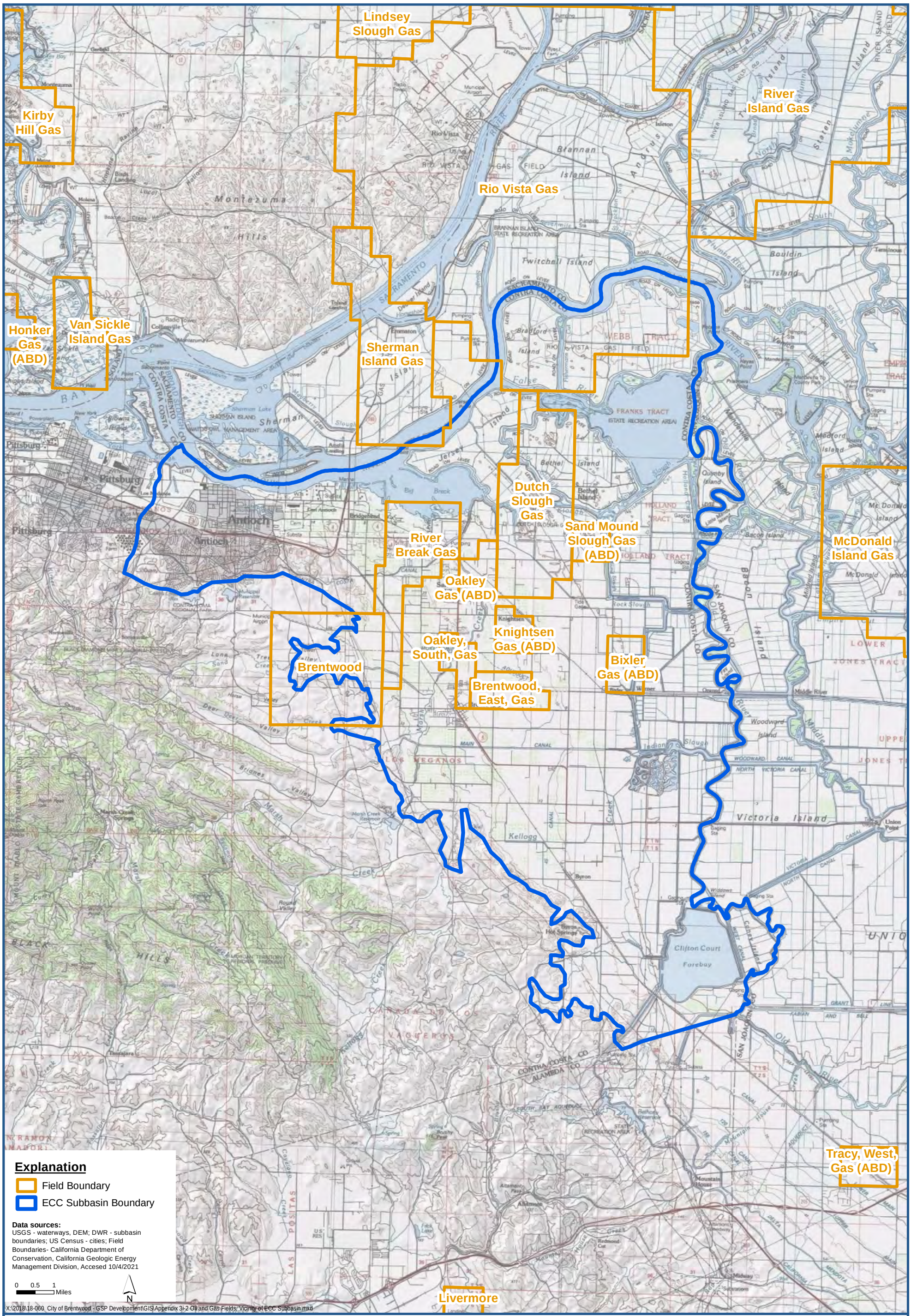

Luhdorff & Scalmanini Consulting Engineers

Oil and Gas Fields, Vicinity of ECC Subbasin

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Appendix 3i-2

APPENDIX 4a

Individual Surface Water Diversions: Point of Delivery Totals by Tract/Model Subregion and by Calendar Year

Appendix 1 Reported Individual Surface Water Diversions: Point of Delivery Totals by Tract/Model Subregion and by Calendar Year (AF, source eWRIMS), East Contra Costa Subbasin

Subregion Name	Antioch	Big Break	Oakley	Jersey Island	Bradford Island	Webb Tract	Franks Tract	Bethel Island	Holland Tract and Quimby Island (769 ac)	Knightsen (Veale Tract (1362) & Bixler (584))	Palm/ Orwood	Byron Tract (RD 800) (ac incl some TODB)	Clifton Court Forebay	Coney Island	South Clifton Court Forebay	Brent-wood	ECCID	Discovery Bay	BBID North	Total
Year/Sub-region Number	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	
2008	0	0	0	0	0	14,700	0	0	10,500	1,850	3,088	59,709	0	0	0	0	0	0	14	89,861
2009	0	0	0	12,862	0	14,700	0	0	10,500	1,550	38,350	61,774	0	0	2,908	0	0	0	12	142,655
2010	0	22	0	12,862	0	14,700	0	0	13,715	10,166	56,542	61,555	0	3,252	2,908	0	0	1,912	15	177,649
2011	0	18	0	12,862	0	14,700	0	0	13,715	11,741	57,963	59,963	0	3,324	2,908	0	0	1,885	12	179,091
2012	0	30	32	12,862	1	14,700	0	0	14,221	9,173	54,734	62,145	0	3,660	2,905	0	0	1,969	12	176,444
2013	0	0	0	25,531	0	14,700	0	2,273	20,400	10,248	55,869	54,214	0	4,722	5,816	0	0	2,084	18	195,874
2014	0	0	0	11,559	0	0	0	4,258	11,811	7,920	41,225	52,630	0	4,769	4,405	0	0	1,785	18	140,380
2015	0	0	0	11,197	0	1,821	0	2,278	11,211	6,263	37,307	44,702	0	3,687	2,647	0	0	1,605	0	122,719
2016	0	0	0	10,366	3	15,043	0	6,136	21,492	5,894	57,027	31,869	0	4,065	2,174	0	0	1,440	18	155,526
2017	0	0	0	13,074	3	15,624	0	5,192	17,631	5,991	40,982	37,824	0	5,150	3,285	0	0	1,153	2	145,912
2018	0	0	0	13,381	3	1,812	0	3,823	15,720	7,037	41,034	25,954	0	2,283	1,780	0	0	1,357	2	114,184
2019	0	0	0	12,422	3	15,658	0	2,174	23,708	6,563	37,254	30,309	0	4,345	3,409	0	0	1,329	11	137,186

Note: There may be errors to these data due to a reporting units problem (gallons vs acre-feet) or duplicate reporting (Michael George, Delta Watermaster, Delta Protection Commission meeting September 17, 2020).

APPENDIX 5a

Model Documentation

East Contra Costa Subbasin

Groundwater Sustainability Plan (GSP)

East Contra Costa Groundwater-Surface Water Simulation Model (ECCSim) Report

September 2021

Prepared by

Luhdorff & Scalmanini, Consulting Engineers

East Contra Costa Subbasin

Groundwater Sustainability Plan

East Contra Costa Groundwater-Surface Water Simulation Model (ECCSim) Report

September 2021

Prepared For

ECC Working Group

Prepared By

Luhdorff & Scalmanini,
Consulting Engineers

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LIST OF ABBREVIATIONS

3D	Three-Dimensional
AF	Acre-Feet
AN	Above Normal
BMP	Best Management Practice
BN	Below Normal
C	Critical
C2VSim	California Central Valley Groundwater-Surface Water Simulation Model
C2VSim-CG	California Central Valley Groundwater-Surface Water Simulation Model – Coarse Grid
C2VSim-FG Beta2	California Central Valley Groundwater-Surface Water Simulation Model – Fine Grid
CDEC	California Data Exchange Center
CIMIS	California Irrigation Management Information System
CVHM	Central Valley Hydrologic Model
CVP	Central Valley Project
CWD	Chowchilla Water District
D	Dry
DWR	California Department of Water Resources
ECCSim	East Contra Costa Groundwater-Surface Water Simulation Model
ET	Evapotranspiration
ET_a	Actual ET
ET_c	Crop ET
ET_o	Grass Reference ET
ET_r	Alfalfa Reference ET
ET_{ref}	Reference Crop Evapotranspiration
eWRIMS	SWRCB Electronic Water Rights Information Management System
ft/d	Feet Per Day
GDE	Groundwater Dependent Ecosystem
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWS	Groundwater System
HCM	Hydrogeologic Conceptual Model
IDC	Integrated Water Flow Model Demand Calculator
IWFM	Integrated Water Flow Model
Kh	Horizontal Hydraulic Conductivity
Kv	Vertical Hydraulic Conductivity
MA	Management Area
Model	Numerical Groundwater Flow Model
NOAA NCEI	National Oceanic and Atmospheric Administration National Centers for Environmental Information
NRCS	United States Department of Agriculture Natural Resources Conservation Service
PRISM	Parameter Elevation Regression on Independent Slopes Model
SGMA	Sustainable Groundwater Management Act of 2014

SS	Specific Storage
SWRCB	State Water Resources Control Board
SWS	Surface Water System
Sy	Specific Yield
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USGS	United States Geological Survey
W	Wet
WCR	Well Completion Report

1 INTRODUCTION

This report documents the development and calibration of the East Contra Costa Groundwater-Surface Water Simulation Model (ECCSim), a numerical groundwater flow model developed for the East Contra Costa Subbasin to support preparation of its Groundwater Sustainability Plan (GSP) along with other future potential groundwater management and planning needs. This report includes a summary of the model platform, data sources, model development and calibration, and calibration results.

1.1 Background

To support the preparation of the GSP for the East Contra Costa Subbasin, the Groundwater Sustainability Agencies (GSAs) in the Subbasin elected to pursue development of a numerical groundwater flow model to be able to satisfy GSP regulations requiring use of a numerical groundwater model, or equally effective approach, to evaluate projected water budget conditions and potential impacts to groundwater conditions and users from the implementation of the GSP. The development of ECCSim is intended to support groundwater resources management activities associated with GSP development and implementation. ECCSim utilizes data and the hydrogeologic conceptualization that are presented and described in the East Contra Costa Subbasin GSP to improve the understanding of hydrologic processes and their relationship to key sustainability metrics within the Subbasin. ECCSim provides a platform to evaluate potential outcomes and impacts from future management actions, projects, and adaptive management strategies through predictive modeling scenarios.

1.2 Objectives and Approach

Numerical groundwater models are structured tools developed to represent the physical basin setting and simulate groundwater flow processes by integrating a multitude of data (e.g., lithology, groundwater levels, surface water features, groundwater pumping, etc.) that compose the conceptualization of the natural geologic and hydrogeologic environment. ECCSim was developed in a manner consistent with the Modeling Best Management Practices (BMP) guidance document prepared by the California Department of Water Resources (DWR) (DWR, 2016). The objective of ECCSim is to simulate hydrologic processes and effectively estimate historical and projected future hydrologic conditions in the Subbasin related to groundwater dependent ecosystems (GDEs) and SGMA sustainability indicators relevant to the Subbasin including:

1. Lowering of Groundwater Levels
2. Reduction of Groundwater Storage
3. Depletion of Interconnected Surface Water
4. Water-Quality Degradation

The development of ECCSim involved starting with and evaluating the beta version (released 5/1/2018) of DWR's fine-grid version of the California Central Valley Groundwater-Surface Water Flow Model (C2VSim-FG Beta2) and eventually carving out a local model domain and conducting local refinements to the model structure (e.g., nodes, elements) and modifying or replacing inputs as needed to sufficiently and accurately simulate local conditions in the Subbasin within the model domain. C2VSim-FG Beta2 utilizes the most current version of the Integrated Water Flow Model (IWFM) code available at the time of the ECCSim development. IWFM and C2VSim-FG Beta2 were selected as the modeling platform due to the versatility in simulating crop-water demands in the predominantly agricultural setting of the subbasins, groundwater surface-water interaction, the existing hydrologic inputs existing in the model for the time period through the end of water year 2015, and the ability to customize the existing C2VSim-FG Beta2 model to be more representative of local conditions in the area of the East Contra Costa Subbasin. ECCSim was refined from C2VSim-FG Beta2 and calibrated to a diverse set of available historical data using industry standard techniques.

1.3 Report Organization

This report is organized into the following sections:

- Section 2: Model Code and Platform
- Section 3: Groundwater Flow Model Development
- Section 4: Groundwater Flow Model Results
- Section 5: Model Uncertainty and Limitations
- Section 6: Conclusions and Recommendations
- Section 7: References

2 MODEL CODE AND PLATFORM

The modeling code and platform utilized for ECCSim are described below. As required by GSP regulations, the selected model code is in the public domain. The decision to select the model codes for the ECCSim was based on providing the Subbasin with a modeling tool that can be used for GSP development with sufficient representation of local conditions, while utilizing to the extent possible, previous modeling tools available, including regional models. With this objective in mind, the model tools and platforms described below were determined to be most suitable for adaptation for use in GSP analyses.

2.1 Integrated Water Flow Model

IWFM is a quasi three-dimensional finite element modeling software that simulates groundwater, surface water, groundwater-surface water interaction, as well as other components of the hydrologic system (Dogrul et al., 2017). ECCSim is developed using the IWFM Version 2015 (IWFM-2015) code, which couples a three-dimensional finite element groundwater simulation process with one-dimensional land surface, river, lake, unsaturated zone and small-stream watershed processes (Brush et al., 2016). A key feature of IWFM-2015 is its capability to simulate the water demand as a function of different land use and crop types, and compare it to the historical or projected amount of water supply (Dogrul et al., 2017). IWFM uses a model layering structure in which model layers represent aquifer zones that are assigned aquifer properties relating to both horizontal and vertical groundwater movement (e.g., horizontal and vertical hydraulic conductivity) and storage characteristics (e.g., specific yield, specific storage) with the option to associate an aquitard to each layer, although represented aquitards are assigned a more limited set of properties relating primarily to their role in vertical flow (e.g., vertical hydraulic conductivity).

The IWFM-2015 source code and additional information and documentation relating to the IWFM-2015 code is available from DWR at the link below:

http://baydeltaoffice.water.ca.gov/modeling/hydrology/IWFM/IWFM-2015/v2015_0_630/index_v2015_0_630.cfm

2.1.1 IWFM Demand Calculator

IWFM includes a stand-alone Integrated Water Flow Model Demand Calculator (IDC) that calculates water demands. Agricultural water demands are calculated in IDC based on climate, land use, soil properties, and irrigation method whereas urban demands are calculated based on population and per-capita water use. ECCSim utilizes IDC to simulate root zone processes and water demands. The physically based IDC version 2015.0.0036 (DWR, 2015) is developed and maintained by DWR.

2.2 C2VSim-Fine Grid

The C2VSim-FG Beta2 model utilizes the IWFM-2015 code and represents a refinement of the previous C2VSim-Coarse Grid (C2VSim-CG) model. Refinements made in the development of C2VSim-FG Beta2 include a finer horizontal discretization, an updated aquifer layering scheme, updated precipitation data,

and an extended simulation period through water year 2015 (DWR, 2018). C2VSim-CG had an average element size of approximately 15 square miles and the average element size for C2VSimFG Beta2 is about 0.6 square miles. The C2VSimFG Beta2 version available from DWR at the time of the initiation of modeling efforts to support GSP preparation for East Contra Costa, was not a calibrated model version. DWR published a calibrated version of the fine grid model on Tuesday December 8th 2020.

3 GROUNDWATER FLOW MODEL DEVELOPMENT

This section describes the spatial and temporal (time-series) structure of the model and the input data that was utilized for model development. The model development process utilized data and information that was available at the time of model development.

3.1 ECCSim – Historical Model

The ECCSim historical model simulates the period from October 1993 through September 2018 at a monthly time step, with a calibration period of October 1996 through September 2018. Annual model time periods are based on water years defined as October 1 through September 30. The historical calibration model period extends from water years 1997 through 2018. Water years 1994 through 1996 are not included as part of the historical calibration period, but are simulated to allow the model some time to adjust to the specified initial conditions and spin-up prior to the calibration period starting in October 1996.

3.1.1 Model Grid

Although ECCSim focuses on the East Contra Costa Subbasin, the model domain was extended outside the subbasin to incorporate a buffer zone including areas within the Tracy, Eastern San Joaquin, and Solano Subbasins and the Pittsburg Plain Basin. The extent of the buffer zone was determined based on the geometry of delta islands, surface water features, the anticipated impact of groundwater pumping, and jurisdictional boundaries. The ECCSim domain, shown in **Figure 3-1**, encompasses a total of 207,714 acres. All C2VSim-FG Beta2 model features (e.g., nodes, elements, streams, layers) within this domain were initially considered for adoption in the development of the ECCSim structure, but subsequent modifications and refinements made within ECCSim to these model components were made and are described in this report.

3.1.1.1 Nodes and Elements

The ECCSim grid contains 1,097 nodes and 1,209 elements (**Figure 3-1**). The X-Y coordinates for node locations are presented in the UTM Zone 10N, NAD83 (meters) projected coordinate system. The number of nodes and elements within the ECCSim domain were altered from C2VSim-FG Beta2, the spacing and alignment of nodes and elements were constructed for ECCSim to more accurately align with the GSA boundaries, delta island geometry, and surface water features. **Figure 3-2** shows the difference between C2VSim-FG Beta 2 and modified nodes and elements in ECCSim. **Table 3-1** presents ECCSim grid characteristics.

Table 3-1. ECCSim Grid Characteristics.

Nodes	1,097
Elements	1,209
Average Element Size (acres)	172
Minimum Element Size (acres)	0.005
Maximum Element Size (acres)	1,252
Subregions	34
Aquifer Layers	4

3.1.1.2 Subregions

Model elements are grouped into subregions to assist in the summarization of model results and development of water budgets. ECCSim includes 34 subregions (listed in **Table 3-2**). The East Contra Costa Subbasin is divided into 19 water balance subregions. Subregions were delineated by subbasin, and also by GSA and area within the Subbasin. While subregions are used as the basis for summarizing model results, the model simulates hydrologic processes and conditions at the resolution of elements or nodes. **Figure 3-3** shows the delineation of subregions included within ECCSim.

Table 3-2. Model Subregions within ECCSim.

Subregion	Subbasin/Basin	GSA	Area
1	East Contra Costa	City of Antioch GSA	Antioch
2	East Contra Costa	Diablo Water District GSA	Big Break
3			Oakley
4	East Contra Costa	County of Contra Costa GSA	Jersey Island
5			Bradford Island
6			Webb Tract
7			Franks Tract
8			Bethel Island
9			Holland Tract
10			Knightsen
11			Orwood
12			South Discovery Bay
13			Clifton Court Forebay
14			Coney Island
15			South Clifton Court Forebay
16	East Contra Costa	City of Brentwood GSA	Brentwood
17	East Contra Costa	East Contra Costa Irrigation District GSA	ECCID
18	East Contra Costa	Discovery Bay Community Services District GSA	Town of Discovery Bay
19	East Contra Costa	Byron-Bethany Irrigation District GSA – East Contra Costa	BBID North (Byron Division)
20	Tracy	Byron-Bethany Irrigation District GSA - Tracy	BBID South (Bethany Division)
21			BBID Mountain House Division
22	Tracy	County of San Joaquin GSA – Tracy	Hammer Island
23			Union Island
24			Victoria Island
25			Woodward Island
26			Bacon Island
27			Mandeville Island
28	Eastern San Joaquin	Central Delta Water Agency GSA	Venice Island

Subregion	Subbasin/Basin	GSA	Area
29			Bouldin Island
30	Solano	Reclamation District No. 317 GSA	Andrus Island
31	Solano	County of Sacramento GSA - Solano	Twitchell Island
32			Sherman Island
33			Kimball Island
34	Pittsburg Plain	Not Applicable	Pittsburg

3.1.1.3 Surface Water Bodies

ECCSim simulates surface water bodies including: Marsh Creek, Old River, Middle River, San Joaquin River, Big Break, Franks Tract, and Clifton Court Forebay. Surface water bodies simulated in C2VSimFG Beta2 only include the San Joaquin River, which was deemed insufficient for purposes of this GSP, so the ECCSim was developed to include these other afore-mentioned surface water bodies. The surface water bodies included in ECCSim are shown in **Figure 3-4**.

3.1.1.4 Model Layers

The C2VSim-FG Beta2 model layering was adapted for ECCSim purposes to better represent the hydrogeological conceptual model (HCM) of the aquifer system through model layering. Within the ECCSim domain, C2VSim-FG Beta2 delineates three aquifer layers; ECCSim was refined to include four aquifer layers corresponding with key hydrogeologic features identified in the Hydrogeologic Conceptual Model (HCM) for the Subbasin. The aquifer system within ECCSim is broken down into the Shallow Aquifer (layers 1 and 2) and the Deep Aquifer (layers 3 and 4).

Using the HCM shallow and deep aquifer zones, the shallow zone is divided into two layers using CVHM's bottom of layer 1. CVHM's layer 2 is very similar to the HCM's delineation of the vertical boundary between the shallow and deep aquifer zones. Since according to the HCM, most of the wells in ECC are completed in the shallow zone, the deep aquifer zone is split into two model layers to account for deeper production and/or public supply wells that extend past the base of the shallow aquifer zone. Generally, layer thicknesses increase to the east. A summary of the model layering is stated below:

- Top of Layer 1: Land Surface
- Bottom of Layer 1: based on CVHM's bottom of layer 1, 50 feet below ground surface
- Bottom of Layer 2: based on our HCM Zone 1 and 2 Boundary
- Bottom of Layer 3: based on the bottom of the max depths of Production and Public Wells and to the east of the ECC Subbasin, consistent with C2VSimFG-Beta2 bottom of model layers 2 and 3
- Bottom of Layer 4: based on the base of freshwater from HCM, considering C2VSimFG and CVHM's base of model

Elevations and thicknesses of ECCSim aquifer and aquitard layers are shown in **Figures 3-5** through **3-13**.

3.1.2 Land Surface System

The IWFM Land Surface Process, which includes the IDC, calculates a water budget for four land use categories: 1) non-ponded agricultural crops, 2) ponded agricultural crops (i.e., rice), 3) native and riparian vegetation, and 4) urban areas. The Land Surface Process calculates water demand at the surface, allocates water to meet demands, and routes excess water through the root zone (Brush et al., 2016). The development of land surface system input files is explained in this section.

3.1.2.1 Precipitation

Monthly precipitation time series data for water years 1922 through 2015 were extracted from C2VSim-FG Beta2. Precipitation rates were extracted for all elements and small watersheds included within the ECCSim model domain. Precipitation data within both C2VSim-FG Beta2 and ECCSim is based on Parameter Elevation Regression on Independent Slopes Model (PRISM) by the PRISM Climate Group at Oregon State University. Similar water year types and total annual precipitation for water years 2016-2018 were identified in previous years to bring the model's precipitation data up to date.

3.1.2.2 Evapotranspiration

Monthly evapotranspiration (ET) time series data was extracted from C2VSim-FG Beta2 for water years 1922 through 2015. Evapotranspiration rates for each agricultural crop, urban outdoors, native vegetation, and bare soil was developed for each Subbasin in C2VSim-FG and for each small watershed. The same water years were repeated as used above for precipitation, based on water year types and annual precipitation, to fill in the ECCSim's missing years' data between water years 2016-2018. Adjustments to a subset of ET values were made in order to better match actual agricultural demand, as needed.

