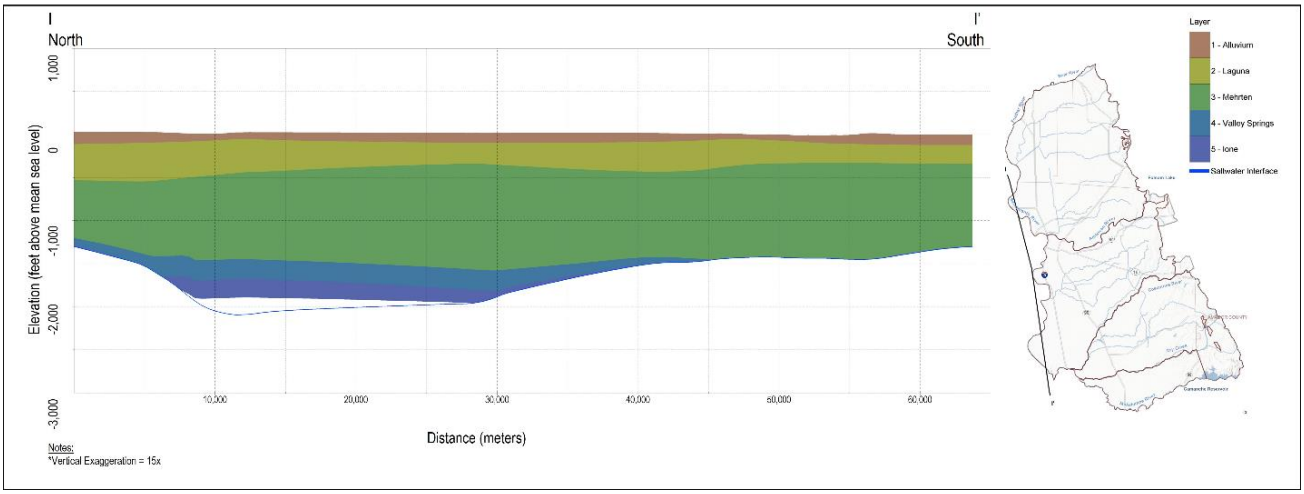


Figure 2-35: CoSANA Cross Section I-I'

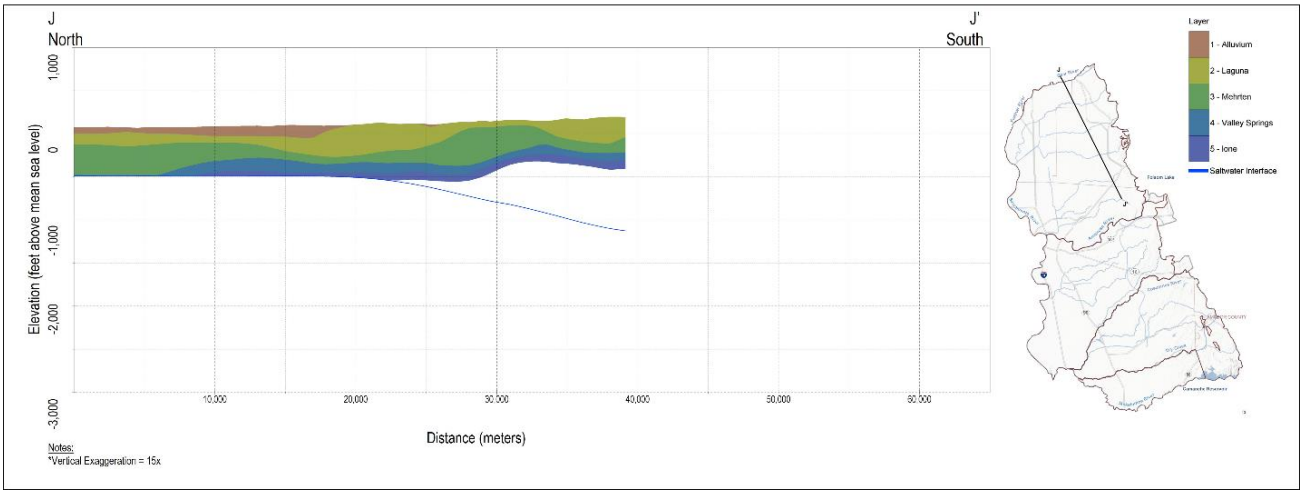


Figure 2-36: CoSANA Cross Section J-J'