3.1.2.3 Land Use

Land use work involves using land use surveys from 1995, 2014, and 2016 (DWR) to calculate the acreage of land use categories. To be consistent with C2VSim-FG land use parameters, a total of 24 land use groups were spatially joined to the ECCSim model elements. Most of the land use type categories are for irrigated agriculture (non-ponded crops including corn, pasture, grain, etc.), and the remaining categories cover ponded crops (like rice), native and riparian vegetation, and urban land use. To support water budget development for each land use group, the DWR Integrated Water Flow Model Demand Calculator (IDC) was employed using ECCSIM-updated land use and spatially joined ET and root zone input data from C2VSimFG. The IDC was used for the development of root zone and land and water use budget components on a monthly basis for use with the other flow components of IWFM.

3.1.3 Surface Water System

Due to the complexity of the surface water system in the ECCSim model domain, several approaches were employed to simulate the movement of surface water. The ECCSim model advances the representation of surface water bodies compared to C2VSim and C2VSimFG because the latter only simulated the San Joaquin River. ECCSim includes Marsh Creek, Old River, Middle River, San Joaquin River, Big Break, Franks Tract, Clifton Court Forebay, and the Delta into the simulated surface water system. **Figure 3-14** shows the simulated surface water features in the ECCSim model.

3.1.3.1 Stream Package

The only surface water body that utilizes the stream package in IWFM is Marsh Creek. Marsh Creek is simulated with stream bed parameters estimated from elevation maps, soil properties, and stream characteristics. Rating curves for Marsh creek were developed using stage and gage data. Stream bed parameters, particularly stream bed conductivity and wetted perimeter, were further refined during the calibration process. Stream inflows for Marsh Creek were estimated based on stream gage data from USGS Station 11337600 (Marsh Creek at Brentwood, CA) and California Data Exchange Center's MDA Station (Marsh Creek at Dainty Ave).

3.1.3.2 General Head Surface Water Features

Due to the nature of the engineering, controlled flows, and tidal influence of other surface water bodies in the model domain, the Middle River, San Joaquin River, Old River, Clifton Court Forebay, Franks Tract, and the Delta are simulated using general head boundaries. Similar to the simulation of the Delta in CVHM, general head boundaries were used along these surface water features. The elevations used for the general head inputs along these surface water features were based on stage data and interpolated stages between gaging stations. Stations used for analysis and estimation of the time-series stage (general head) values for nodes along rivers in ECCSim included: Venice Island, Three Mile Slough at San Joaquin River, San Joaquin River at Jersey Point (USGS), San Joaquin River at Antioch, Collinsville on Sacramento River, Middle River at Howard Road Bridge, Middle River at Tracy Blvd, Middle River Above Barrier, Middle River at Union Point, Jones Tract, Middle River at Bacon Island Rd, Old River at Quimbly Island Near Bethel Island, Old River at Coney Island, Old River at Clifton Court Intake, Old River at Delta Mendota Canal, Old River Near Tracy, and San Joaquin River at Prisoners Point Near Termino.

3.1.3.3 Surface Water Diversions and Deliveries

Surface water diversions and deliveries are simulated in the model as diversions from a stream node with an assigned delivery destination (water balance subregion). Diversion amounts are based on data received from individual GSA entities, as well as the State Water Resources Control Board Electronic Water Rights Information Management System (eWRIMS) database.

Losses associated with surface water deliveries are defined as fractions of each surface water diversion within the model domain and remain constant throughout the simulation period. Recoverable losses occur as seepage of water from the delivery system prior to arrival at the delivery destination. Accordingly, the fraction of recoverable loss represents water that recharges from conveyance losses associated with surface water deliveries. Non-recoverable losses occur from evapotranspiration associated with surface water deliveries. The fraction of non-recoverable loss represents water that does not recharge. The remaining percentage of surface water diversions (after subtraction of recoverable and non-recoverable losses) is considered the delivery fraction. The recoverable loss and non-recoverable loss fractions used in the model were determined based on C2VSim-FG values for diversions in the East Contra Costa and Tracy Subbasins.

In ECCSim, surface water diversions are assigned to water balance subregions for water delivery. A total of 86 unique entities that have surface water points of diversion data from eWRIMS were compiled for monthly delivery amounts during the model simulation period. The surface water delivery points of diversion were grouped according to water balance subregion, and combined with GSA-reported purchased water, recycled water, and other surface water sources to provide the water supply for each water balance subregion (groundwater pumping provides the remainder of the water demand, both as reported by GSA entity and estimated for private pumpers). **Figure 3-15** shows the locations of historical surface water diversions.

3.1.4 Groundwater System

The IFWM Groundwater Flow Process balances subsurface inflows and outflows and manages groundwater storage within each element and layer (Brush et al., 2016). The development of groundwater system input files is explained in this section.

3.1.4.1 Aquifer Parameters

Initial aquifer parameters were adopted from C2VSim-FG Beta2 and compared to both C2VSim-CG, CVHM values, and qualitatively to the HCM descriptions for appropriateness. Aquifer parameters in ECCSim are

assigned to each node for each model layer, and were developed to represent subsurface hydrogeologic characteristics. Aquifer parameters were calibrated in groups based on depositional environment for regions that needed adjustment. Depositional environments included Alluvial Plain, Delta Islands, Fluvial Plain, and Marginal Delta Dune as described in the GSP Basin Settings section.

3.1.4.2 Model Boundary Conditions

ECCSim utilizes a combination of no-flow boundaries and general head boundary conditions along the model domain's boundary. No-flow boundaries occur along the western border, and general head boundaries occur along the north, east, and southern model boundaries. General head boundary conductance was determined at each boundary node by layer. Conductance was calculated in each layer based on Kh, distance between boundary nodes, aquifer layer thickness, and the distance from the model boundary (set as 1,000-ft). Transient historical water level boundary conditions were developed using interpreted groundwater elevations from C2VSimFG Beta2. Groundwater elevations from C2VSimFG output over time were assigned to the appropriate corresponding ECCSim layer and node on the northern, eastern, and southern sides of the model domain. Similar water years were repeated as was done for the precipitation and ET records to bring the model forward.

3.1.4.3 Groundwater Pumping

Pumping within ECCSim is simulated using a combination of individual wells and elemental pumping. Elemental pumping is calculated internally by the IDC to meet both agricultural and domestic/urban demands after available surface water deliveries have been accounted for. The vertical distribution of pumping by layer in ECCSim was modified based on review of well construction information in DWR's database of Well Completion Reports (WCR) for wells within the model domain. Agricultural and domestic/urban pumping were distributed vertically based on well construction information data in DWR's WCR database for respective well types. Individual municipal wells for which GSAs provided monthly pumping records for were simulated directly.

3.1.4.4 Tile Drains

Tile drains were incorporated in ECCSim where historic drain maps or direct information from GSAs suggest their location. **Figure 3-16** shows the area of drains simulated within the model domain. Information from GSAs supported an estimated depth of either 5 or 8 feet below land surface as the depth of the drains.

3.1.5 Small Watersheds

A total of 22 small watersheds were included in ECCSim from C2VSim-FG Beta2 (**Figure 3-17**). **Table 3-3** summarizes the contributions of small watersheds to modeled streams. Minor modifications were made to C2VSim-FG Beta2 small watersheds to properly route water to the water balance subregions in ECCSim by making minor edits to the contributing acreage of small watersheds to better align with model elements along the western boundary.

Table 3-3. Summary of Small Watersheds.

Water Balance Subregion Fed by Small Watersheds	Count of Contributing Watersheds	Total Contributing Watershed Acreage
34	5	6,732
1	5	6,631
16	3	12,994
17	1	17,599
19	4	15,782
20	3	16,336
21	1	2,791
TOTAL	**22**	**78,865**

3.1.6 Initial Conditions

Initial conditions for ECCSim were generated from simulated output from C2VSimCG and the C2VSim-FGC2VSim-FG Beta2 regional models for October 1993 in conjunction with mapped groundwater conditions based on observed groundwater levels and contour interpretation. ECCSim initial Conditions for the unsaturated zone and small watersheds were defined from simulated C2VSim-FGC2VSim-FG Beta2 conditions. Initial water level conditions used in the historical ECCSim runs are shown in **Figures 3-18** through **3-21**.

3.2 Model Calibration

ECCSim was calibrated through a process of trial and error. The calibration procedure focused on adjusting key model parameter values to improve the fit of simulated data to observed data. The key model parameters included in calibration were aquifer properties and conductance terms associated with surface water features. Aquifer parameters adjusted during calibration included Kh, Kv, Ss, and Sy, which were adjusted from original C2VSimFG aquifer parameters based on depositional environment. Conductance terms associated with streambed properties and simulated surface water features using general head conditions were adjusted during the calibration period to help match shallow groundwater levels in certain areas. Drain elevations were also adjusted in some areas where there was uncertainty about the actual drain elevations and the shallow groundwater levels were not matching observed groundwater levels well. Model results were compared to observed groundwater levels. Observations used to constrain aquifer parameter values included over 3,000 groundwater level observations from 32 wells (**Figure 3-22**).

3.3 ECCSim – Projected Model

ECCSim was used to simulate projected future scenarios including under expected changes in urban growth (land use), and anticipated climate change and sea level rise (hydrology). The projected simulation period runs from WY 2019 through 2068 beginning on October 1, 2018 and ending September 30, 2068, at a monthly time step. The development of the projected future scenarios in ECCSim is described in this section.

3.3.1 Projected Hydrology

Future hydrology model inputs were projected into the future based on adjustments provided by DWR's Guidance for Climate Change Data Use During Groundwater Sustainability Plan Development document[1]. DWR provides climate change adjustment values for climate data, streamflow data, and sea-level rise information. These adjustments are applied to historical hydrology to achieve a future hydrologic period of 50 years that are representative of hydrology potentially occurring in the future. DWR summarizes the various model outputs and respective timelines, which is repeated in **Table 3-4**. The most recent fifty-year period of common simulation periods is 1954-2003. Therefore, this historic period was selected to perform the adjustments for developing the future scenario hydrology inputs.

Table 3-4. Model Data Outputs and Related Simulation Periods.

Model	Output Data	Simulation Period
VIC	Precipitation, Reference ET, Unimpaired flows	1915-2011
CalSim II	Reservoir outflows, river flows, diversions, deliveries	1921-2003
Common Simulation Period for Models at 2030 and at 2070		1921-2003 (82 years of projected hydrology)

In terms of sea-level rise, DWR's Guidance Document mentions that sea-level rise estimates by the National Research Council (NRC) provide two values of expected sea-level rise as median predicted values for the years 2030 and 2070. These two values are 15 and 45 centimeters, respectively, which translates to about 0.5 to 1.4 feet of sea-level rise. In order to be conservative, the ECCSim's future scenario will apply these values to the general head values associated with the Delta according to the incremental changes estimated between the simulated future time frame of 2019 to 2068 as specified in **Table 3-5**.

[1] https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Climate-Change-Guidance_Final_ay_19.pdf (accessed 12/10/2020)

Table 3-5. Incremental Projected Sea Level Rise Amounts (2019-2068).

Projected Water Year	Projected Sea-Level Rise Incremental Adjustment (ft)	Projected Water Year	Projected Sea-Level Rise Incremental Adjustment (ft)	Projected Water Year	Projected Sea-Level Rise Incremental Adjustment (ft)
2019	0	2036	0.65	2053	1.075
2020	0.0455	2037	0.675	2054	1.1
2021	0.091	2038	0.7	2055	1.125
2022	0.136	2039	0.725	2056	1.15
2023	0.182	2040	0.75	2057	1.175
2024	0.227	2041	0.775	2058	1.2
2025	0.273	2042	0.8	2059	1.225
2026	0.318	2043	0.825	2060	1.25
2027	0.364	2044	0.85	2061	1.275
2028	0.409	2045	0.875	2062	1.3
2029	0.455	2046	0.9	2063	1.325
2030	**0.5**	2047	0.925	2064	1.35
2031	0.525	2048	0.95	2065	1.375
2032	0.55	2049	0.975	2066	1.4
2033	0.575	2050	1	2067	1.425
2034	0.6	2051	1.025	2068	1.45
2035	0.625	2052	1.05		

3.3.2 Projected Land Use Changes

Urban growth is the main change expected to occur in terms of land use for the future fifty-year time period. Urban growth is expected to change in the Contra Costa County area within the model domain. The projected change in urban acres is provided in **Table 3-6**.

Table 3-6. Projected Change in Urban Areas

Area	2016 Urban Area	Projected 2026 Urban Area
ECC Subbasin	22,596	41,630
Entire Model Domain	30,712	52,593

3.3.3 Projected Future Scenarios

Five projected future scenarios were simulated to compare possible outcomes. These scenarios include: 1) a Projected Land Use Change scenario; 2) a Projected Land Use Change with Increased Pumping (Sustainable Yield Run); 3) a Projected Land Use Change with Climate Change scenario(s); 4) a Projected Land Use Change with Sea Level Change scenario; and 5) a Projected Land Use Change with Climate Change and Sea Level Change scenario. The projected scenarios with climate change incorporate the 2030 mean climate change scenario adjustment for precipitation, ET, stream inflows, and surface water diversion volumes. Future wet and dry climate change scenarios were also evaluated. The projected scenario with sea-level change uses a ramping up of sea level rise from 0.5 feet in 2030 to 1.5 feet in 2070. All other model inputs are held constant across projected future scenarios.

The Projected Land Use Change scenario was chosen as the baseline future projected scenario. The Projected Land Use with Climate Change(s), Projected Land Use Change with Sea Level Rise, and Projected Land Use Change with Climate Change and Sea Level Rise model runs were chosen as sensitivity analysis scenarios. The Projected Land Use Change with Increased Pumping scenario is an attempt to determine the sustainable yield for the East Contra Costa Subbasin, to determine what the sustainable yield of the subbasin might be. **Table 3-7** summarizes the differences between each projected future scenario.

Table 3-7. Summary of Projected Future Scenarios.

Scenario Conditions	Projected Land Use Change	Projected Land Use Change with Increased Pumping (Sustainable Yield Run)	Projected Land Use Change with Climate Change	Projected Land Use Change with Sea Level Rise	Projected Land Use Change with Climate Change and Sea Level Rise
Change in Land Use (Urban Growth)	x	x	x	x	x
Climate Change Adjustment			x		x
Sea Level Rise				x	x
Increased Groundwater Pumping (reducing Surface Water Deliveries)		x			

3.3.4 Land Surface System

The development of land surface system datasets for projected future scenarios is described below.

3.3.4.1 Precipitation

The precipitation amount in each future year was assumed to be equal to the amount in the historical period from 1954-2003. For scenarios with climate change adjustments, the historical precipitation amount was adjusted by using the DWR 2070 median tendency, 2070 wet, and 2070 dry climate change scenario monthly multipliers. Additional information about the development of projected precipitation rates is included in **Table 3-8**.

Table 3-8. Development of Projected Future Land Surface Process Components.

Water Budget Component	Without Climate Change Adjustments (2019-2068)	With Climate Change Adjustments (2019-2068)
Precipitation	1954-2003 repeat historical data	1954-2003 historical data adjusted by DWR 2030 central tendency, 2070 wet, and 2070 dry monthly change factors
Evapotranspiration	1954-2003 repeat historical data, assuming land use adjusted for projected urban area growth from 2019-2068	1954-2003 historical data adjusted by DWR 2030 central tendency, 2070 wet, and 2070 dry monthly change factors, assuming land use adjusted for projected urban area growth from 2019-2068

3.3.4.2 Evapotranspiration

Evapotranspiration rates were also projected into the future based on historical data from 1954-2003 and projected changes in land use (described in Section 3.3.3.3). Additional information about the development of projected ET rates is included in **Table 3-8**.

3.3.4.3 Land Use

Projected Land Use Change Scenarios

Except in areas with urban growth, projected land use acreage in future scenarios was based on 2016 land use from DWR Land Use surveys. In areas with urban growth, agricultural acreage decreases over time with urban expansion in the vicinity of existing urban areas. **Table 3-6** describes the changes in urban areas for the subbasin and the model domain.

3.3.5 Surface Water System

The development of surface water system datasets for projected future scenarios is described below.

3.3.5.1 Surface Water Features

Stream inflow volumes and other surface water feature inputs were projected into the future based on historical data from the base period as it corresponds to the projected water year based on water year type. For scenarios with climate change, a climate change adjustment was incorporated into the projections. Additional information about the development of projected stream inflows is included in **Table 3-9**.

Table 3-9. Development of Projected Future Surface Water System Components.

Water Budget Component	Without Climate Change Adjustments (2019-2068)	With Climate Change Adjustments (2019-2068)	With Sea Level Rise Adjustments (2019-2068)
Surface Water Inflow - Unimpaired Streams (Marsh Creek)	1954-2003 repeat historical data	1954-2003 historical data adjusted by DWR 2030 central tendency monthly change factors; 2070 wet and 2070 dry monthly change factors were also incorporated	1954-2003 repeat historical data
Surface Water Delta Features	1954-2003 repeat historical data	1954-2003 repeat historical data	Incremental increase in delta heads based on 2030 and 2070 sea level rises (15 and 45 cm)
Surface Water General Head Boundaries (Middle River, Old River, San Joaquin River)	1954-2003 repeat historical data	1954-2003 historical data adjusted by DWR 2030 monthly change factors; 2070 wet and 2070 dry monthly change factors were also incorporated	1954-2003 repeat historical data
Surface Water General Head Boundaries (Franks Tract & Clifton Court Forebay)	1954-2003 repeat historical data	1954-2003 repeat historical data	1954-2003 repeat historical data
Drains*	Repeat historical data	Repeat historical data	Repeat historical data
Diversions*	1954-2003 repeat historical data	1954-2003 historical data adjusted by DWR 2030 monthly change factors; 2070 wet and 2070 dry monthly change factors were also incorporated	1954-2003 repeat historical data

*Drains and diversions adjust according to urban growth – drains are removed if urban area extends into drain areas, and diversion amounts increase for urban municipal demand and decrease for removal of agricultural lands as a result of urban growth.

3.3.6 Groundwater System

The development of groundwater system datasets for projected future scenarios is described below.

3.3.6.1 Boundary Conditions

Model boundary general head boundary conditions were developed for use in evaluating potential future conditions in the projected future scenarios. This was completed by matching water year types from the base period of 1997-2018 to the fifty-year period of 1954-2003.

3.3.6.2 Groundwater Pumping

The pumping specifications used for the historical simulation period were retained for the duration of all projected simulations (2019-2068), with the exceptions of the following areas:

- Urban areas that rely of groundwater increase municipal pumping according to population growth
- Removal of agricultural areas that rely on groundwater due to urban growth results in a decrease in agricultural pumping

3.3.6.3 Sustainable Yield Run

The future scenario in which ECCSim is used to estimate the sustainable yield attempts to stress the subbasin at levels not previously experienced. Surface water deliveries were reduced by specified percentages. This allows the model to ramp up the amount of groundwater pumping and it is possible to observe the changes in: groundwater storage, groundwater levels, surface water depletion, and subbasin interflow over a fifty-year time frame.

3.3.7 Initial Conditions

Initial conditions for projected future simulation in ECCSim were generated from the historical simulation in ECCSim. Initial Conditions for the unsaturated zone, root zone, small watersheds, and groundwater levels were defined as the final conditions of the historical simulation in ECCSim. Generally speaking, the future scenarios are a continuation of the historic simulation period.

4 GROUNDWATER FLOW MODEL RESULTS

Calibrated parameter values for the historical model simulation as well as water budgets for both the historical and projected future scenarios in ECCSim are presented in this section. Model calibration involves the adjustment of model parameters to achieve a model that simulates the observed hydrologic system as best possible. Model parameters adjusted during calibration include aquifer parameters, and surface water and drain elevations. The final parameters for the calibrated model are presented in this section. Previous discussion of the calibration process and values was also presented in Sections 3.1 and 3.2.

4.1 Aquifer Parameters

Initial aquifer parameter values assigned to each model element were based on C2VSimFG beta2 reported values. These values were further refined and adjusted during the calibration process. Final calibrated values are presented in **Table 4-1**.

4.1.1 Hydraulic Conductivity

The calibrated horizontal hydraulic conductivity (Kh) values range from 0.04 feet per day (ft/d) to 850 ft/d (**Table 4-1**). The final Kh values in the calibrated model area shown by model layer in **Figures 4-1 through 4-4**. Calibrated vertical hydraulic conductivity (Kv) values range from 0.0002 ft/d to 52.25 ft/d (**Table 4-1**). The Kv values in the calibrated model are shown by model layer in **Figures 4-5 through 4-8**.

4.1.2 Storage Coefficients

Final specific yield (Sy) values used in the calibrated model range from 0.06 to 0.09 (**Table 4-1**). Final Sy values in the calibrated model by layer are shown in **Figures 4-9 through 4-12**. Specific storage (Ss) values used in the calibrated model range from 2.25×10^{-7} ft^{-1} to 6.00×10^{-5} ft^{-1} (**Table 4-1**). Final calibrated Ss values by model layer are shown in **Figures 4-13 through 4-16**. The calibrated Ss term incorporates elastic storage, inelastic storage, and the compressibility of water. The C2VSim-FG Beta2 model available for use in development of the ECCSim model and at the time of this model report, does not currently include the

capability to simulate land subsidence. With the inclusion of a subsidence component in future versions of IWFM, which will account for the inelastic storage component, the Ss term can be refined in future versions of ECCSim to include only elastic storage.

Table 4-1. Summary of Calibrated Aquifer Parameter Values.

		Aquifer Parameters			
		Horizontal Conductivity (Kh)	Specific Storage (Ss)	Specific Yield (Sy)	Vertical Conductivity (Kv)
Units		ft/d	ft^{-1}	-	ft/d
Layer 1	**Min**	1.00	1.29E-05	0.07	0.05
	Max	327.38	6.43E-05	0.11	15.00
	Average	35.33	1.88E-05	0.08	2.43
	Median	25.00	1.50E-05	0.08	2.00
Layer 2	**Min**	0.04	4.50E-06	0.07	0.00
	Max	327.38	6.43E-05	0.11	2.80
	Average	31.77	1.38E-05	0.08	0.46
	Median	25.00	7.50E-06	0.08	0.39
Layer 3	**Min**	0.10	4.50E-07	0.06	0.01
	Max	650.00	6.43E-05	0.11	7.00
	Average	56.61	9.64E-06	0.08	0.62
	Median	25.00	6.75E-06	0.07	0.37
Layer 4	**Min**	5.75	2.25E-07	0.01	0.14
	Max	850.00	7.11E-05	0.11	52.25
	Average	100.17	9.77E-06	0.08	2.50
	Median	14.10	4.73E-06	0.07	0.19

4.1.3 Groundwater Levels

Out of 133 wells with observed groundwater levels in the model domain, a subset of 33 wells was selected for model calibration. Wells were selected to provide a broad representation of the model domain based on the spatial distribution, availability of associated well construction information, depth zone of well completion (e.g., layer 1, 2, 3, or 4), and period of record of available water level data. Simulated and observed groundwater elevations were compared over the 1997 through 2018 calibration period. Well hydrographs of simulated and observed groundwater elevations used for model calibration are included in **Appendix A**.

To quantify model fit between the simulated and observed groundwater levels, residual (simulated minus observed) groundwater levels were calculated for each well. To summarize calibration results, a single model layer was selected to compare to observed water levels. In some cases, a well is constructed across multiple model layers, or no construction details were available to determine where the well was screened. In these cases, a single model layer was chosen for each well based on a qualitative review of the hydrograph.

A histogram of residual groundwater elevations for all observations is shown in **Figure 4-17**. Residual groundwater levels range from -40 feet to 70 feet, with 72 percent of simulated groundwater elevations within 10 feet of observed and almost 84 percent of simulated groundwater elevations within 20 feet of observed. A review of average residual groundwater elevations by well (**Figure 4-18**) shows that 14 wells, or 42 percent of total, have an average residual groundwater elevation within 10 feet of observed, while 27 wells, or 82 percent of total, have an average residual groundwater elevation within 20 feet of observed. Average residual groundwater elevations by well range from -34 feet to 34 feet.