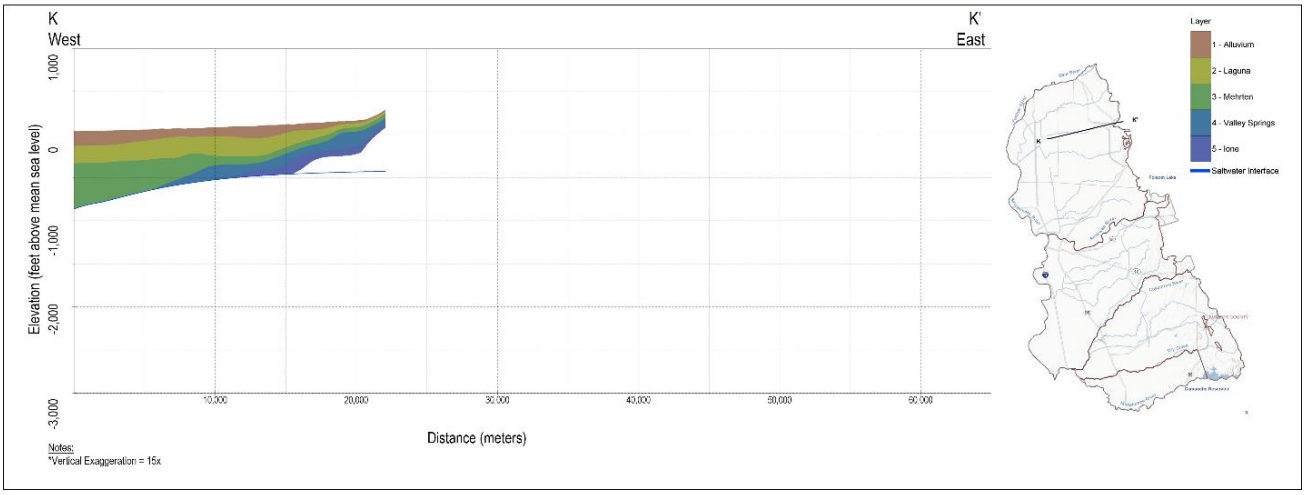


Figure 2-37: CoSANA Cross Section K-K'

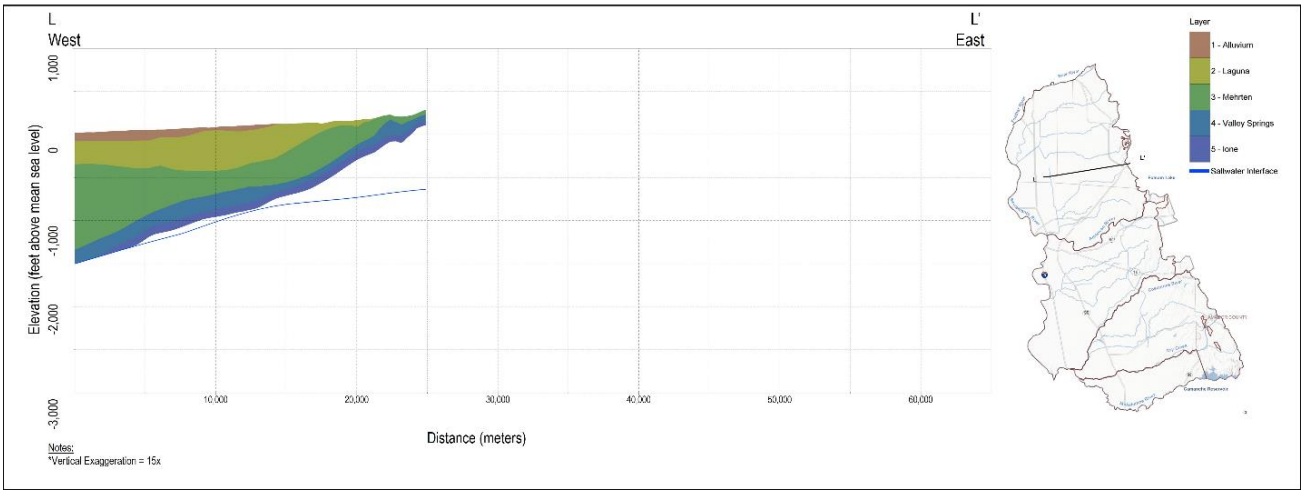


Figure 2-38: CoSANA Cross Section L-L'