The relation between observed and simulated groundwater elevations is shown by layer in **Figure 4-19**. Points plotting above 1-to-1 correlation line represent observations where ECCSim is simulating higher than observed groundwater elevations, while points plotting below the 1-to-1 correlation line represent observations where ECCSim is simulating lower than observed groundwater elevations. In general, points are plotting close to the 1-to-1 correlation line, indicating a good model fit.

The relationship between residual and observed groundwater elevations is shown by layer in **Figure 4-20**. This figure shows that the model generally predicts water levels close to observed in the Upper Aquifer, as the majority of points plot near the origin. The model tends to predict higher than observed levels at lower observed groundwater elevations, while the model tends to predict lower than observed levels at higher observed groundwater elevations. The greatest residuals occur in wells in layers 3 and 4.

The spatial distribution of residual errors in the simulated levels are presented by well in **Figure 4-21**. The East Contra Costa Subbasin is generally well calibrated.

4.1.4 Groundwater Pumping

Over the historical model period, most of the pumping occurs in the two middle layers (Layers 2 and 3) within the East Contra Costa Subbasin. Approximately 92 percent of pumping occurs in Layers 2 and 3. The proportion and distribution of pumping is maintained for the projected future climate scenarios.

The sustainable yield future scenario ramps up the groundwater pumping to determine a higher level of pumping that the ECC Subbasin can sustain without resulting in negative effects including storage depletion, surface water depletion, or reversal of subsurface lateral flow with neighboring subbasins.

Table 4-2. Summary of Historical and Projected Groundwater Pumping in ECCSim.

East Contra Costa Subbasin (area 107,596 ac)			
Model Scenario	**Model Layer**	**Pumping Amount or Proportion**	**Units**
Historical Period (1997-2018)	Layer 1	319	AF/yr
	Layer 2	11,699	AF/yr
	Layer 3	30,835	AF/yr
	Layer 4	3,602	AF/yr
	Total Avg Pumping	46,455	AF/yr
	Total ECC Subbasin Avg Pumping	0.4	AF/ac/yr
	Layer 1	0.7	%
	Layer 2	25.2	%
	Layer 3	66.4	%
	Layer 4	7.8	%
Future Land Use Period (2019-2068)	Layer 1	205	AF/yr
	Layer 2	4,122	AF/yr
	Layer 3	20,757	AF/yr
	Layer 4	3,883	AF/yr
	Total Avg Pumping	28,966	AF/yr
	Total ECC Subbasin Avg Pumping	0.3	AF/ac/yr
	Layer 1	0.7	%
	Layer 2	14.2	%
	Layer 3	71.7	%
	Layer 4	13.4	%
Future Sustainable Yield[2] Period (2019-2068)	Layer 1	616	AF/yr
	Layer 2	7,631	AF/yr
	Layer 3	59,478	AF/yr
	Layer 4	4,267	AF/yr
	Total Avg Pumping	71,992	AF/yr
	Subbasin Avg Pumping	0.7	AF/ac/yr
	Layer 1	0.9	%
	Layer 2	10.6	%
	Layer 3	82.6	%
	Layer 4	5.9	%

[2] The Sustainable Yield run was developed using a reduction of surface water deliveries by 50%, thereby increasing groundwater pumping without deleterious effects.

4.2 Water Budget

Groundwater budgets were generated for the East Contra Costa Subbasin for each of the model simulations. Water budget results are presented in the following sections.

4.2.1 Historical Period, 1997-2018

The water budget during the historical calibration period simulation was calculated for the 1997-2018 water years from October 1, 1997 through September 30, 2018.

Change in groundwater storage shows overall stability over the 21-year historical calibration period. Groundwater leaves the subbasin through drains in amounts that average about 74,800 AFY during the base period. Surface water/groundwater interaction accounts for an average recharge of about 17,800 AF per year. Deep percolation accounts for an average recharge of about 90,000 AF per year. Groundwater pumping accounts for an average discharge of about 46,500 AF per year. Net subsurface outflow accounts for an average of about 8,500 AF per year. There is some uncertainty in subsurface outflow estimates because these calculations depend on a variety of factors inside and outside the subbasin.

Detailed historical water budget results for East Contra Costa Subbasin are presented in **Appendix B**, and groundwater elevation hydrographs at select wells are included in **Appendix A**.

4.2.2 Projected Scenarios, 2019-2068

The water budget during the future projected fifty-year period simulation was calculated for the 2019-2068 water years from October 1, 2018 through September 30, 2068.

Projected Land Use Change
Change in groundwater storage shows aquifer storage replenishment as a result of the projected land use change resulting in more urban land in the subbasin. Groundwater leaves the subbasin through drains in amounts that average about 71,200 AFY during the base period. Surface water/groundwater interaction accounts for an average recharge of about 20,300 AF per year. Deep percolation accounts for an average recharge of about 85,000 AF per year. Groundwater pumping accounts for an average discharge of about 46,100 AF per year. Net subsurface outflow accounts for an average of about 7,000 AF per year.

Detailed projected water budget results for East Contra Costa Subbasin are presented in **Appendix B**.

Projected Land Use Change with Climate Change
Change in groundwater storage shows aquifer storage replenishment as a result of the projected land use change resulting in more urban land in the subbasin. Groundwater leaves the subbasin through drains in amounts that average about 84,000 AFY during the base period. Surface water/groundwater interaction accounts for an average recharge of about 13,900 AF per year. Deep percolation accounts for an average recharge of about 97,000 AF per year. Groundwater pumping accounts for an average discharge of about 34,000 AF per year. Net subsurface outflow accounts for an average of about 11,400 AF per year.

Detailed projected water budget results for East Contra Costa Subbasin are presented in **Appendix B**.

Projected Land Use Change with Sea Level Rise
Change in groundwater storage shows aquifer storage replenishment as a result of the projected land use change resulting in more urban land in the subbasin. Groundwater leaves the subbasin through drains in amounts that average about 86,500 AFY during the base period. Surface water/groundwater interaction accounts for an average recharge of about 13,300 AF per year. Deep percolation accounts for an average recharge of about 95,700 AF per year. Groundwater pumping accounts for an average discharge of about 29,000 AF per year. Net subsurface outflow accounts for an average of about 13,000 AF per year.

Detailed projected water budget results for East Contra Costa Subbasin are presented in **Appendix B**.

Projected Land Use Change with Climate Change and Sea Level Rise

Change in groundwater storage shows aquifer storage replenishment as a result of the projected land use change resulting in more urban land in the subbasin. Groundwater leaves the subbasin through drains in amounts that average about 81,100 AFY during the base period. Surface water/groundwater interaction accounts for an average recharge of about 14,600 AF per year. Deep percolation accounts for an average recharge of about 97,100 AF per year. Groundwater pumping accounts for an average discharge of about 34,000 AF per year. Net subsurface outflow accounts for an average of about 11,400 AF per year.

Detailed projected water budget results for East Contra Costa Subbasin are presented in **Appendix B**.

Projected Land Use Change with Wet Climate Change

Change in groundwater storage shows aquifer storage replenishment as a result of the projected land use change resulting in more urban land in the subbasin. Groundwater leaves the subbasin through drains in amounts that average about 103,000 AFY during the base period. Surface water/groundwater interaction accounts for an average recharge of about 6,900 AF per year. Deep percolation accounts for an average recharge of about 129,500 AF per year. Groundwater pumping accounts for an average discharge of about 32,600 AF per year. Net subsurface outflow accounts for an average of about 14,800 AF per year.

Detailed projected water budget results for East Contra Costa Subbasin are presented in **Appendix B**.

Projected Land Use Change with Dry Climate Change

Change in groundwater storage shows aquifer storage replenishment as a result of the projected land use change resulting in more urban land in the subbasin. Groundwater leaves the subbasin through drains in amounts that average about 75,800 AFY during the base period. Surface water/groundwater interaction accounts for an average recharge of about 16,100 AF per year. Deep percolation accounts for an average recharge of about 88,300 AF per year. Groundwater pumping accounts for an average discharge of about 36,100 AF per year. Net subsurface outflow accounts for an average of about 10,000 AF per year.

Detailed projected water budget results for East Contra Costa Subbasin are presented in **Appendix B**.

4.2.3 Sustainable Yield Projected Period, 2019-2068

The water budget during the sustainable yield projected period simulation was calculated for the 2019-2068 water years from October 1, 2018 through September 30, 2068.

Projected Land Use Change with Increased Pumping

Change in groundwater storage shows some aquifer storage replenishment despite increasing the groundwater pumping. Groundwater leaves the subbasin through drains in amounts that average about 56,900 AFY during the base period. Surface water/groundwater interaction accounts for an average recharge of about 19,200 AF per year. Deep percolation accounts for an average recharge of about 96,000 AF per year. Groundwater pumping accounts for an average discharge of about 72,000 AF per year. Net subsurface outflow accounts for an average of about 3,700 AF per year.

Detailed projected water budget results for East Contra Costa Subbasin are presented in **Appendix B**.

5 MODEL UNCERTAINTY AND LIMITATIONS

Any groundwater flow model is a simplification of the natural environment, and therefore has recognized limitations. For this reason, uncertainty exists in the ability of any numerical model to completely represent groundwater flow. Some of the uncertainty is associated with limitations in available data.

Considerable effort was made to reduce model uncertainty by improving the calibration of aquifer parameters to better match observed groundwater conditions.

The finding and conclusions of this study are focused on a Subbasin scale and use of the model for site-specific analysis should be conducted with an understanding that representation of local site-specific conditions may be approximate and should be verified with local site-specific investigations. The flow model was developed in a manner consistent with the level of care and skill normally exercised by professionals practicing under similar conditions in the area. There is no warranty, expressed or implied, that this modeling study has considered or addresses all hydrogeological, hydrological, environmental, geotechnical or other characteristics and properties associated with the subject model domain and the simulated system.

6 CONCLUSIONS AND RECOMMENDATIONS

Based on the calibration of ECCSim to historical conditions for the calibration period from water year 1997 to 2018 and accompanying assessment of model sensitivity, the ECCSim groundwater flow model is suitable for use as a tool to support management of water resources within the East Contra Costa Subbasin.

6.1 Conclusions

ECCSim provides a useful tool for evaluating a wide variety of future scenarios and inform the decision-making process to maintain sustainable groundwater management in the East Contra Costa Subbasin. A numerical model can be a convenient and cost-efficient tool for providing insights into groundwater responses to various perturbations including natural variability and change, and also changes associated with management decisions or other humanmade conditions. However, as with any other modeling tool, information obtained from a numerical model also has a level of uncertainty, especially for long-term predictions or forecasts. The level of uncertainty associated with model simulations are likely to increase the more the scenarios extend beyond the range of historical conditions and processes over which the model was calibrated, such as for long-term predictive scenarios or predictive scenarios with extreme alterations to the hydrologic conditions.

6.2 Recommendations

Future and ongoing updates to ECCSim will be valuable for improving the model performance and verifying the accuracy of the model predictions. Using data from the ongoing monitoring efforts and forthcoming GSP monitoring, ECCSim should be updated periodically, including through extending of the model period and associated inputs. Although the frequency of conducting model updates may depend on a variety of factors, including evaluation of the model performance in predicting future conditions, such an update could initially be considered every five years. This frequency of model update should be adequate and cost effective to test and improve ECCSim periodically with new site-specific and monitoring information. Groundwater elevations, groundwater pumping, rainfall, and stream discharge should be collected on an ongoing basis, to the extent possible, at intervals of at least monthly for pumpage, rainfall, and streamflow, and less frequently (semi-annually at least) for groundwater levels. The new groundwater data should be compared with the respective model simulation results so that the flow model can be verified into the future. If the differences between the measured groundwater data and ECCSim's predicted results are significant, adjustment and modification may be applied to the model input parameters.

ECCSim has been calibrated and verified. It adheres closely to site-specific observed data so that model input parameters are reasonable and appropriate especially within the East Contra Costa Subbasin. Additional model revisions may be conducted in areas outside the East Contra Costa Subbasin as that data is obtained from adjacent GSAs.

Further refinement to ECCSim should be made by addressing key data gaps. The calibrated C2VSimFG model should be evaluated to incorporate any relevant aspects of the model into ECCSim, as appropriate and necessary. In particular, a calibrated land subsidence simulation package should be considered for incorporation into ECCSim. This capability is anticipated with the release of the calibrated C2VSimFG model. Updates to aquifer parameters can be made through incorporation of lithologic information or aquifer testing information developed from new monitoring well construction efforts in the future. Through upcoming GSP-related monitoring, additional groundwater level data can be used to refine boundary condition water levels and improve model calibration. Additional improvements to model calibration can be made by the potential linking of additional well construction information to wells with appropriate monitoring periods of record, and refinements to the simulation of surface water distribution systems. Further refinements to ECCSim can be made by extending the historical base period and ongoing updating of model calibration in preparation for 5-year GSP status/update report.

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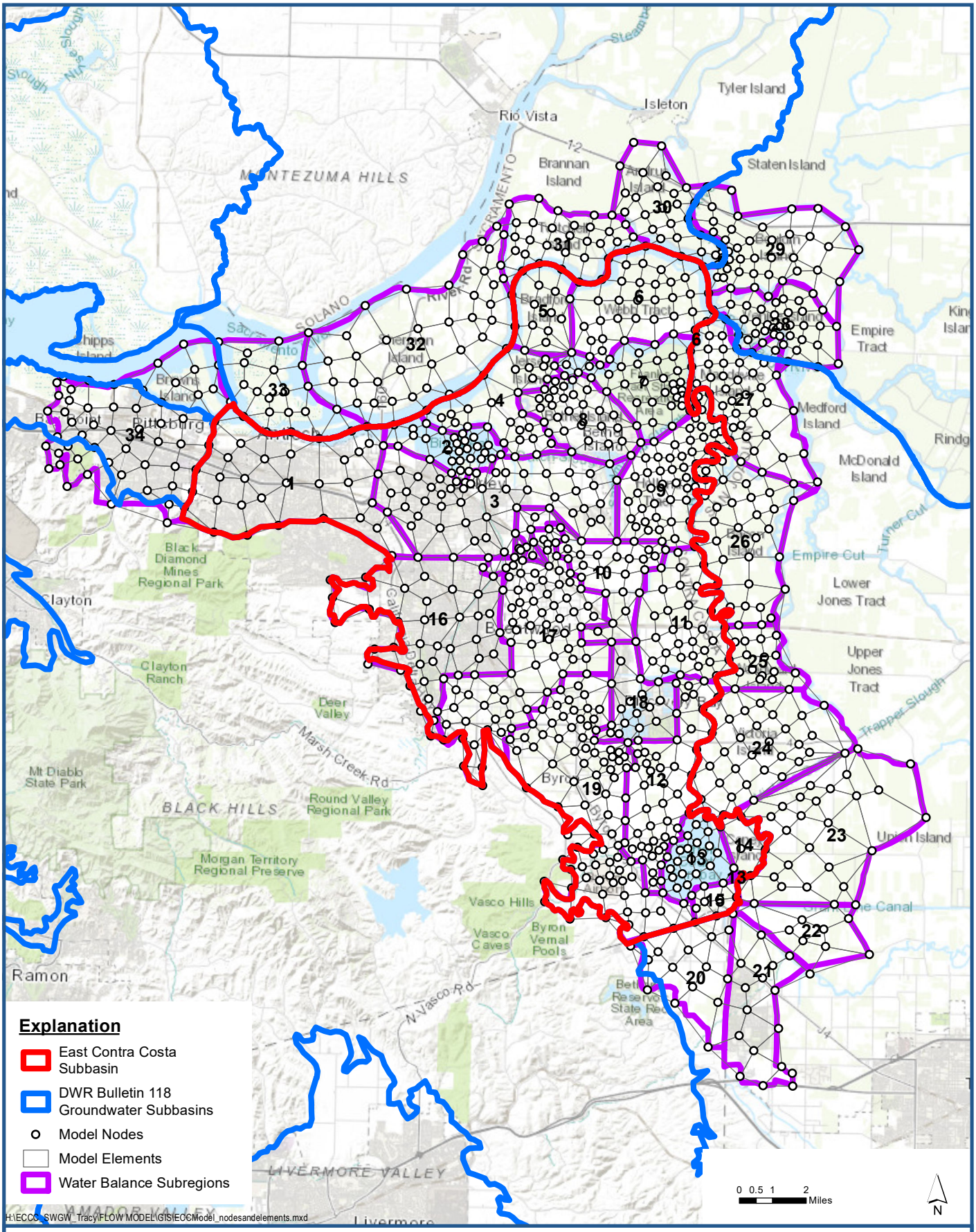
FIGURES



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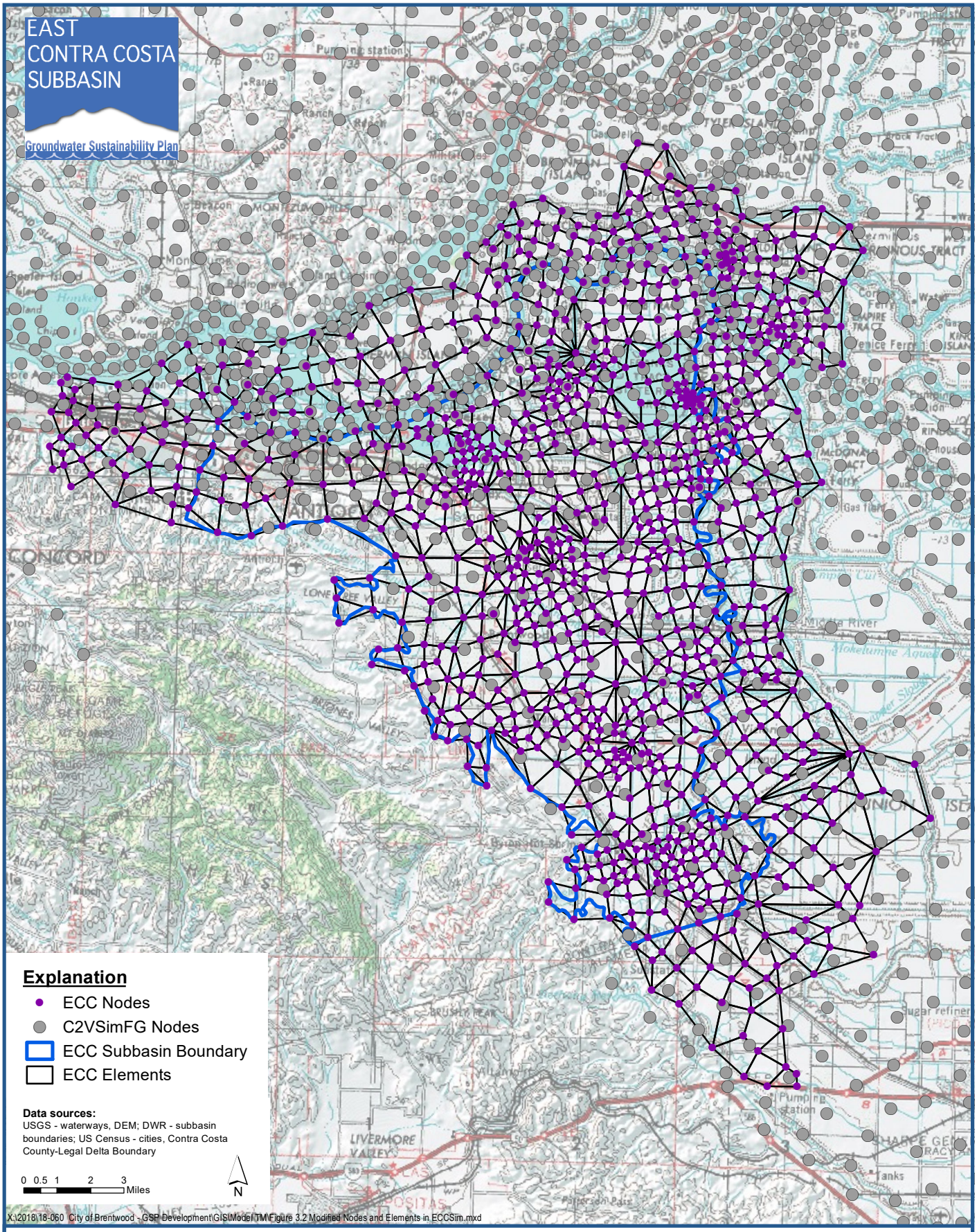
Model Grid and Node Refinement

East Contra Costa Groundwater-Surface Water Simulation Model (ECCSim)

Figure 3-1



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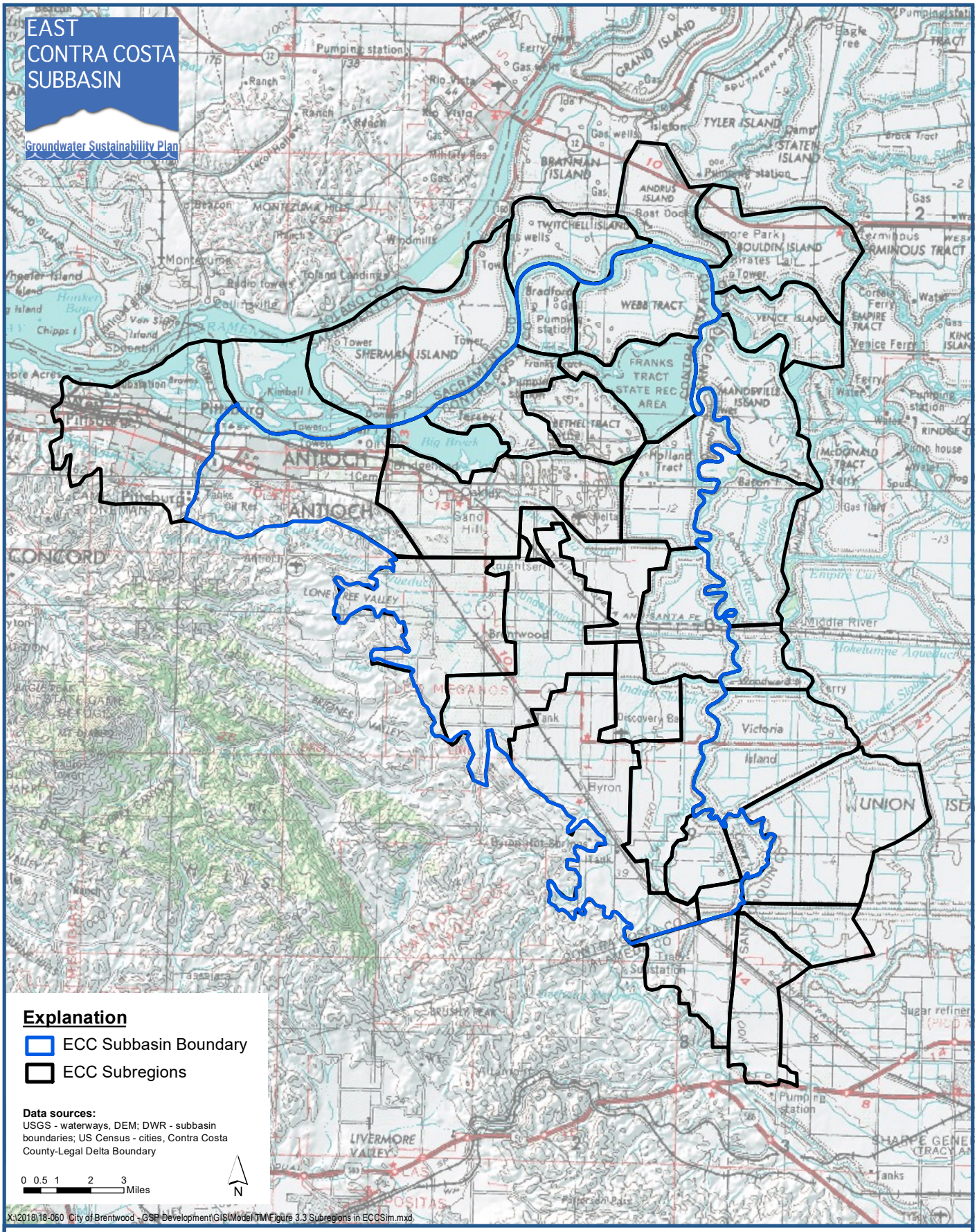
Modified Nodes and Elements in ECCSim