2.11 Tributary Watersheds

The inflow from the eastern boundary of the model (i.e., Sierra Nevada foothills) originates from tributary watersheds, including both gaged and ungaged watersheds. The simulation of runoff and inflows from the gaged watersheds (i.e., stream inflows into the model) was discussed in Section 2.4. The simulation of surface and subsurface flows from the ungaged watersheds is explained in this section.

CoSANA simulates the ungaged eastern inflow using 32 small watersheds (Figure 2-39), based on the latest version of C2VSimFG. Flow from ungaged small watersheds is estimated based on precipitation rates and characteristics assigned to each identified ungaged watershed, again based on parameters from C2VSimFG. A portion of flow from the small watershed enters the model area as surface runoff and flows to simulated streams. The remaining small watershed flow contributes as subsurface boundary flow to the groundwater system.

All subsurface inflows from these small watersheds are routed to model Layer 5 along specified groundwater nodes, with a defined maximum percolation rate at each node. Excess flows that do not infiltrate to groundwater enter the simulated streams at specified locations, delineated using the USGS Watershed Boundary Dataset (HUC12 watersheds).

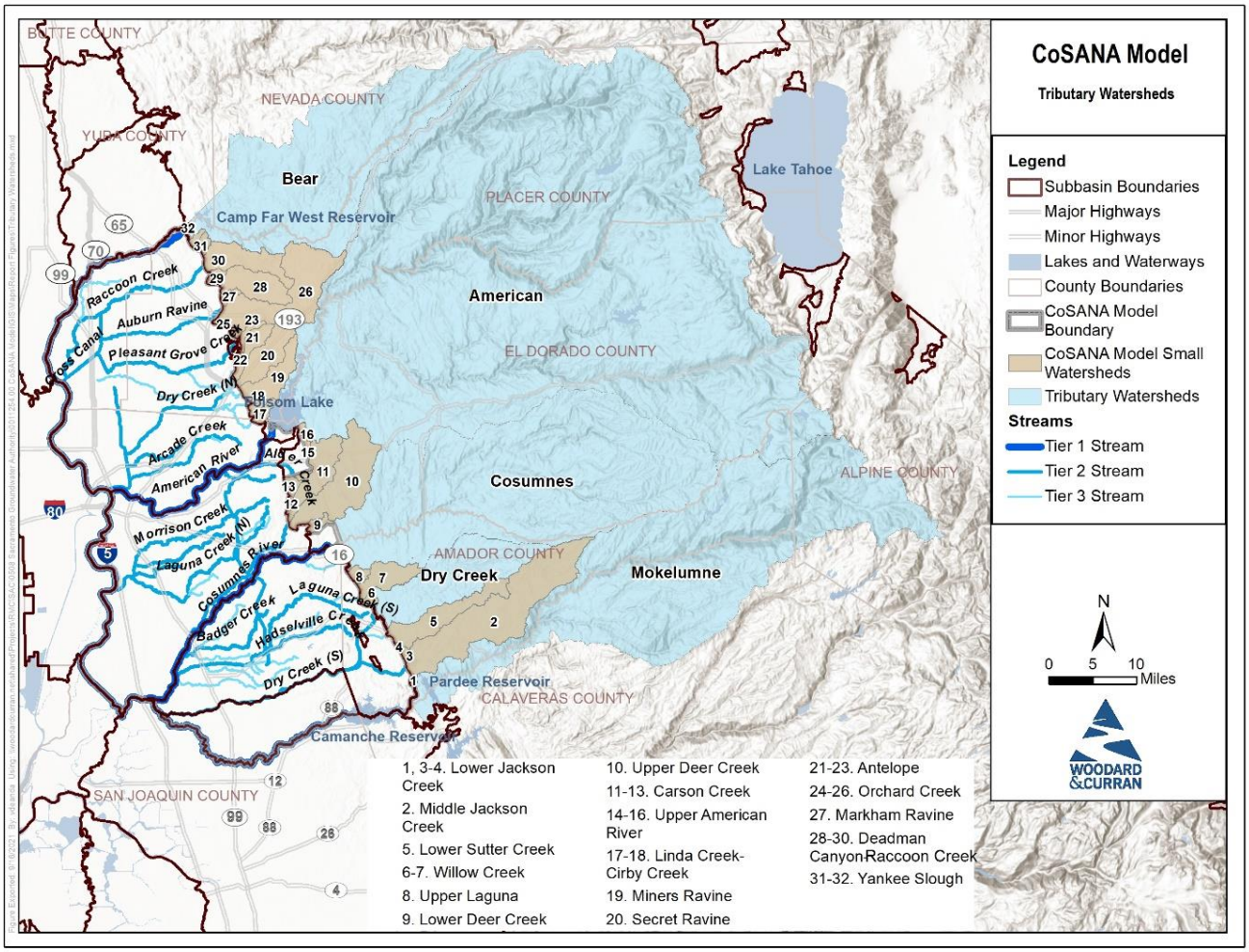


Figure 2-39: Tributary Watersheds

2.12 Boundary Conditions

Boundary conditions define the subsurface inflows for the northern, western, and southern borders of the model. The following boundary conditions are set in CoSANA:

2.12.1 General Head

Time-series general-head boundary conditions representing groundwater levels outside of the model area were defined for all active layers for 713 boundary nodes on the northern, western, and southern limits (i.e., along Bear River, Sacramento River, and Mokelumne River). General head boundary conditions, for each model node that it is defined, use a defined conductance and a reference groundwater level time series at a location outside the model domain with a known distance. The conductance values at the boundary condition nodes were calculated from the horizontal hydraulic conductivity, distance to the reference point, layer thickness, and the length of the boundary section represented by each node.