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-2



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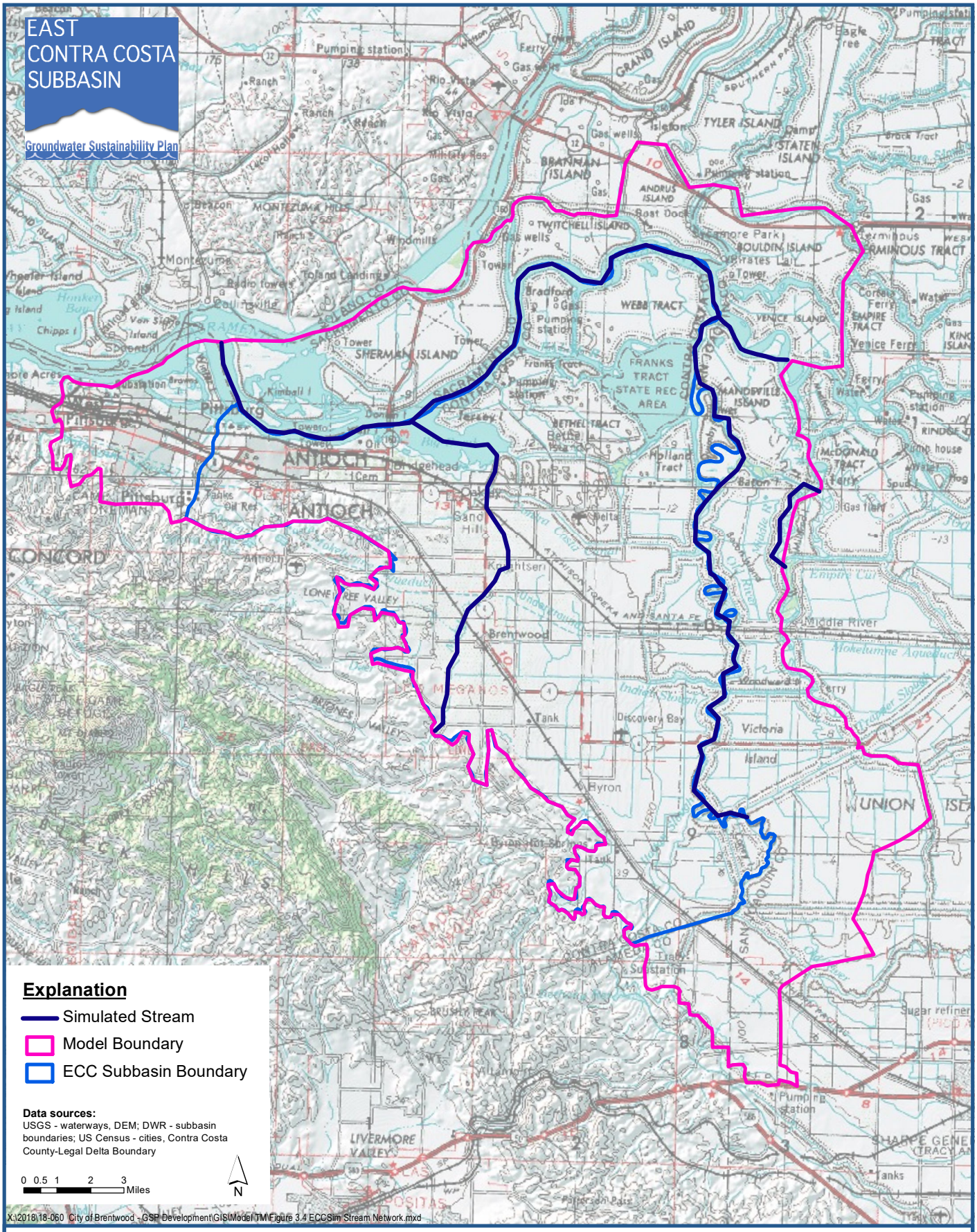
Subregions in ECCSim

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-3



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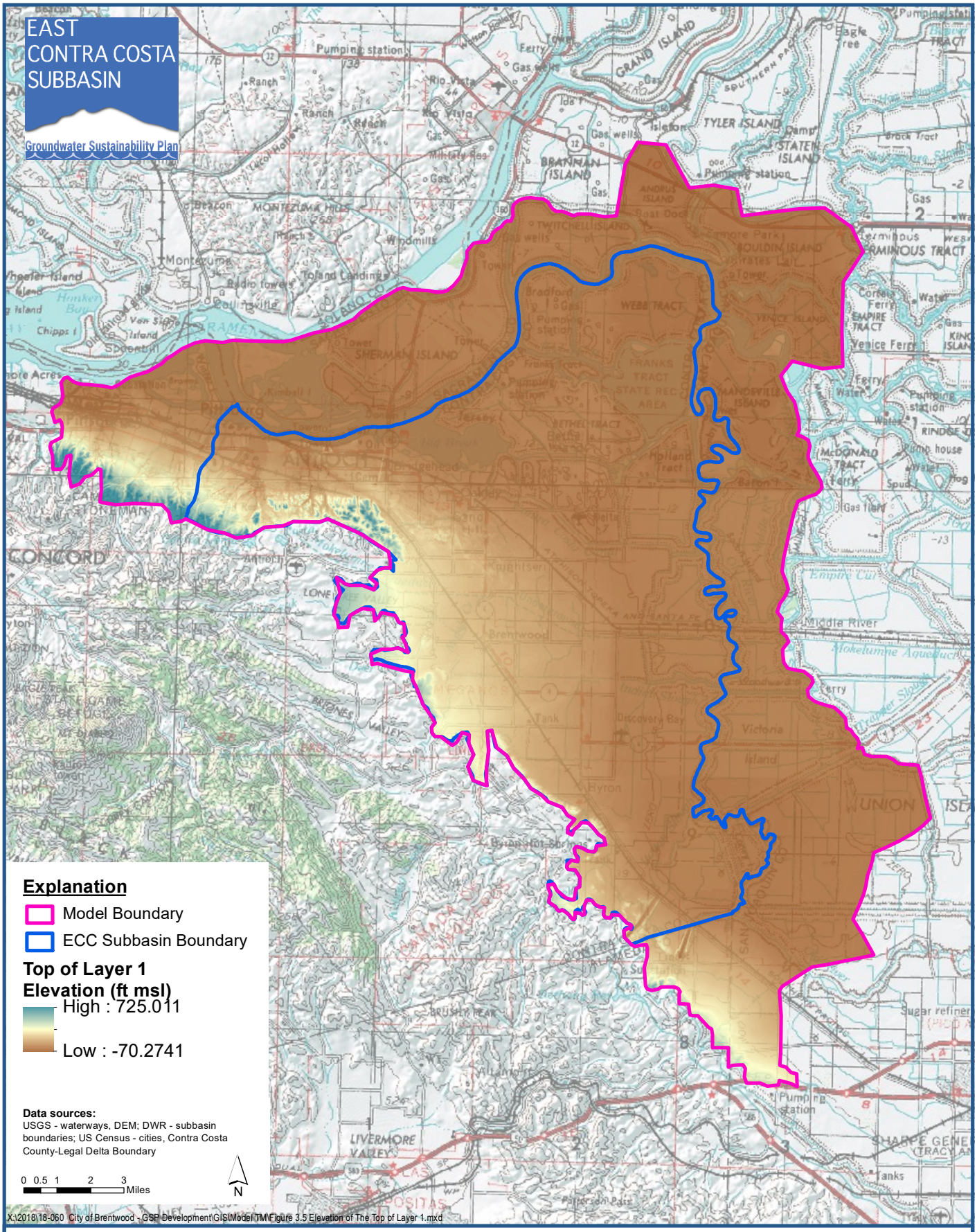
ECCSim Stream Network

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-4



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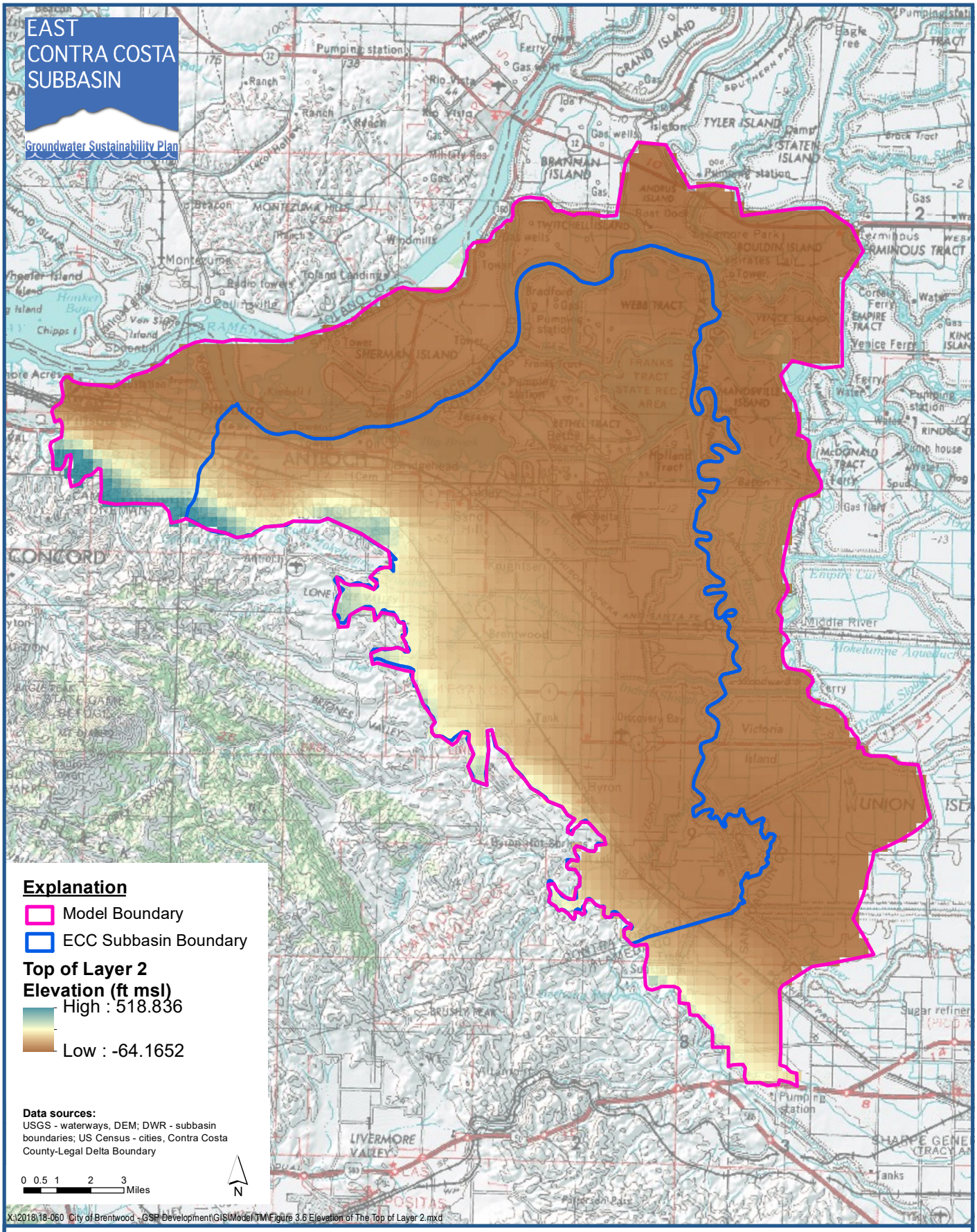
Elevation of The Top of Layer 1

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-5



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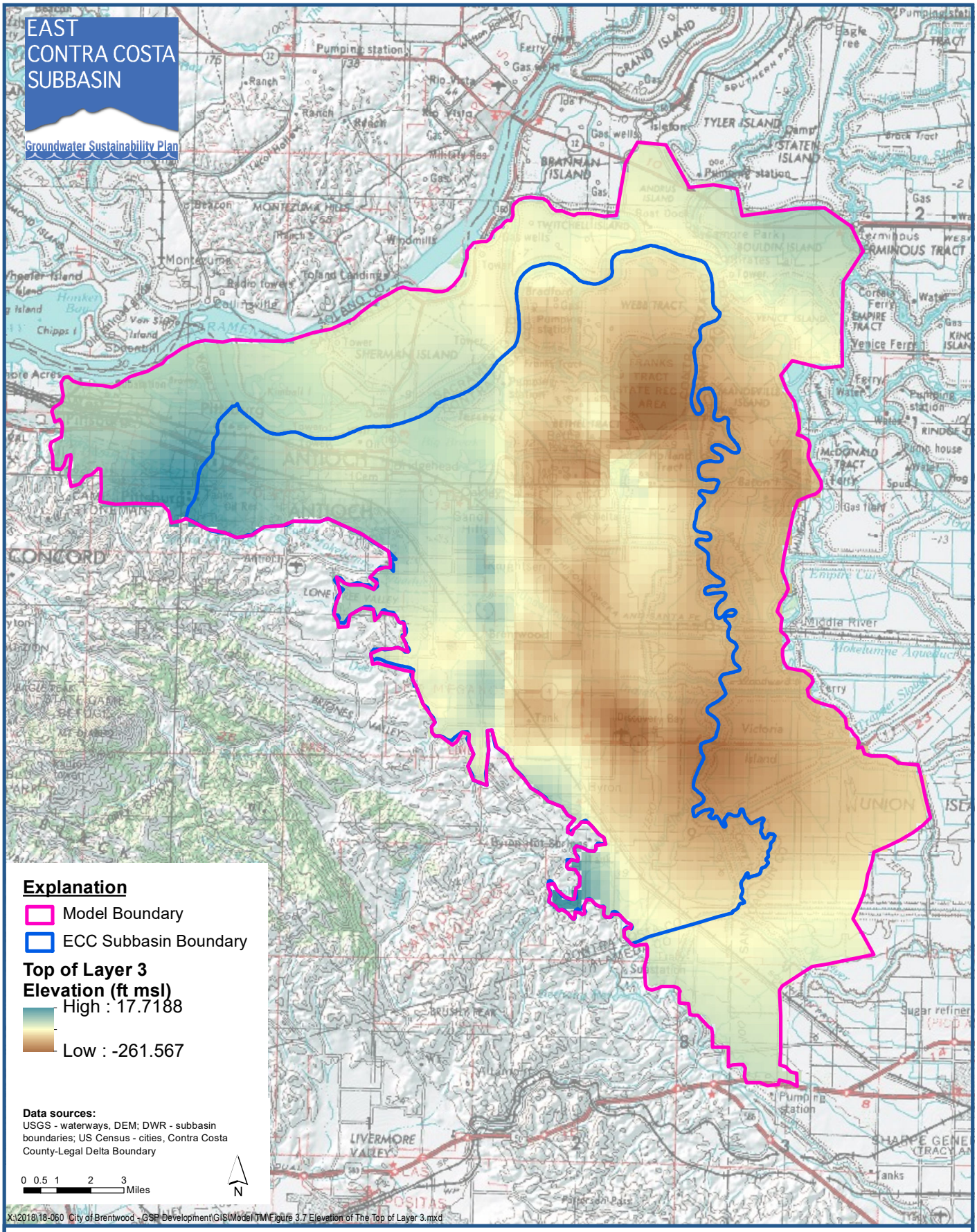
Elevation of The Top of Layer 2

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-6



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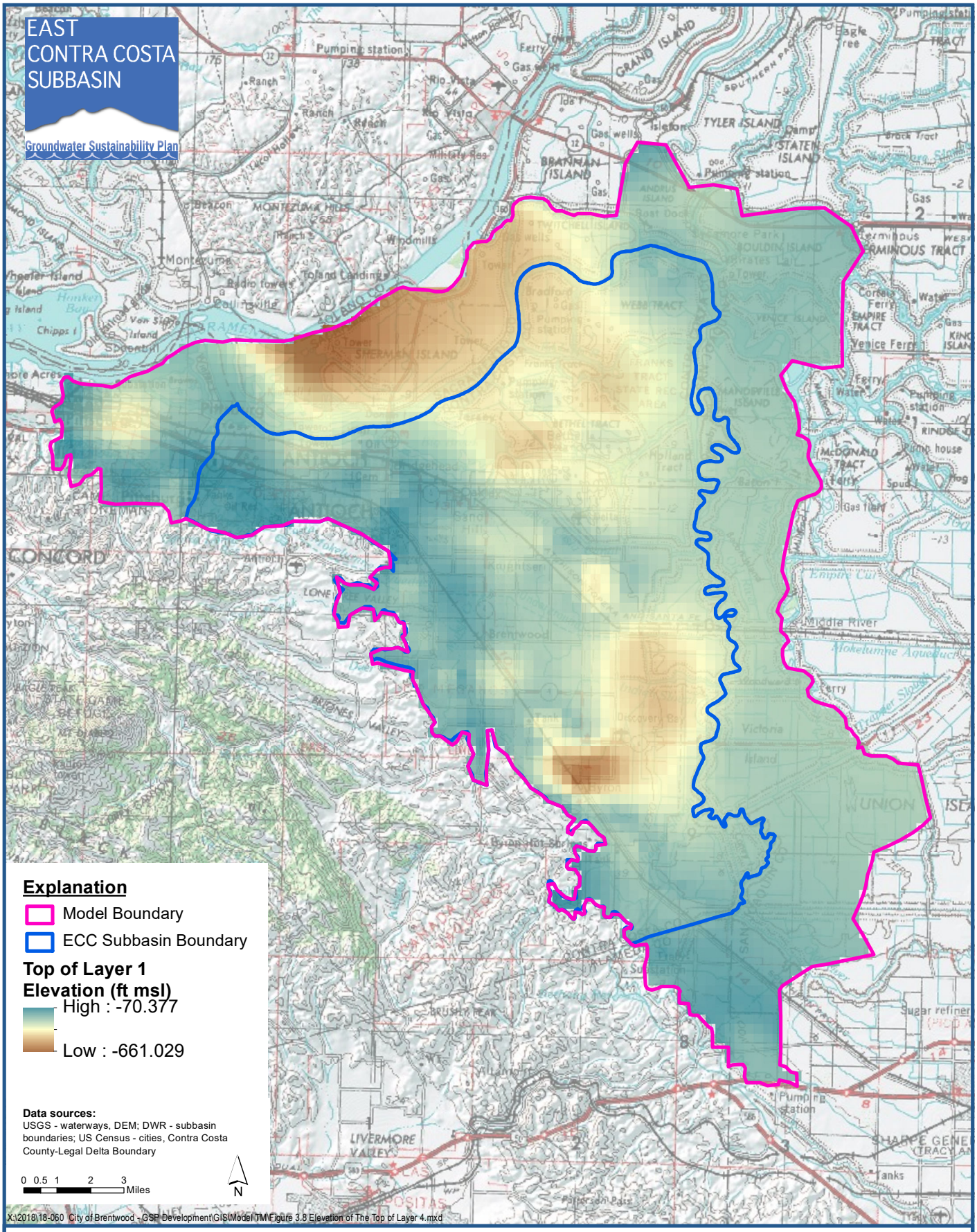
Elevation of The Top of Layer 3

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-7



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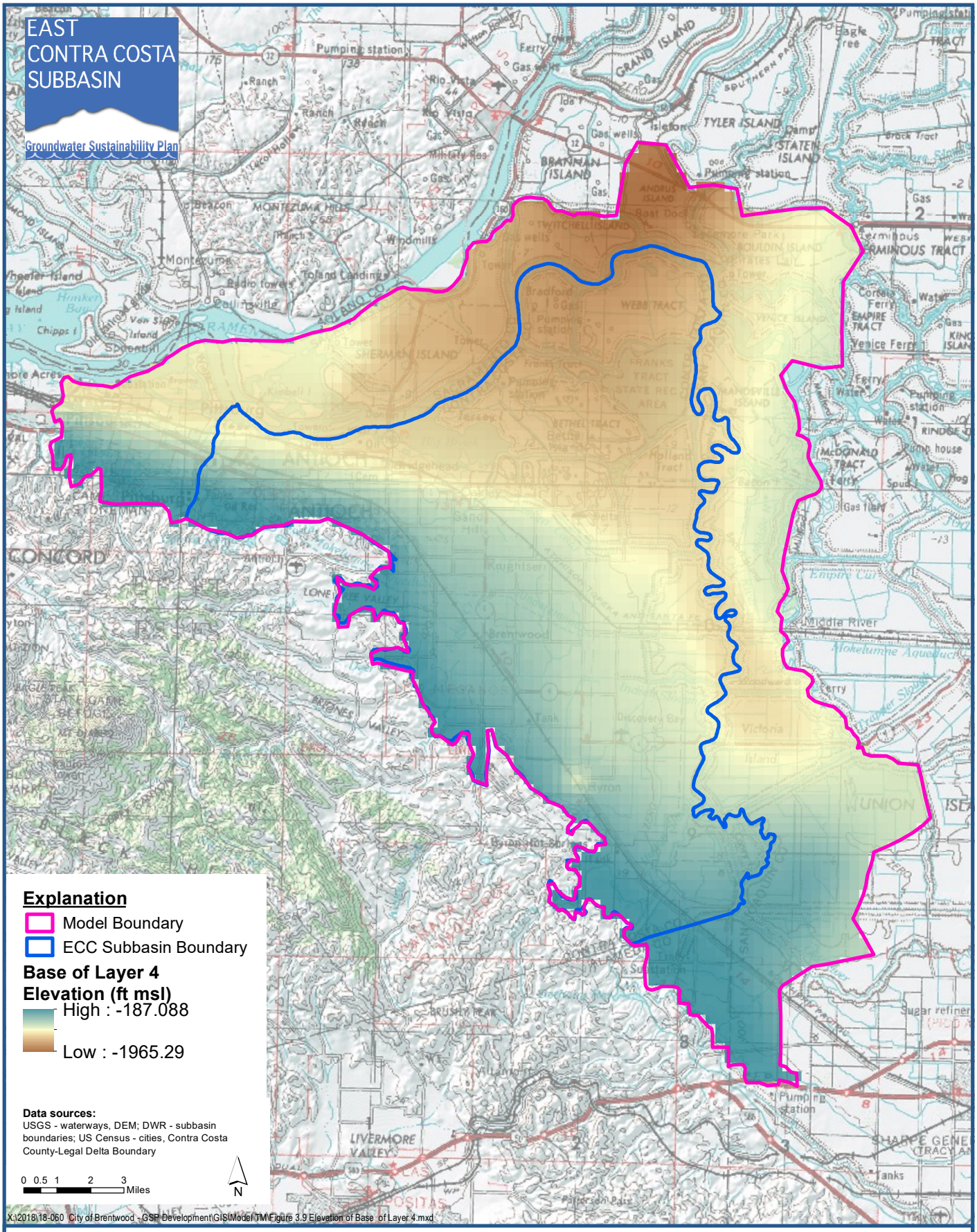
Elevation of The Top of Layer 4

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-8



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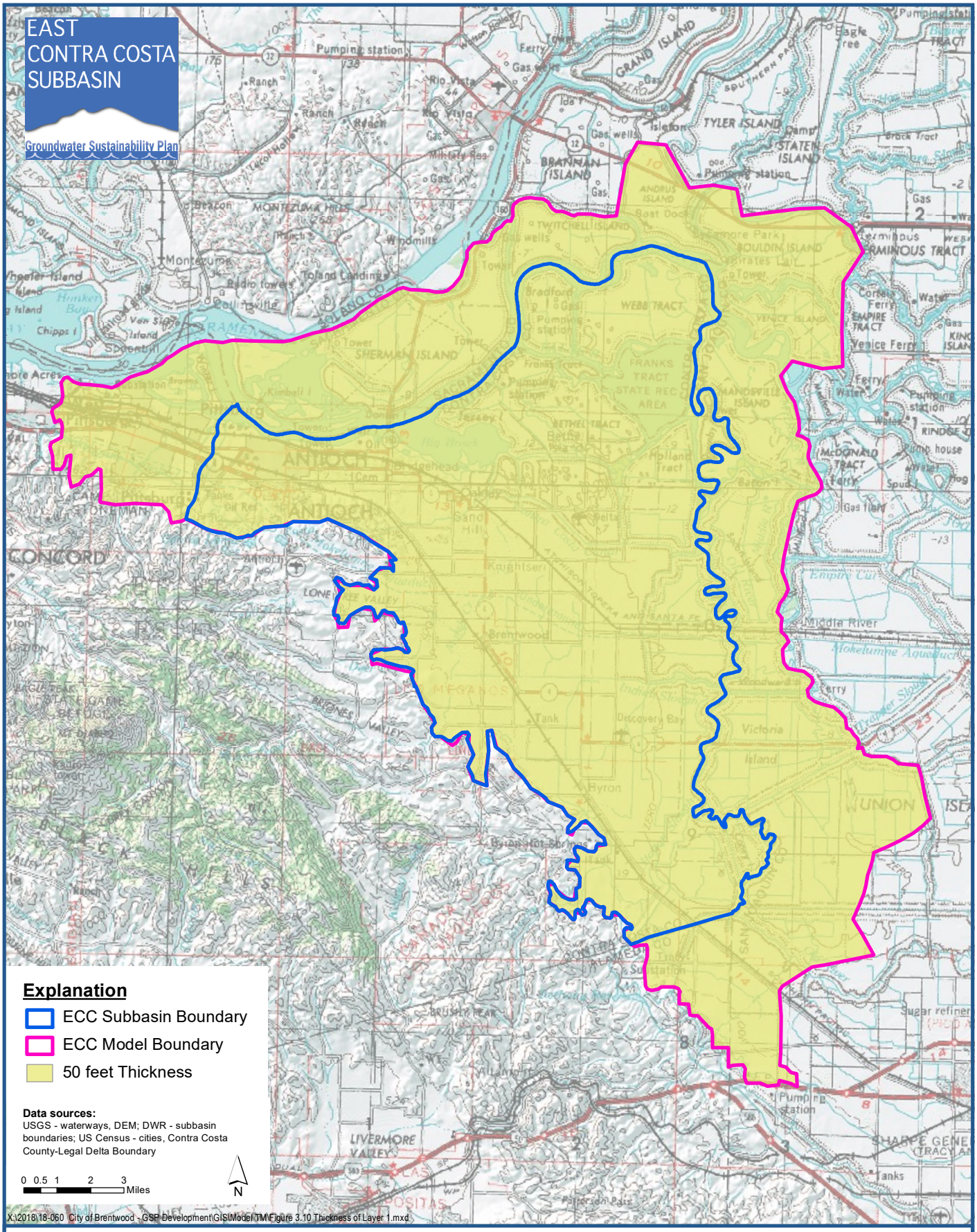
Elevation of The Bottom of Layer 4

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-9



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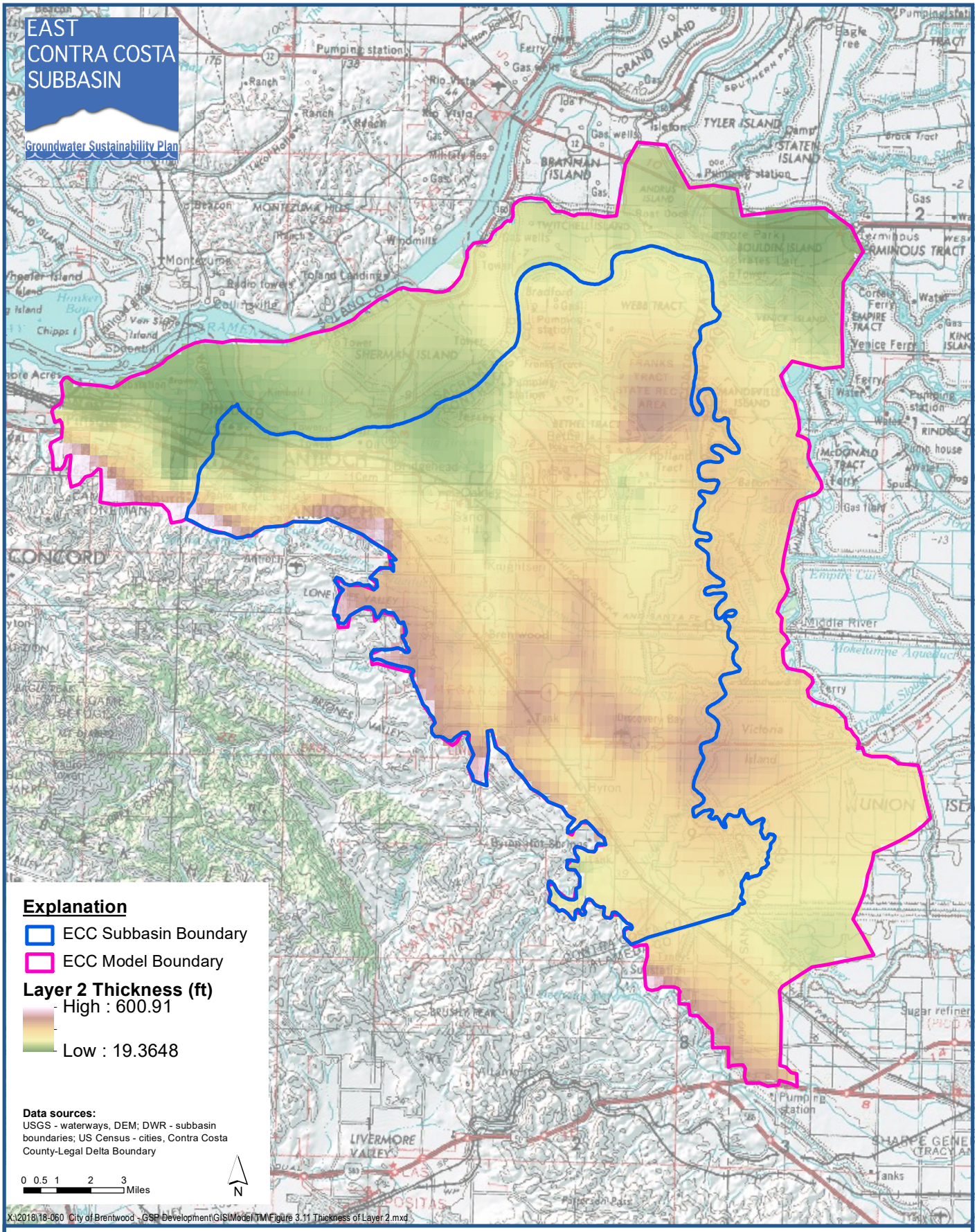
Thickness of Layer 1

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-10



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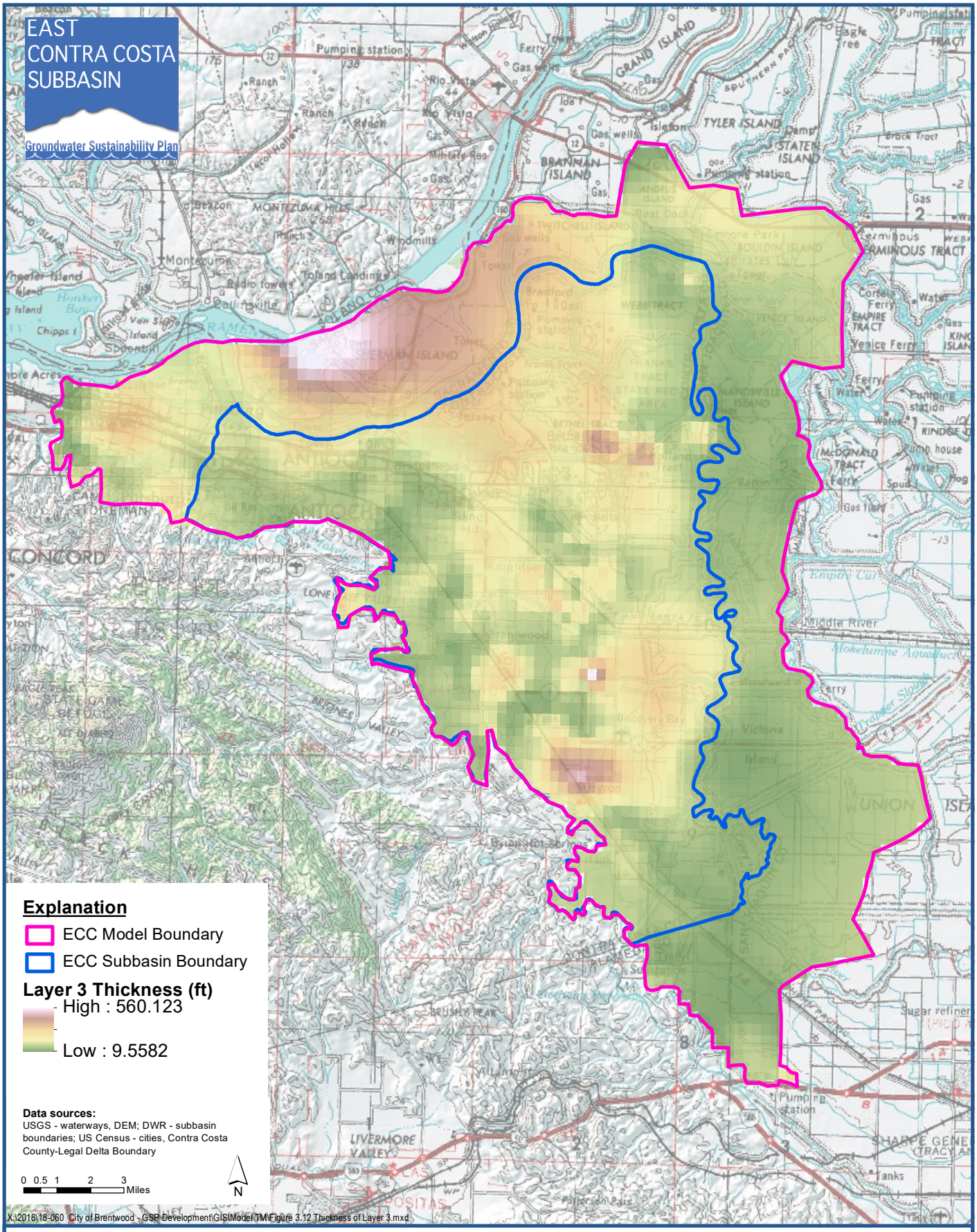
Thickness of Layer 2

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-11



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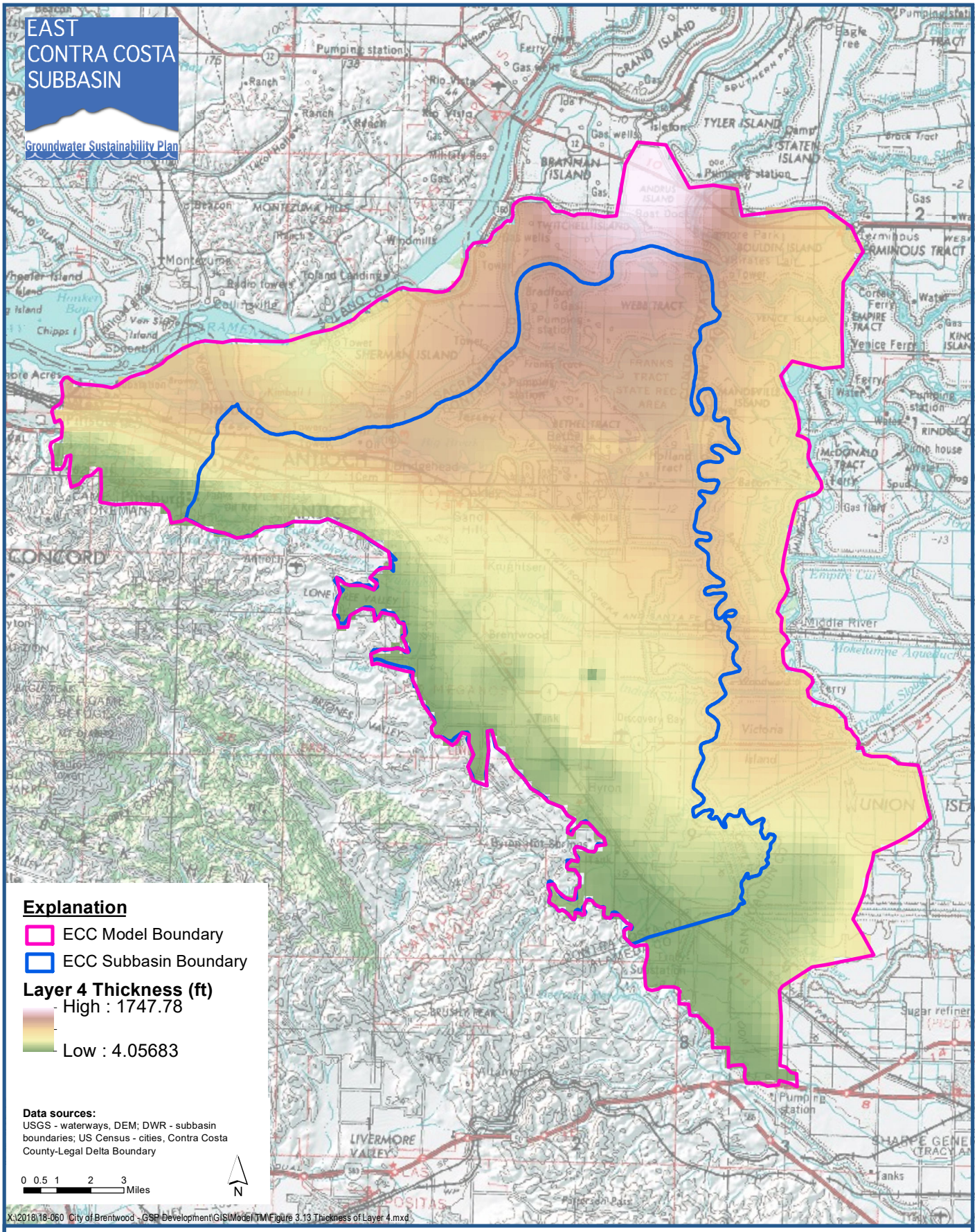
Thickness of Layer 3

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-12



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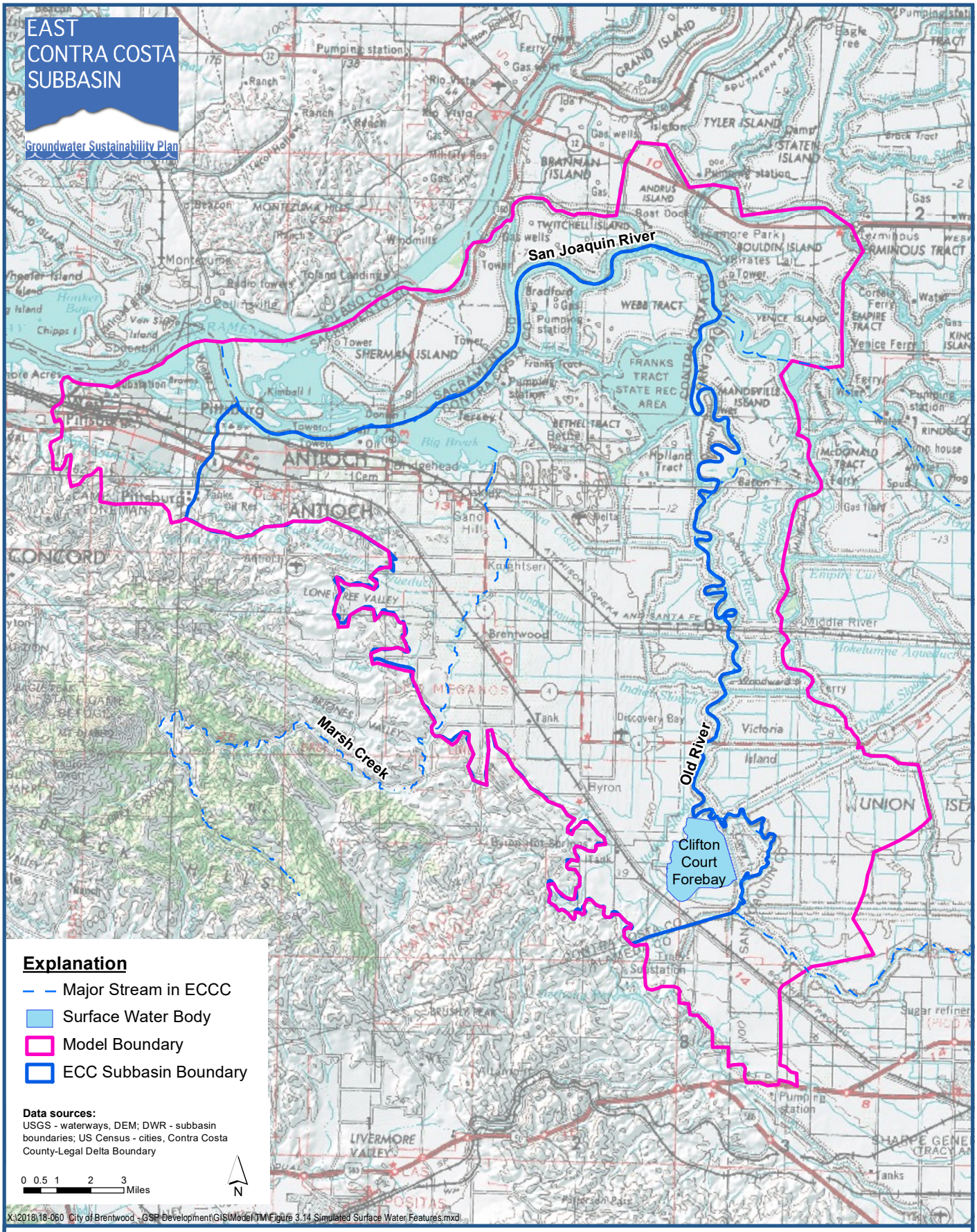
Thickness of Layer 4

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-13



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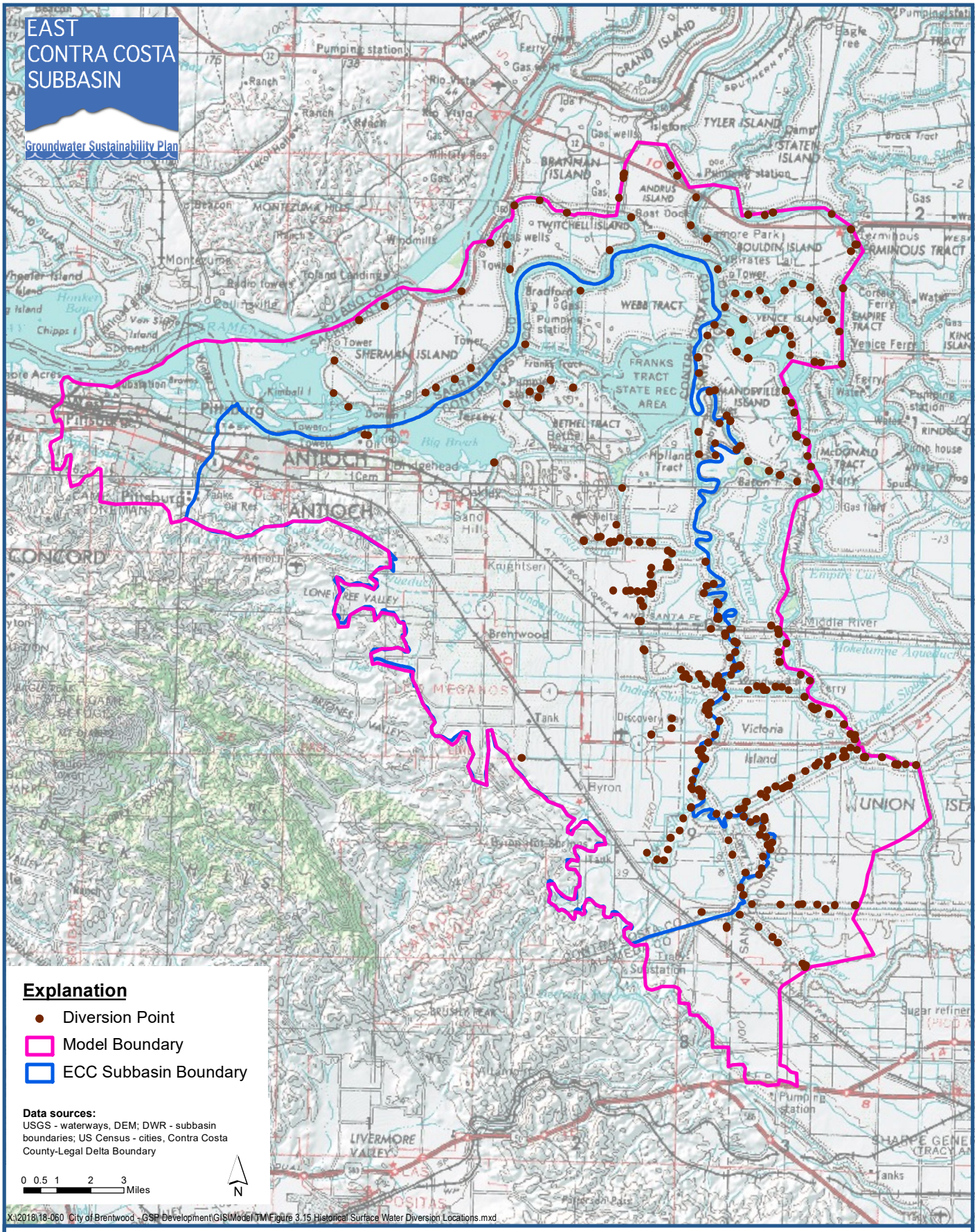
Simulated Surface Water Features