Groundwater level time-series data at a distance of approximately 3,000 feet from the boundary were extracted from the C2VSimFG model. The extracted values were compared with observed groundwater elevations from DWR's Water Data Library (WDL) and modified to better fit the observed elevations by trend and bias correction while protecting the spatial variation provided by C2VSimFG.

2.12.2 Small Watersheds

As discussed in the previous section, subsurface inflows and surface runoff contributions along the eastern boundary of model are represented using small watersheds.

2.12.3 Constrained Head

Additional boundary conditions were defined to simulate known water elevations for Camanche Reservoir. Seepage from Camanche Reservoir was represented by constrained head boundary conditions for the uppermost layer of the 228 groundwater nodes representing the reservoir elevations.

2.13 Initial Conditions

Groundwater heads for each model node and each layer at the beginning of the calibration simulation (October 1, 1989) were developed using DWR's WDL database. Over 815 wells with data were analyzed for use in building the initial groundwater heads. Due to the availability of data in different wells, a hierarchy of data was used to compile sufficient coverage over the model domain for development of initial conditions:

- Fall 1989 (August through October) where available
- Extended Fall 1989 (July through November)
- Surrounding years data, averaged (Fall 1988 or Fall 1990)
- Surrounding two years data, averaged (Fall 1987 or Fall 1991)
- Other timeframes were selected by examining hydrographs and groundwater level trends
- Where all above unavailable outside of the model boundary, depth to water was extrapolated

Observation data were interpolated to develop a raster representing initial groundwater levels over the model domain. Due to the lack of construction information for many of the WDL monitoring locations, the groundwater heads described above are used for all layers. The model "warm up" period from WY1989 to WY1994 allows the model time to equilibrate the groundwater conditions to smooth any issues that might arise from lack of data or erroneous data. The initial conditions for CoSANA representing October 1, 1989 are shown in Figure 2-40.