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-14



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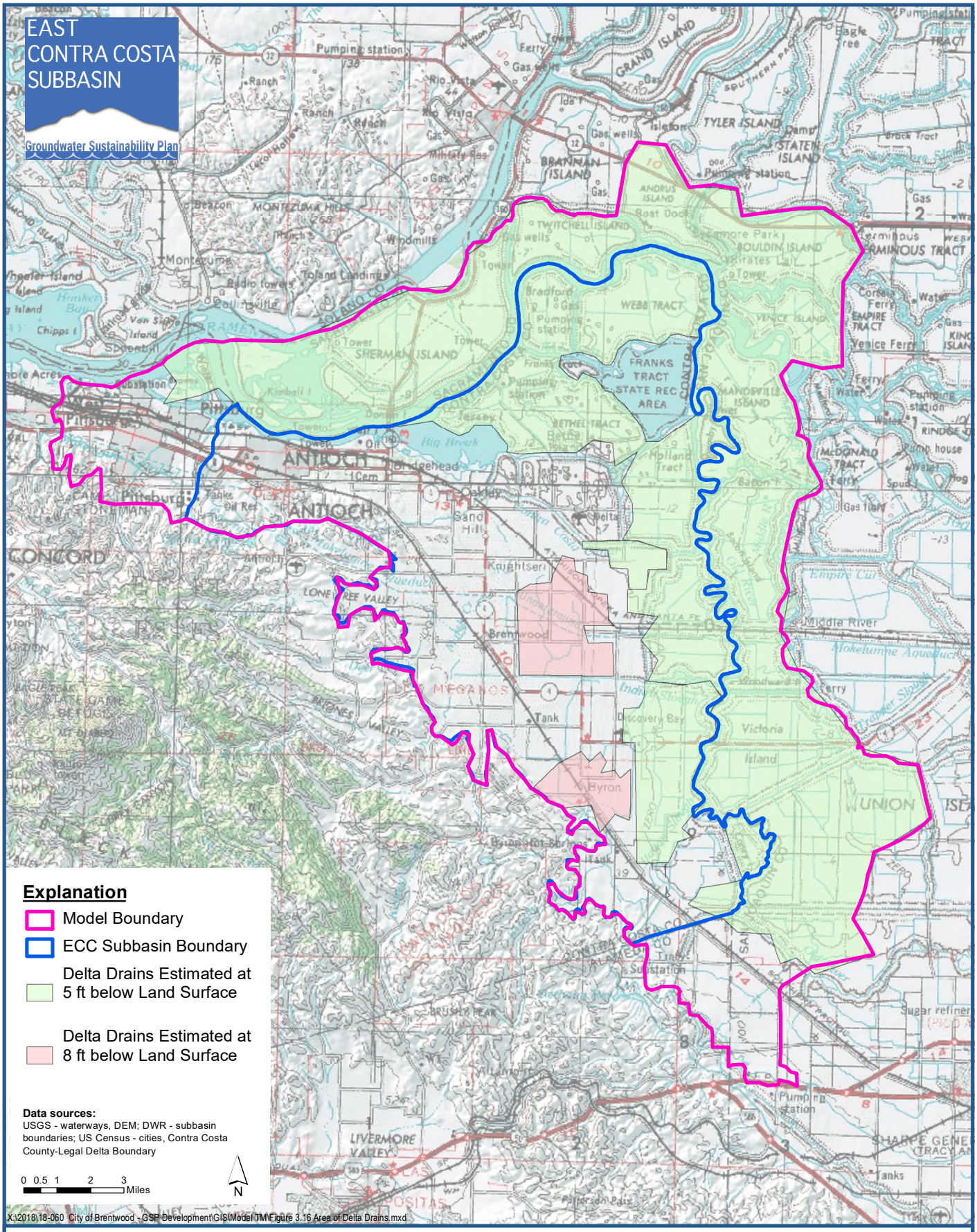
Historical Surface Water Diversion Locations

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-15



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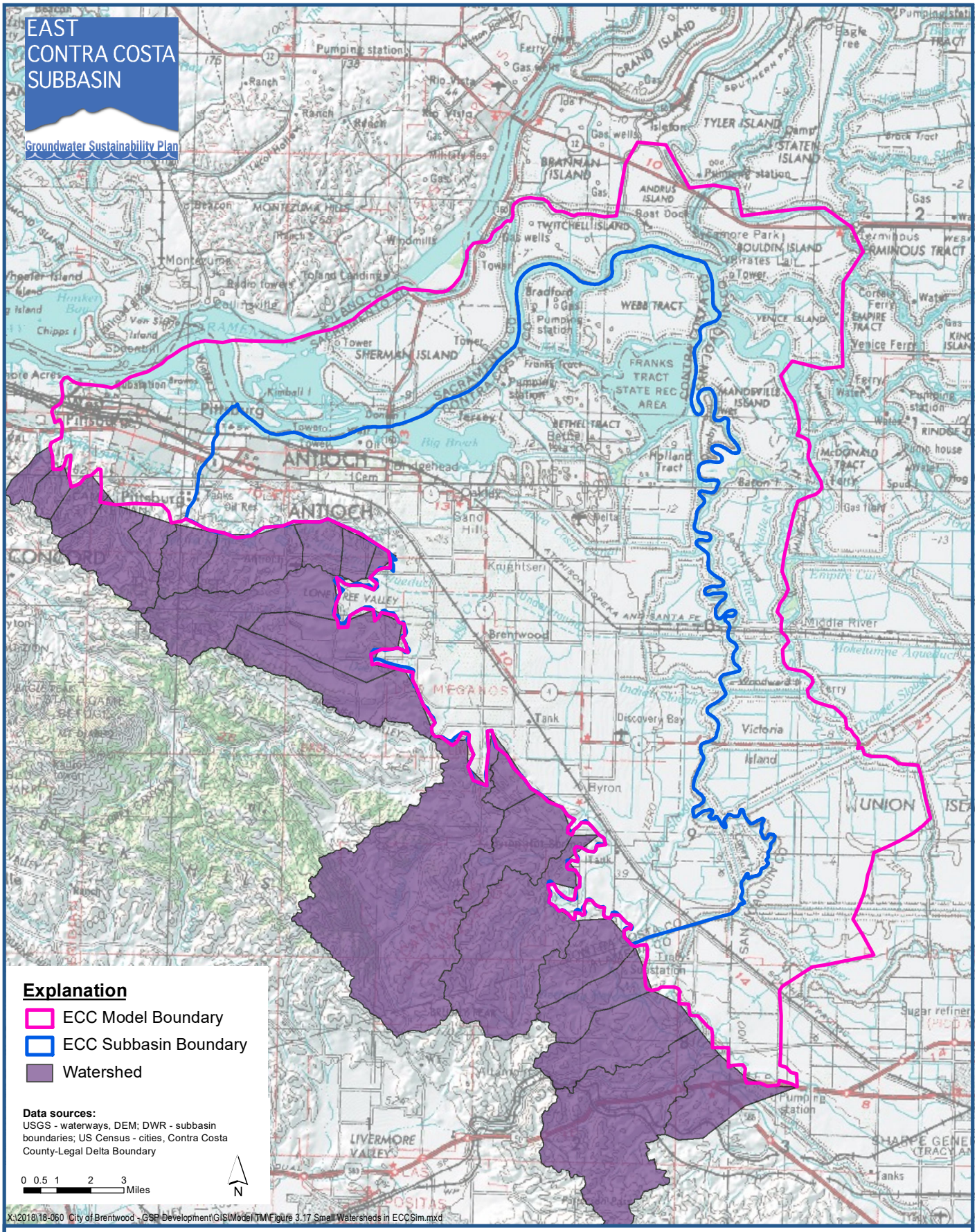
Area of Delta Drains

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-16



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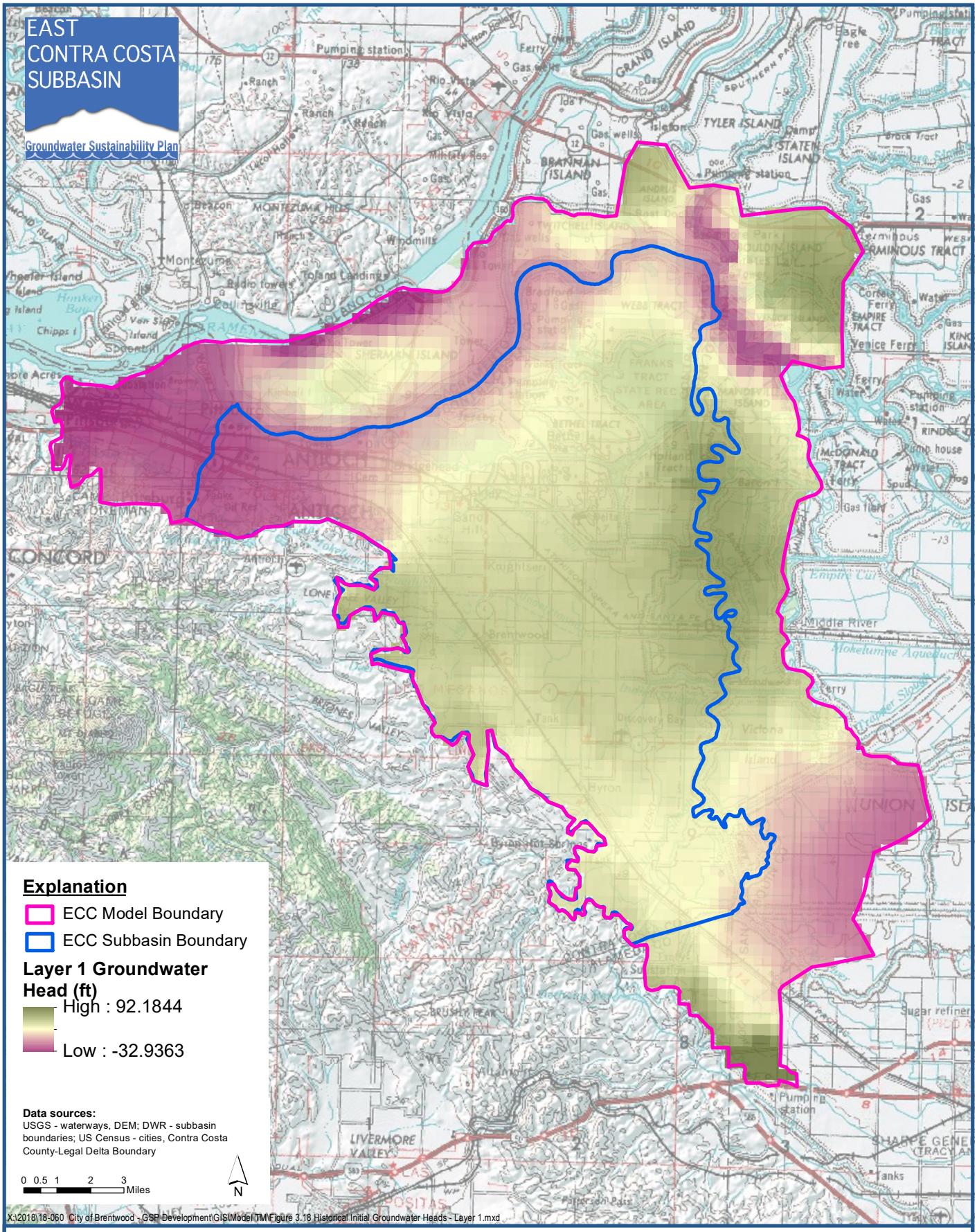
Small Watersheds in ECCSim

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-17



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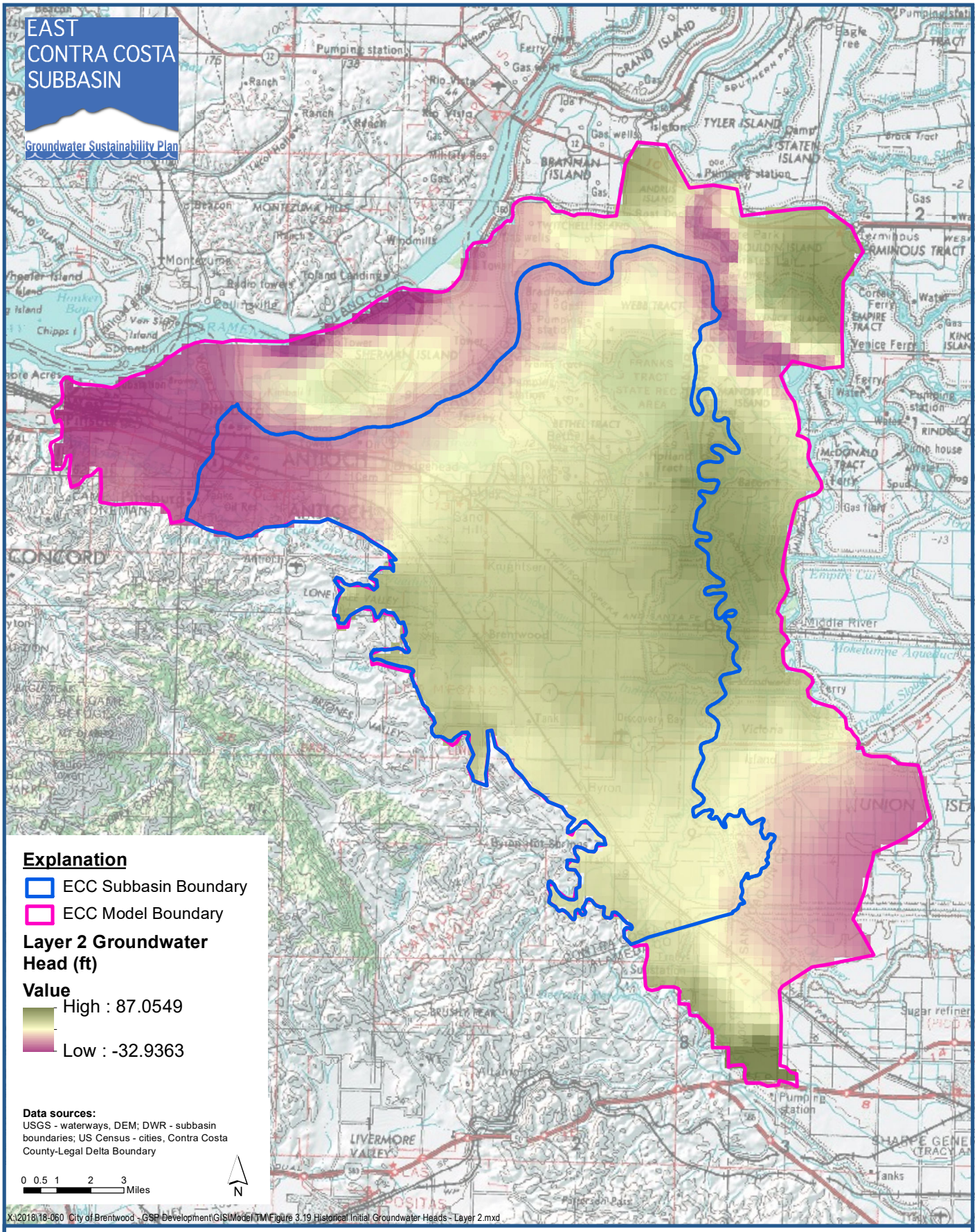
Historical Initial Groundwater Heads - Layer 1

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-18



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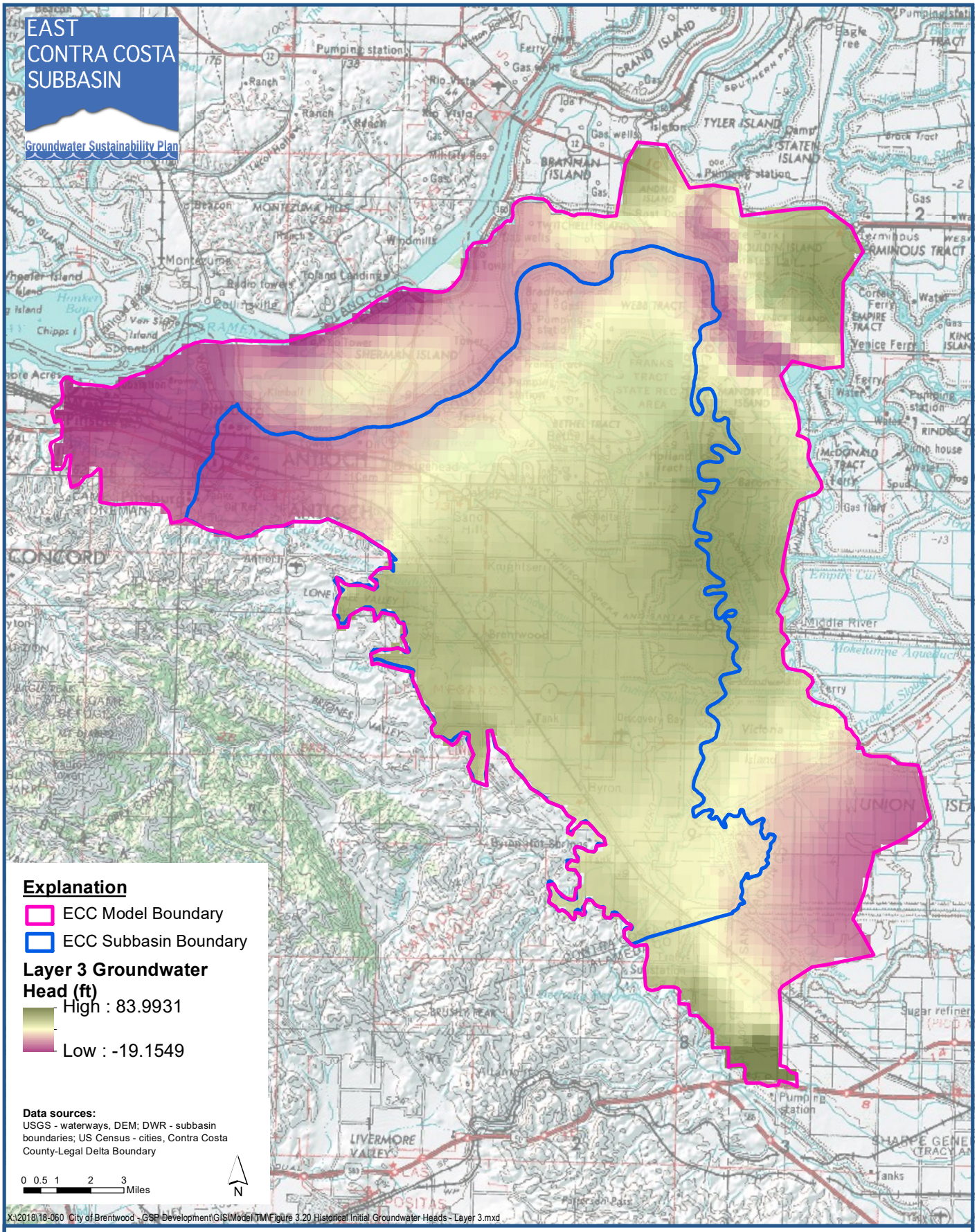
Historical Initial Groundwater Heads - Layer 2

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-19



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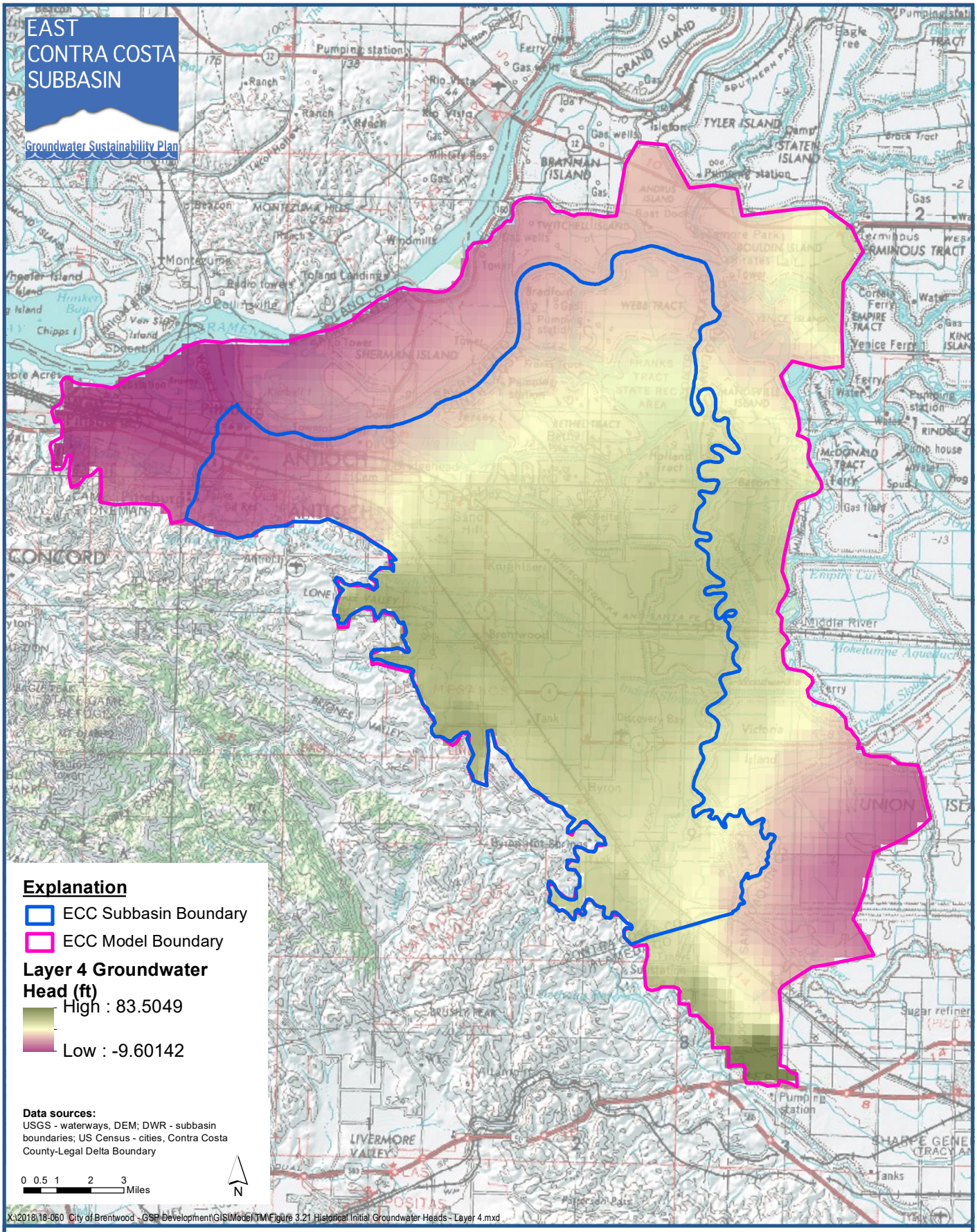
Historical Initial Groundwater Heads - Layer 3

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-20



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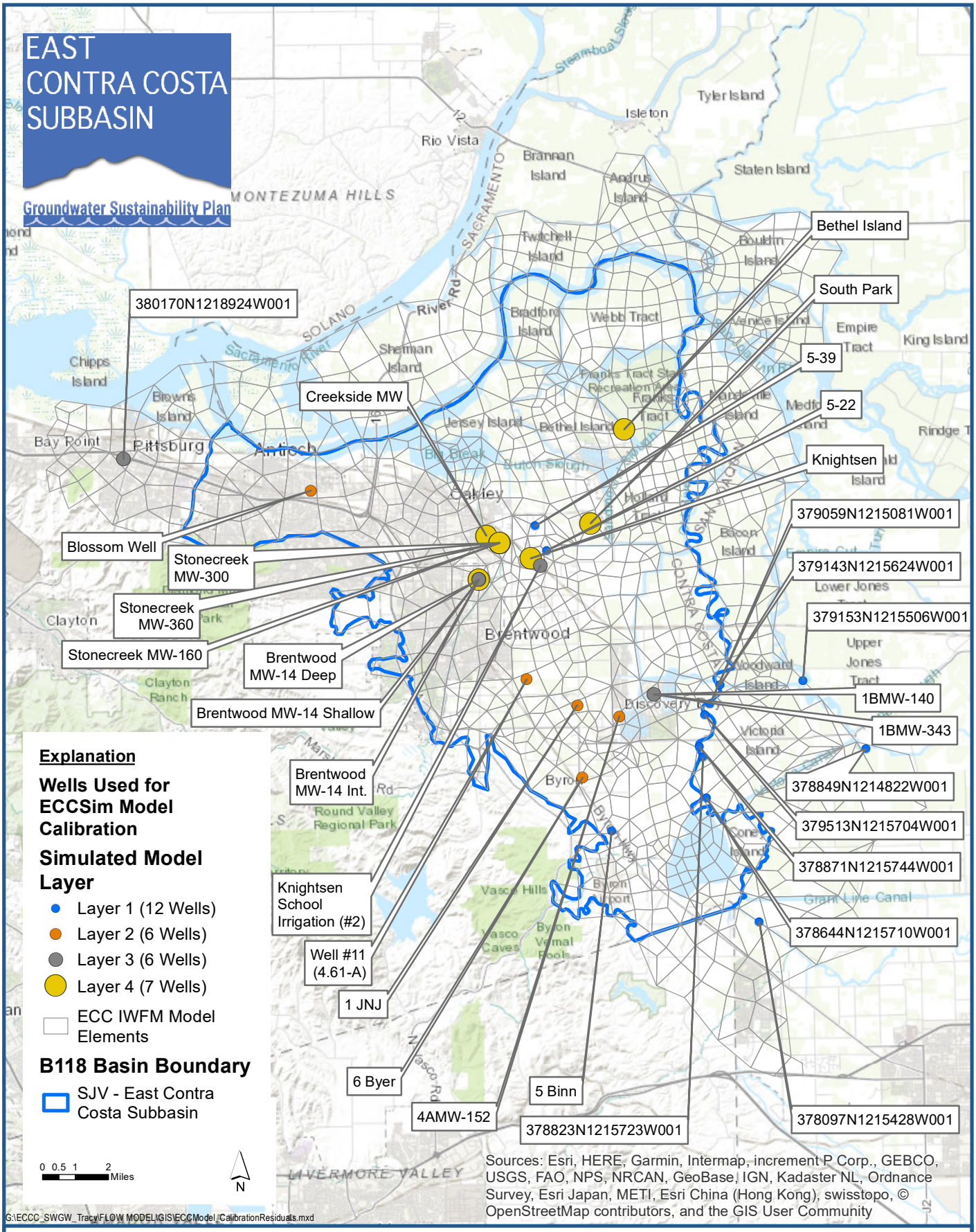
Historical Initial Groundwater Heads - Layer 4

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-21



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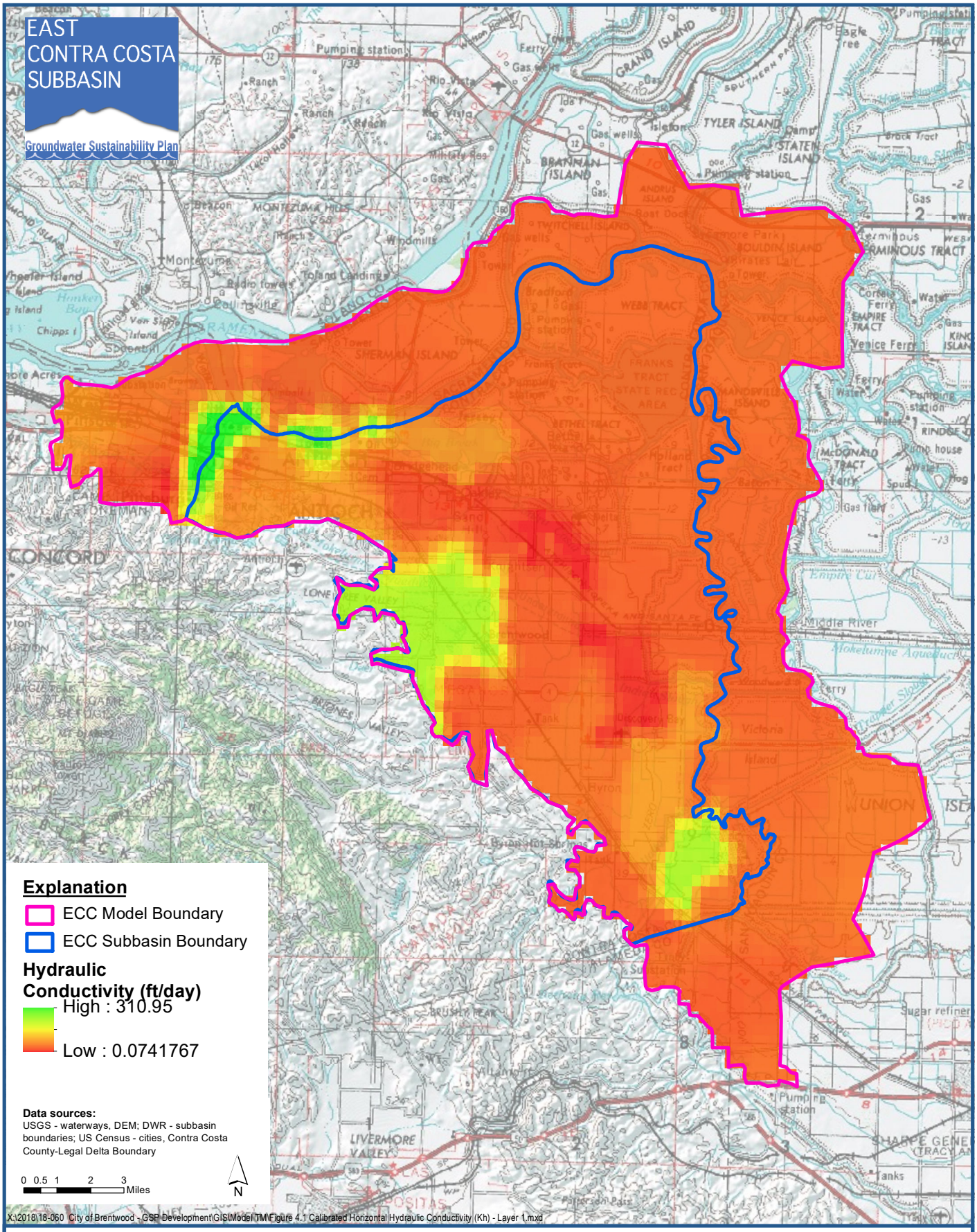
Map of Groundwater Level Calibration Wells

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 3-22



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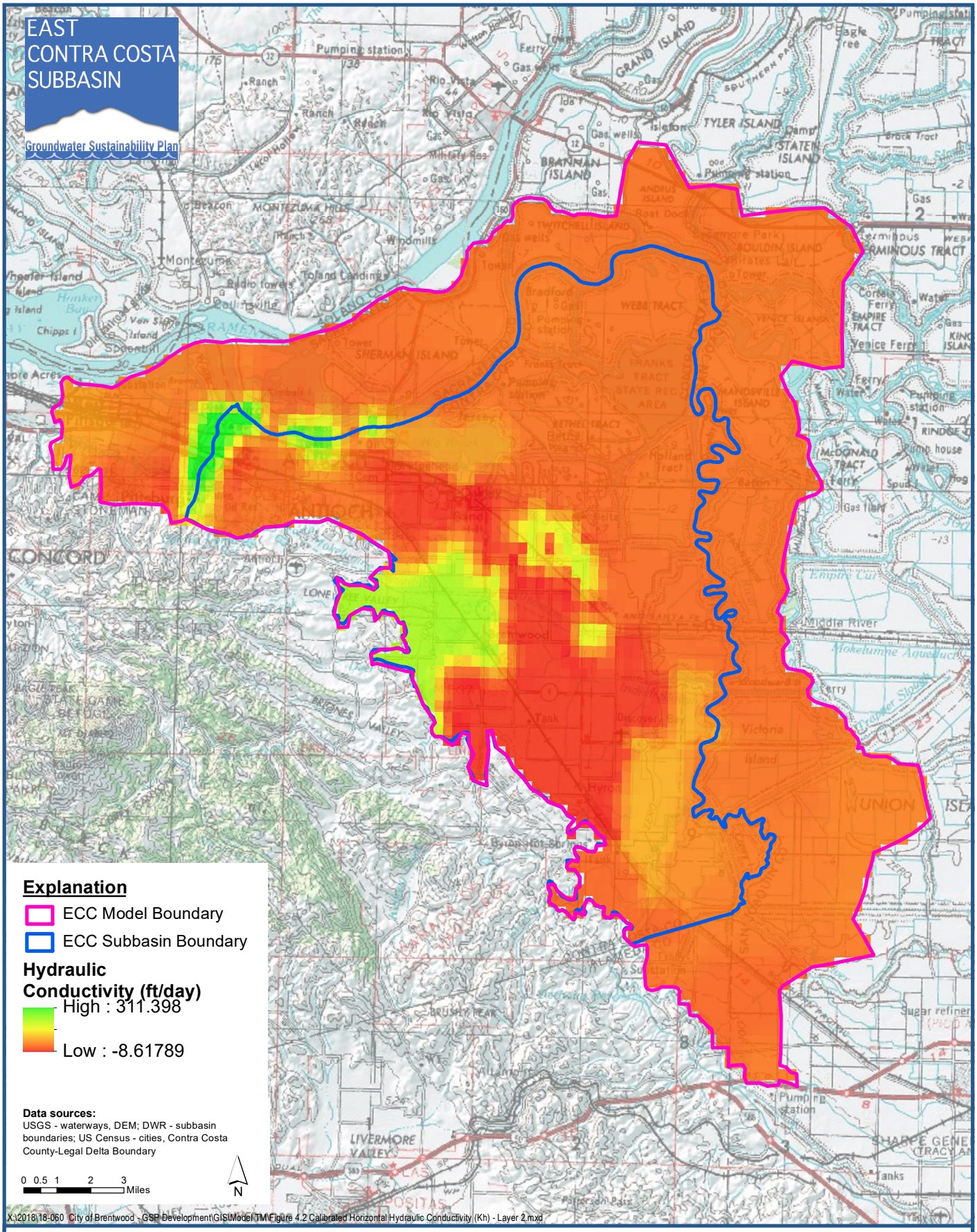
Calibrated Horizontal Hydraulic Conductivity (Kh) - Layer 1

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-1



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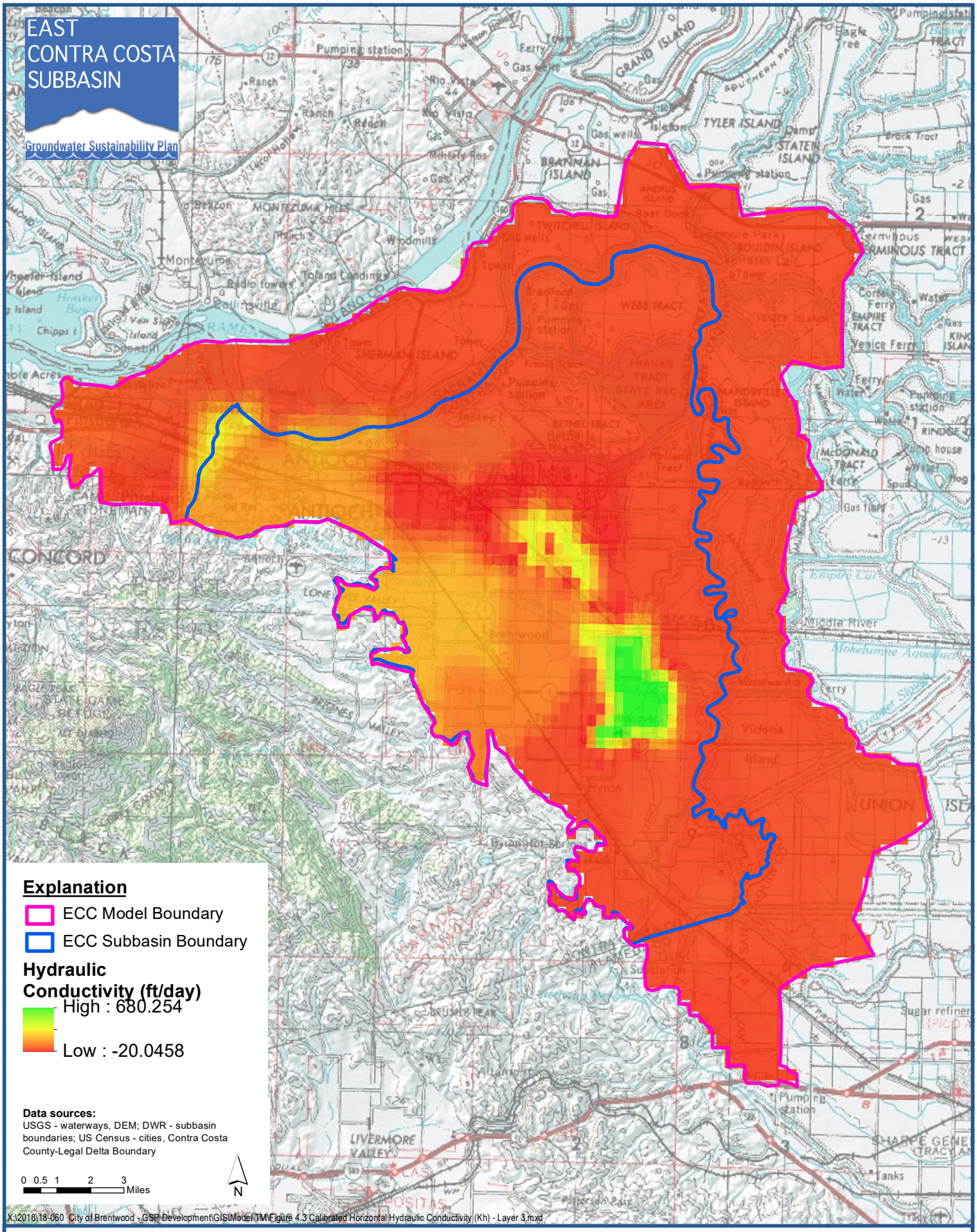
Calibrated Horizontal Hydraulic Conductivity (Kh) - Layer 2

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-2



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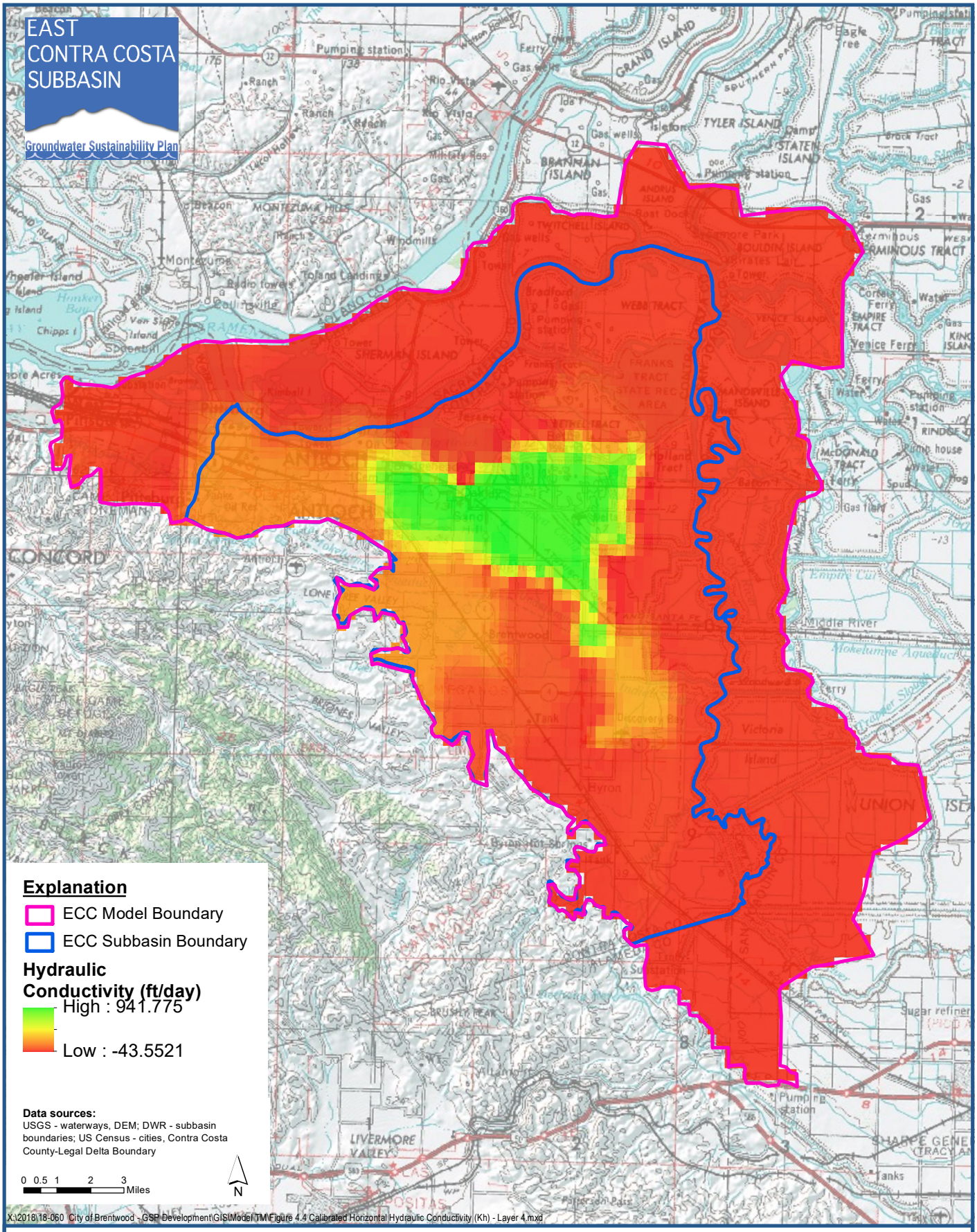
Calibrated Horizontal Hydraulic Conductivity (Kh) - Layer 3

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-3



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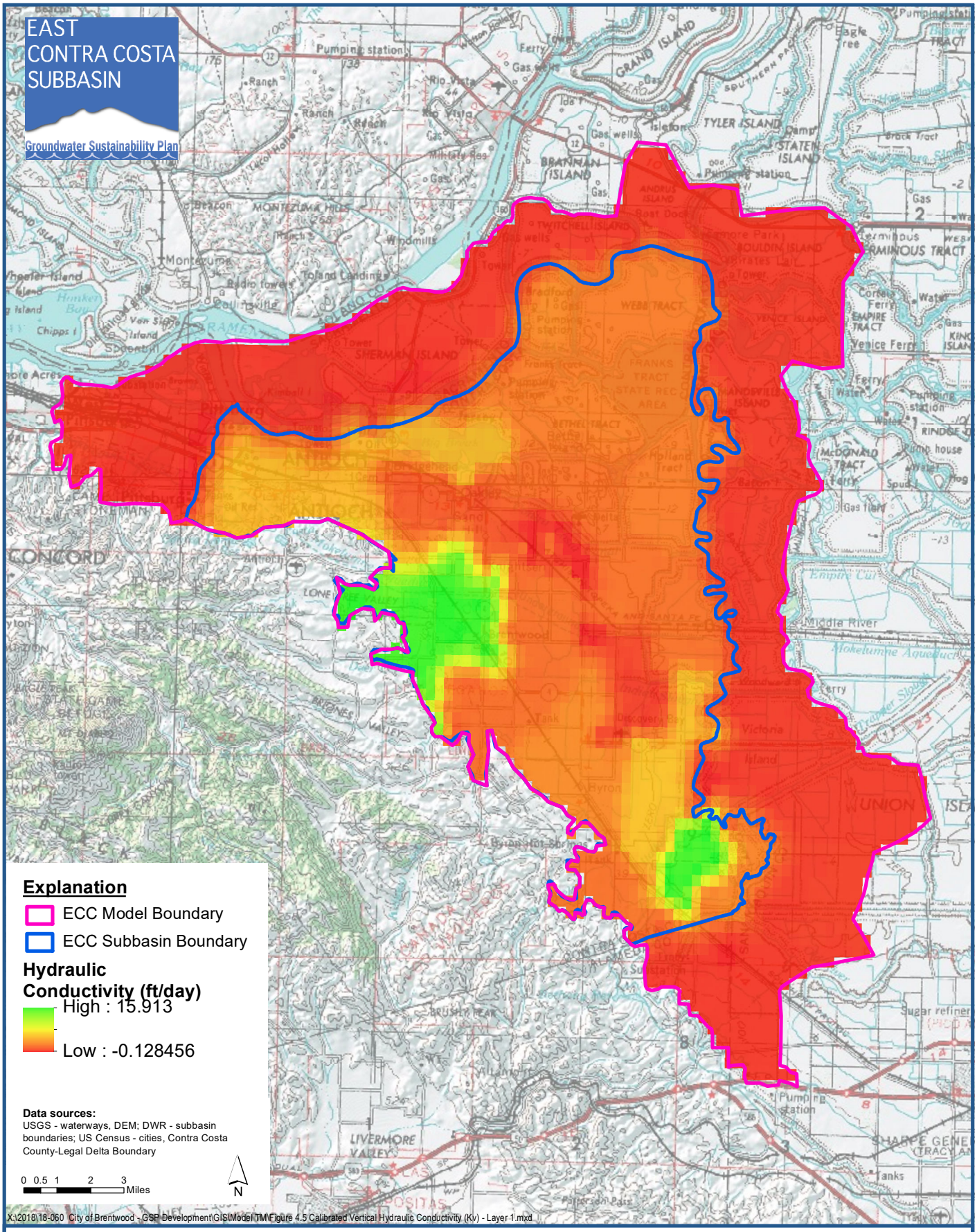
Calibrated Horizontal Hydraulic Conductivity (Kh) - Layer 4

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-4



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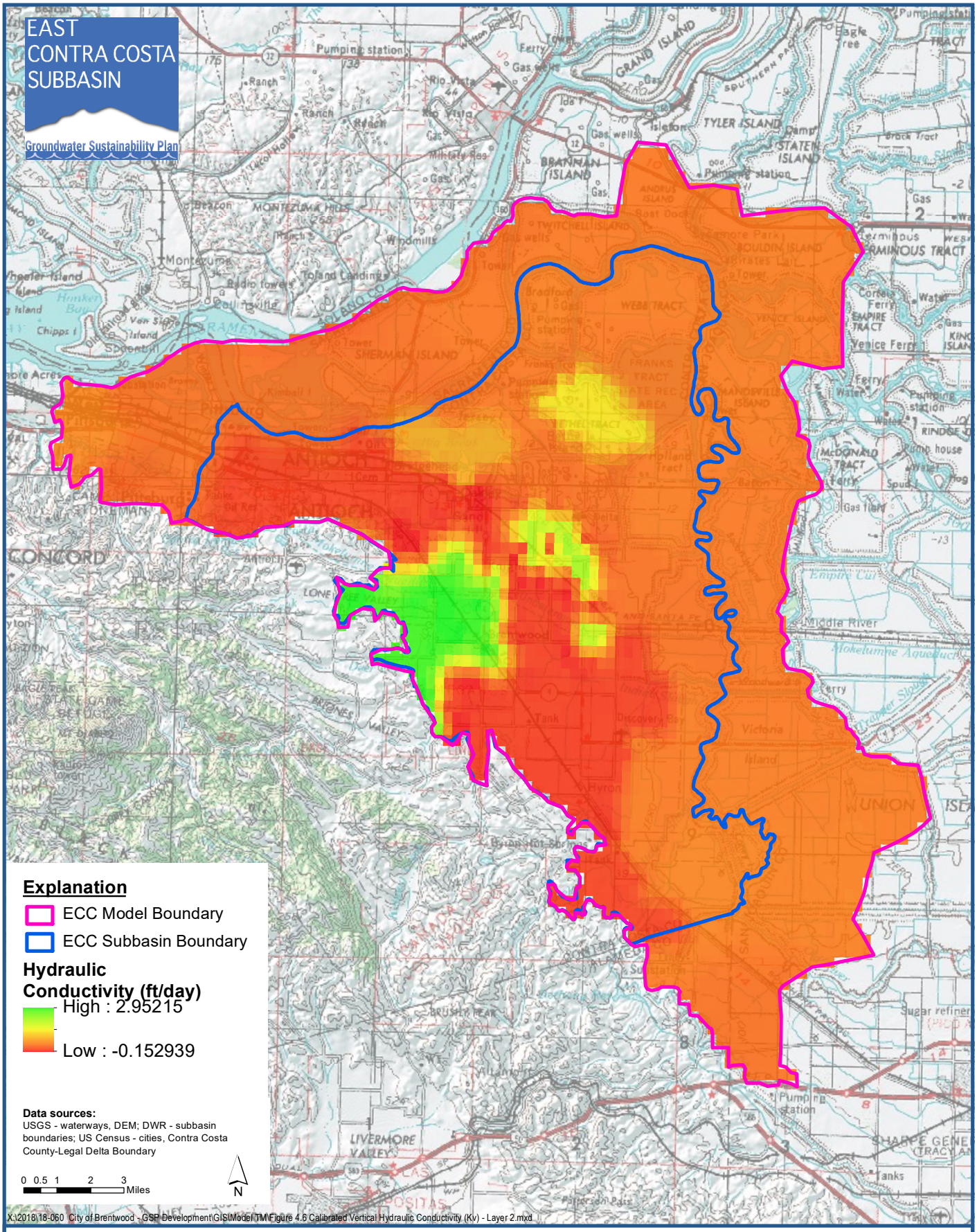
Calibrated Vertical Hydraulic Conductivity (Kv) - Layer 1