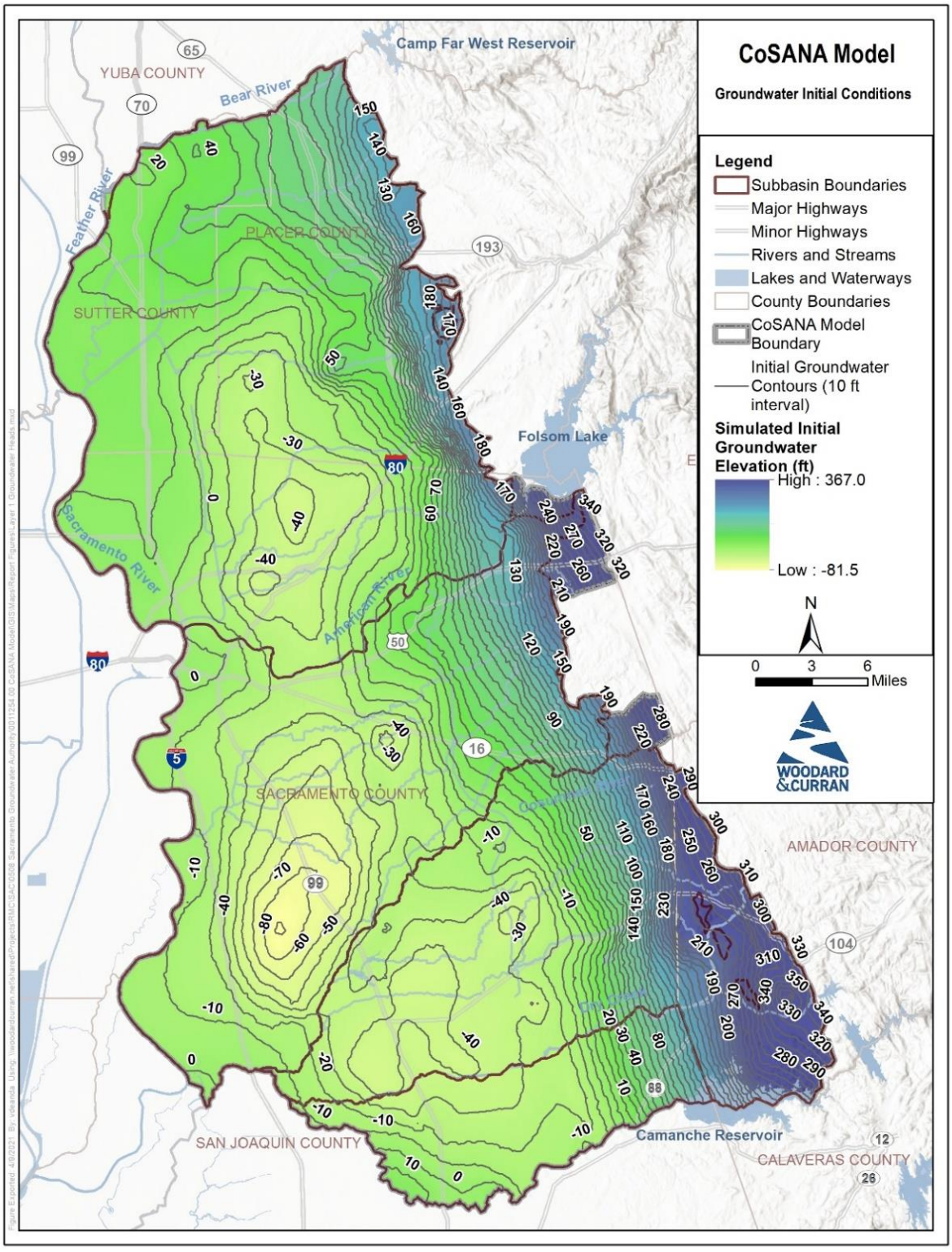


Figure 2-40: Initial Conditions, Groundwater Heads, Fall 1989

3. WATER SUPPLY AND DEMAND DATA

The following sections describe the data and methodology for developing CoSANA water demand and supply input data. Typically, agricultural and urban supplies are specified in IWFM's groundwater pumping and surface water diversion data, and agricultural and urban demands are calculated using the IWFM IDC. In the case of CoSANA, the urban demands for historical period were provided for each one of the urban water purveyors and were input in the model directly.

3.1 Water Supply

Both the agricultural demands estimated by IDC and the urban demands are primarily met through the IWFM representation of surface water diversions and groundwater pumping. Other sources of water simulated in IWFM to meet demand include recycled water, remediated (reuse) water, precipitation, and existing moisture in the soil.

3.1.1 Surface Water Supply

Historical surface water diversions for the simulation period were compiled from a combination of sources discussed in more detail in Sections 3.2 and 3.3, including gage data, water rights reports, Urban Water Management Plans (UWMPs), Agricultural Water Management Plans (AWMPs), and other sources. Some diversions were estimated based on historical demands. A summary of diversions simulated in the model is provided in Appendix A, along with the actual percentage of diverted water that is delivered after the delivery losses are accounted for. Delivery losses comprise recoverable losses (i.e., seepage along delivery and unlined canals) and non-recoverable losses (i.e., evaporation from canals).

Many diversions provide water across two or more model subregions, so deliveries are assigned to a group of elements representing the delivery area, rather than a subregion. Diversions are either assigned to a stream node near the point of diversion or they are treated as imports if the point of diversion is outside model area. Figure 3-1 to Figure 3-3 show schematic diagrams of the surface water delivery system simulated in CoSANA.

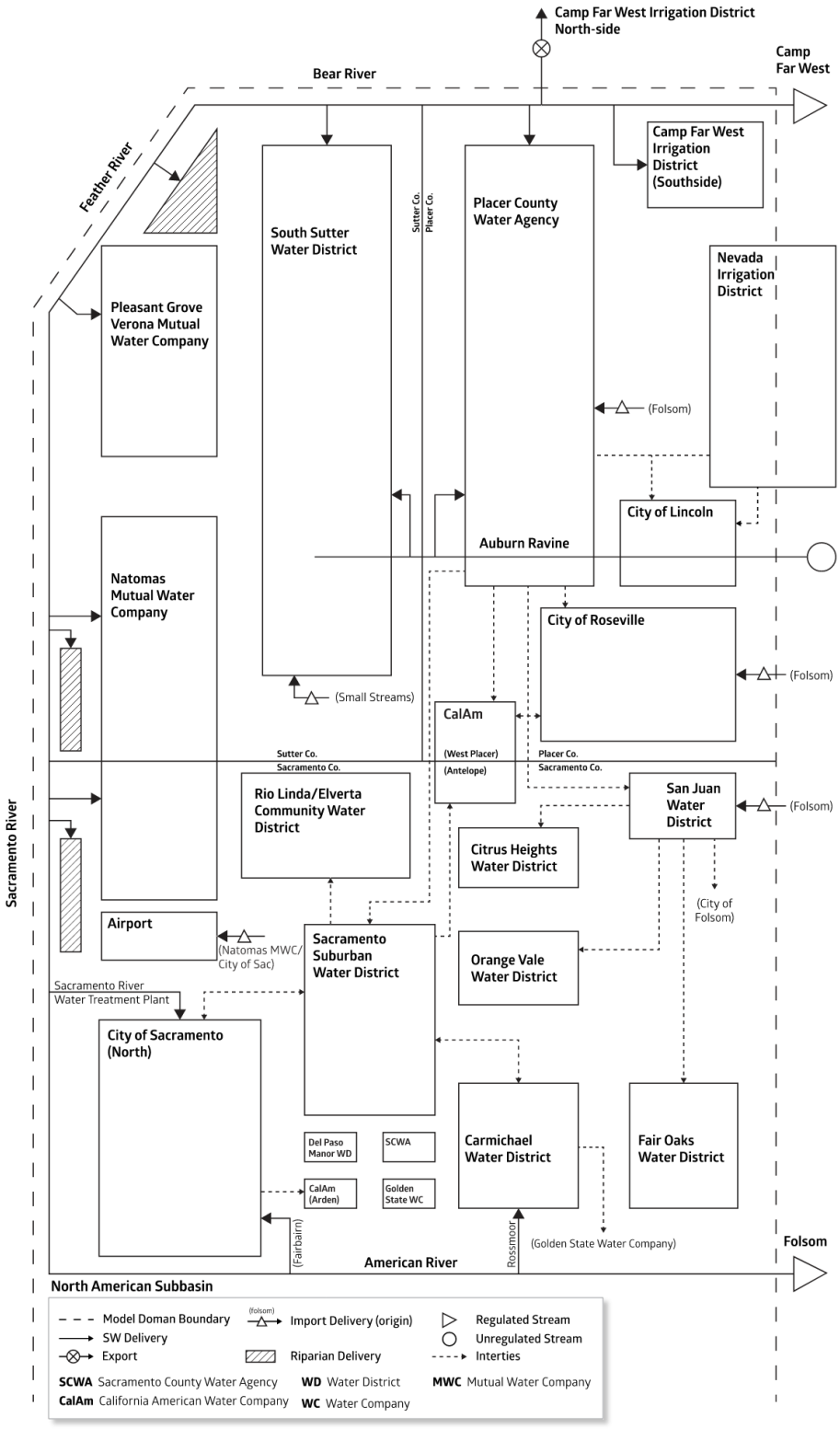


Figure 3-1: CoSANA NASb Surface Water Delivery Schematic

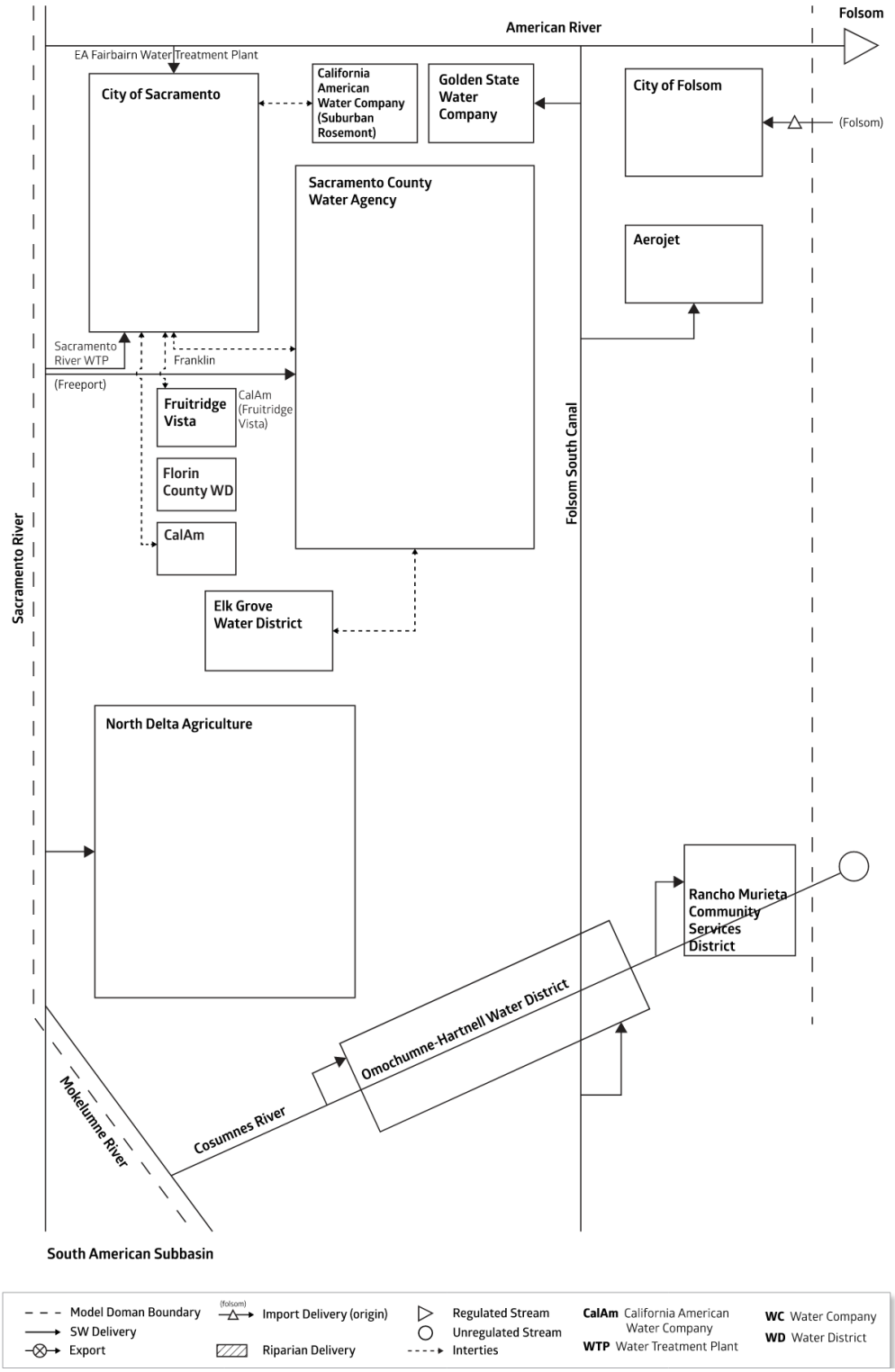


Figure 3-2: CoSANA SASb Surface Water Delivery Schematic

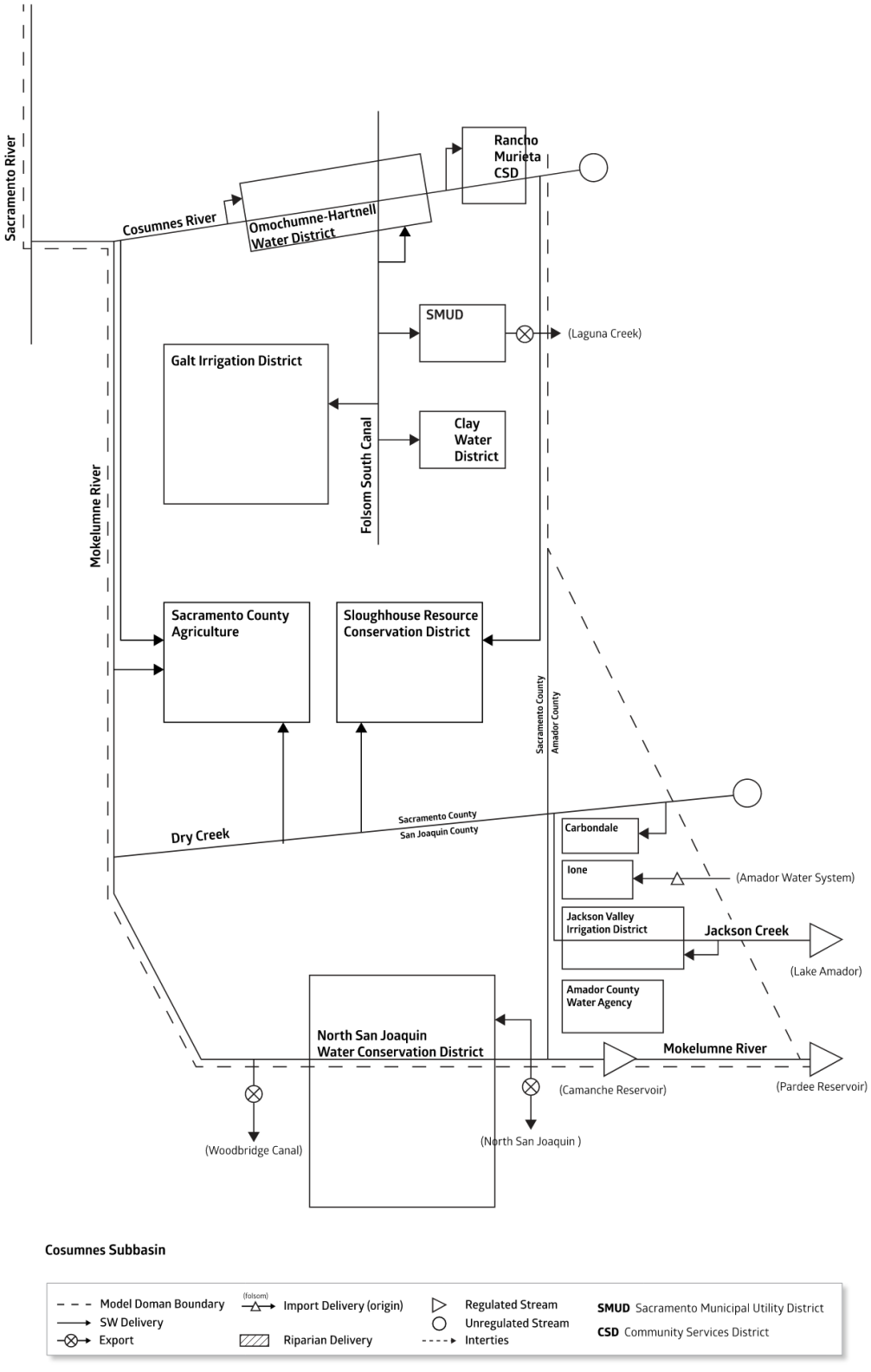


Figure 3-3: CoSANA CoSb Surface Water Delivery Schematic