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-5



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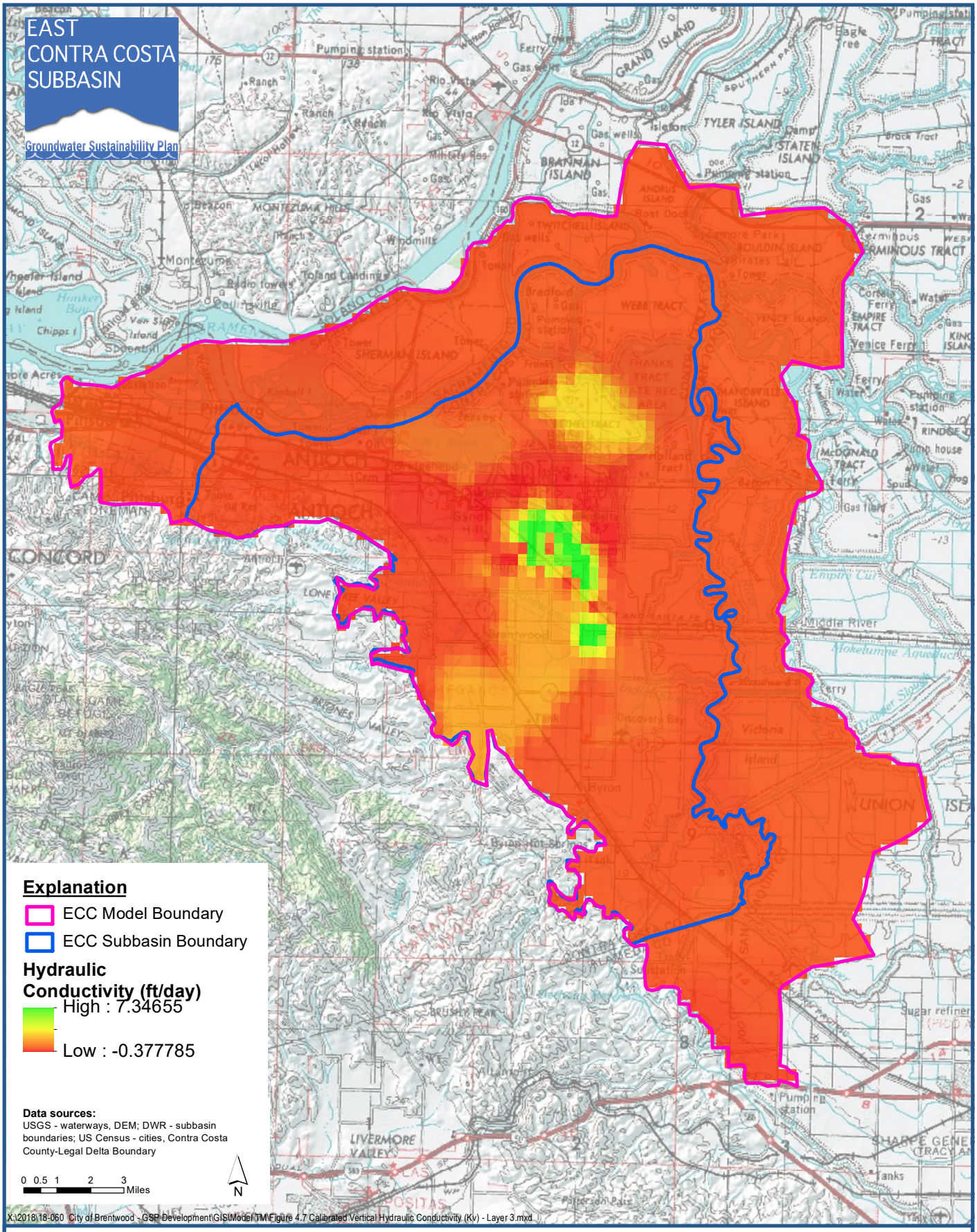
Calibrated Vertical Hydraulic Conductivity (Kv) - Layer 2

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-6



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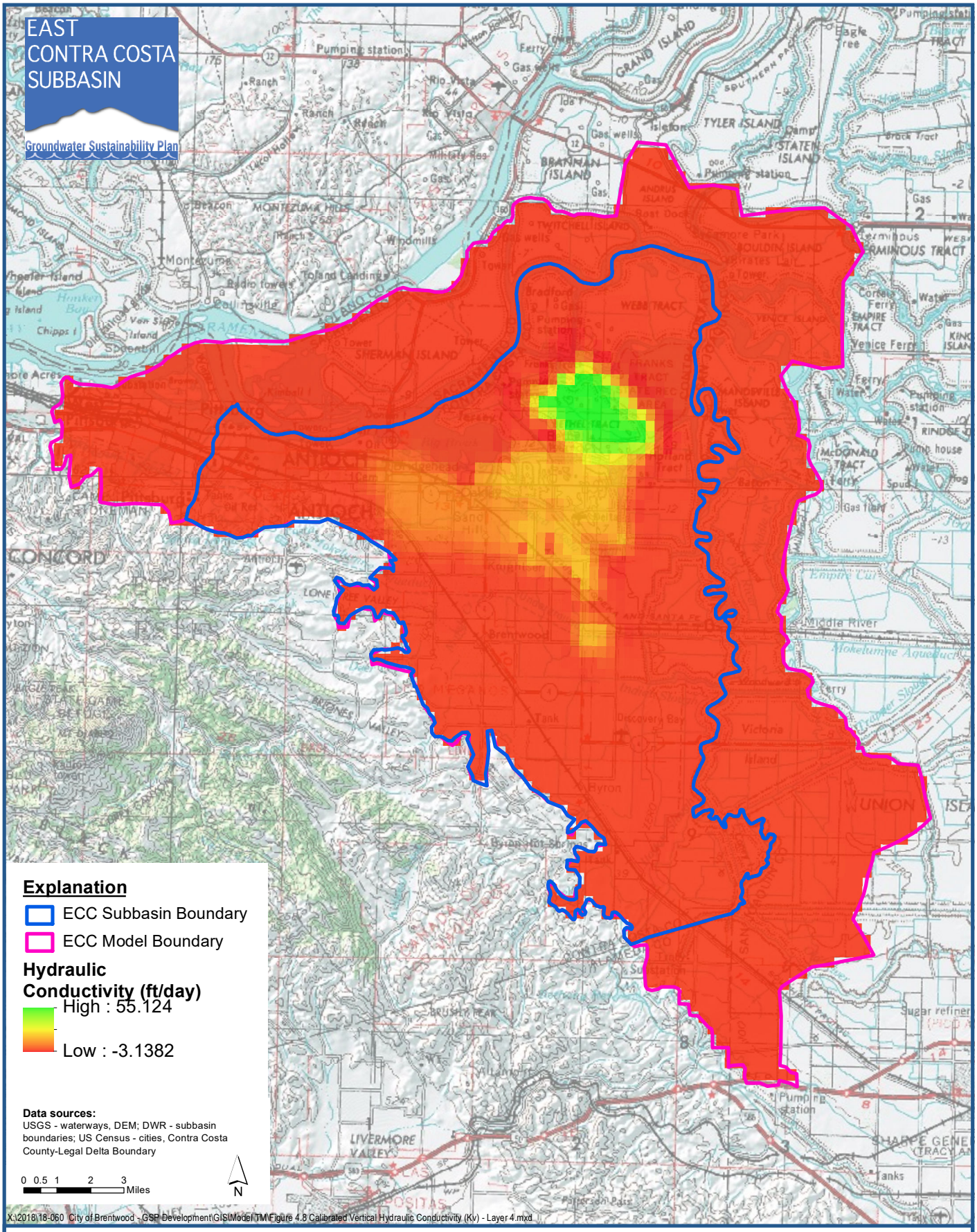
Calibrated Vertical Hydraulic Conductivity (Kv) - Layer 3

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-7



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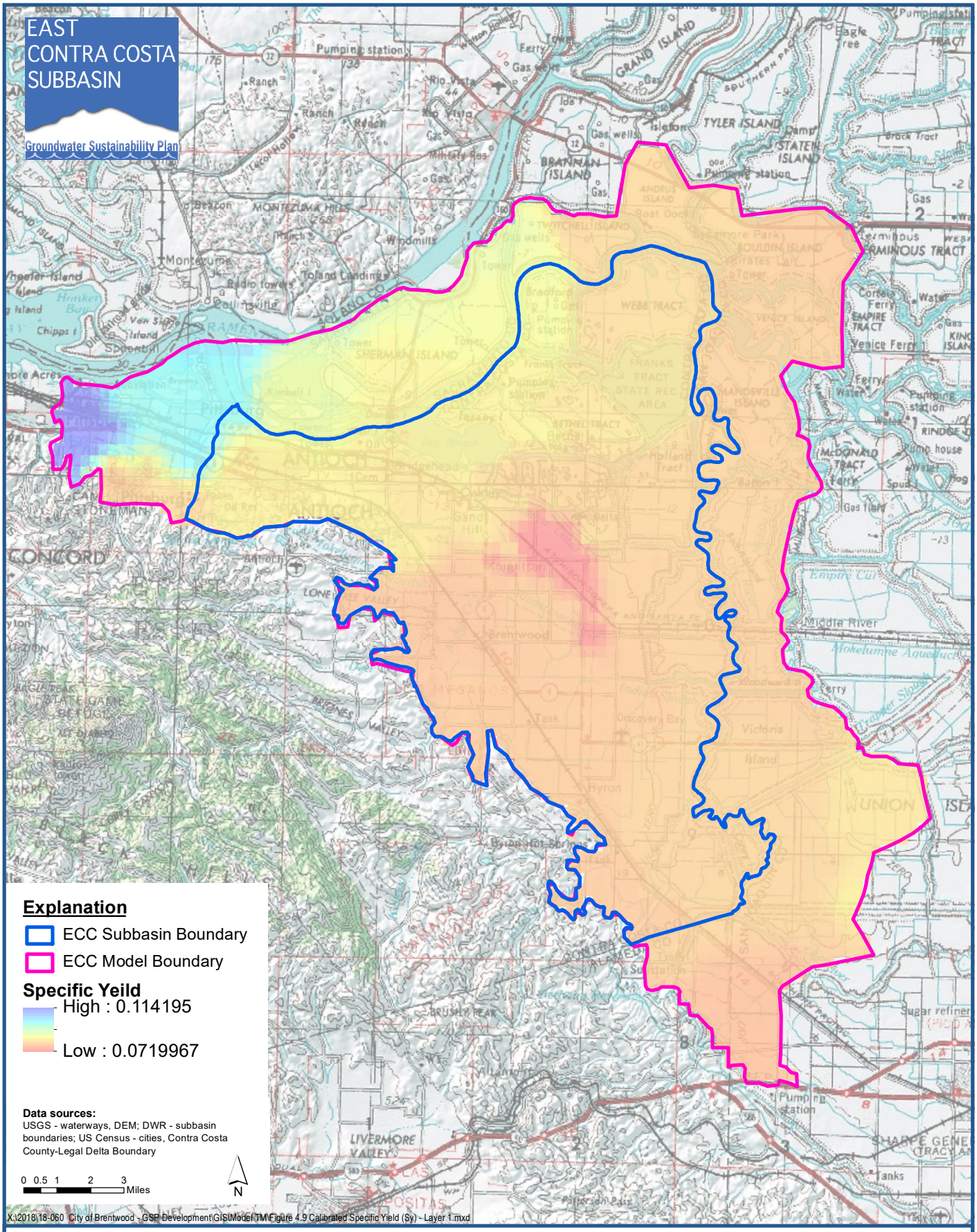
Calibrated Vertical Hydraulic Conductivity (Kv) - Layer 4

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-8



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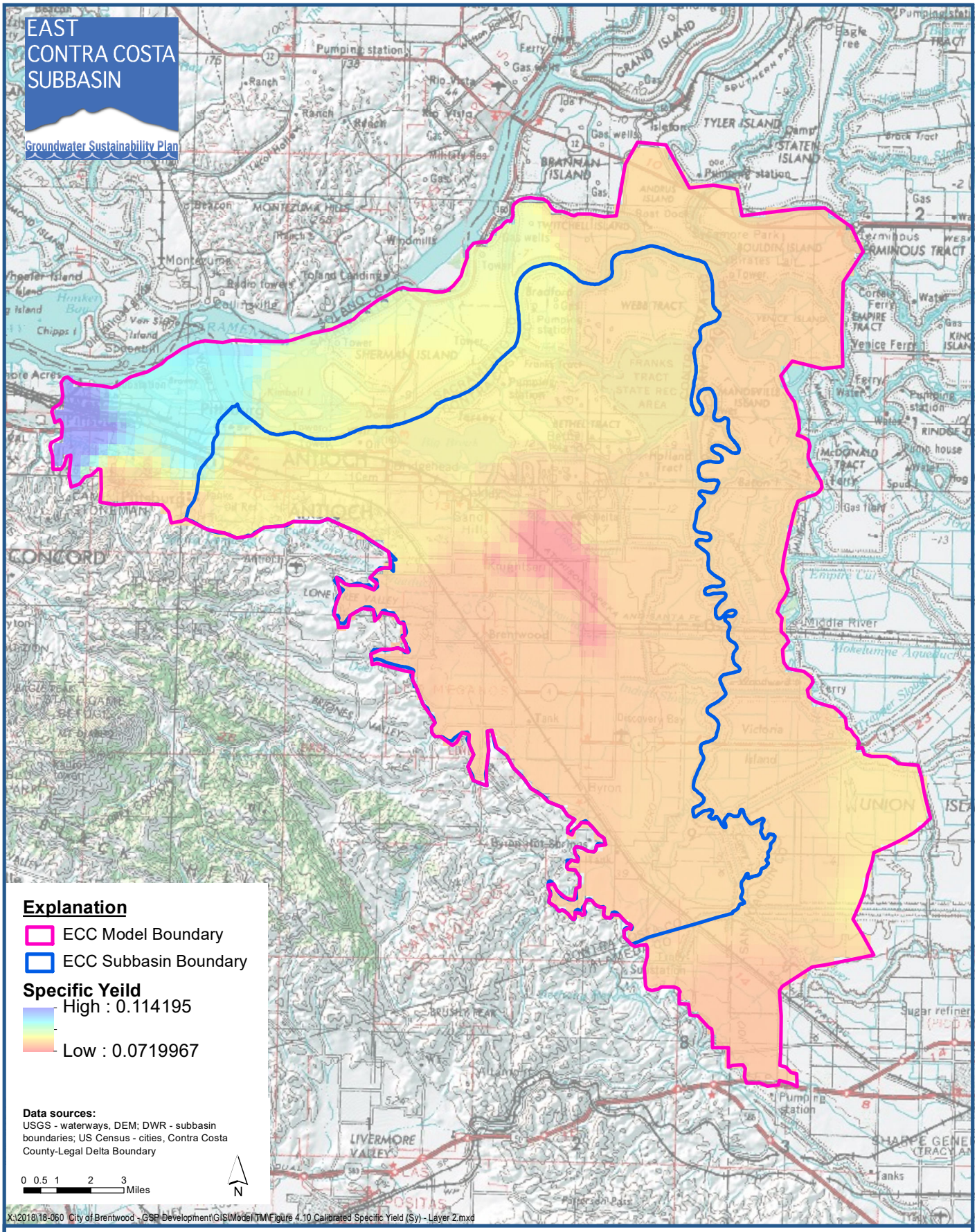
Calibrated Specific Yield (Sy) - Layer 1

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-9



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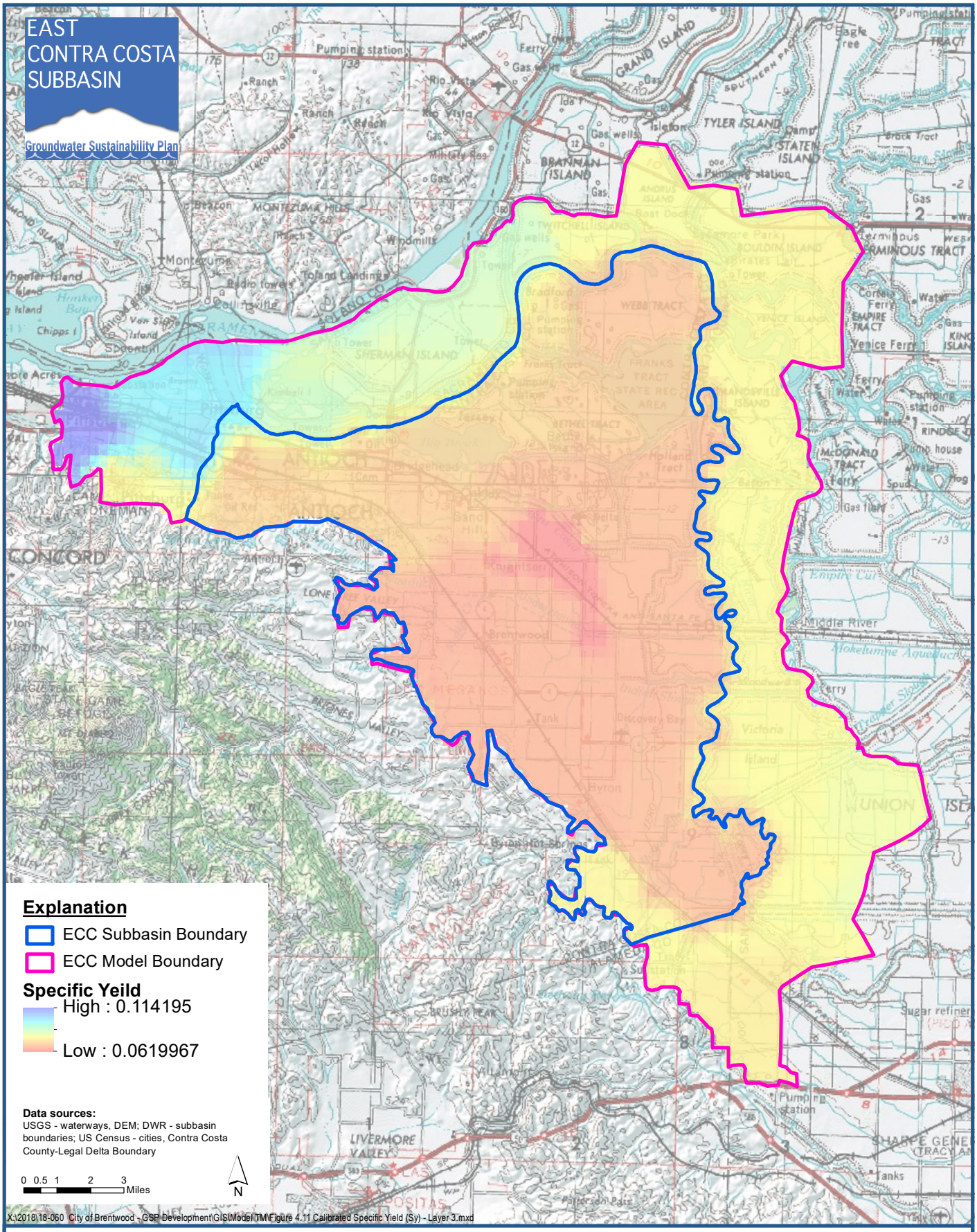
Calibrated Specific Yield (Sy) - Layer 2

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-10



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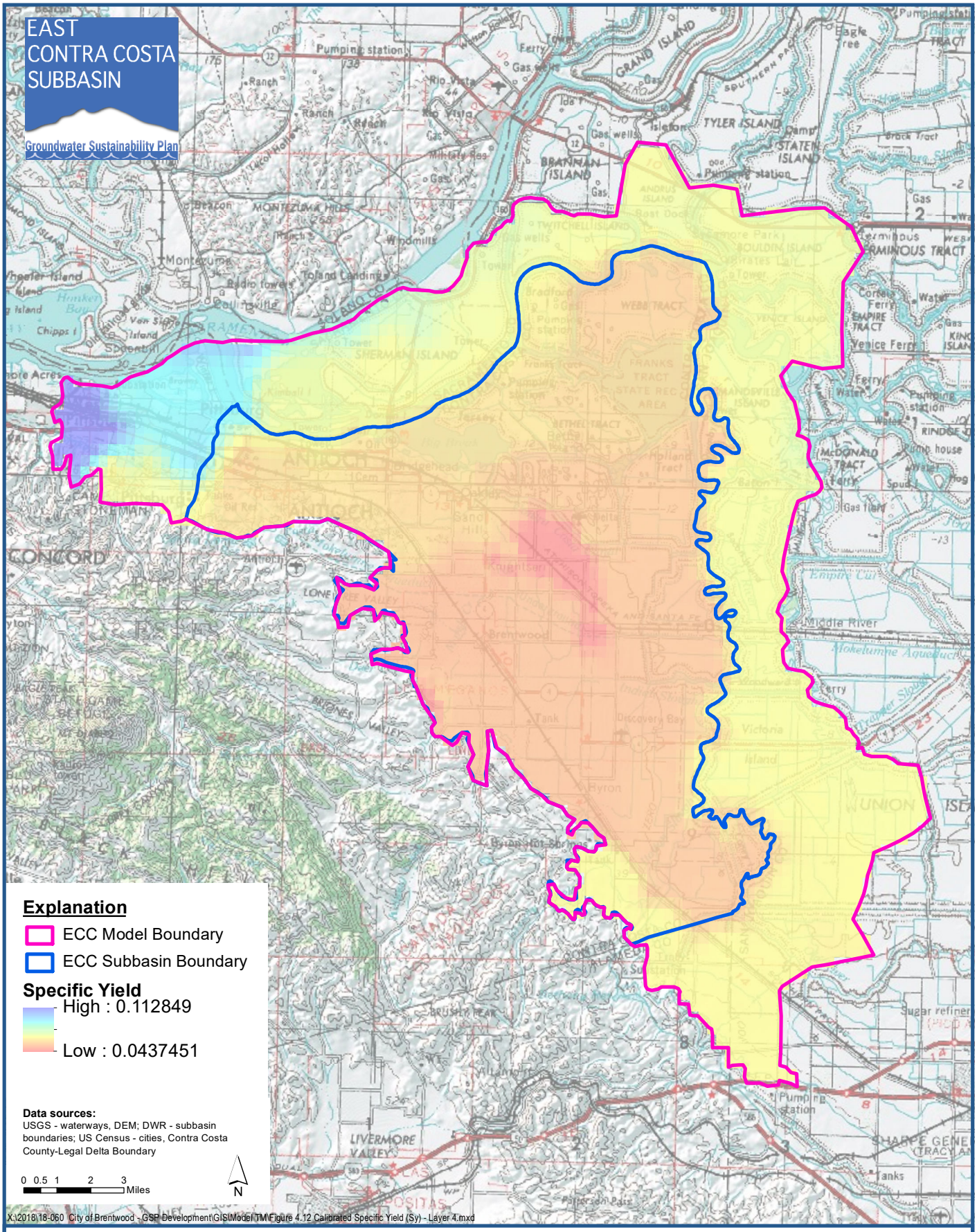
Calibrated Specific Yield (Sy) - Layer 3

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-11



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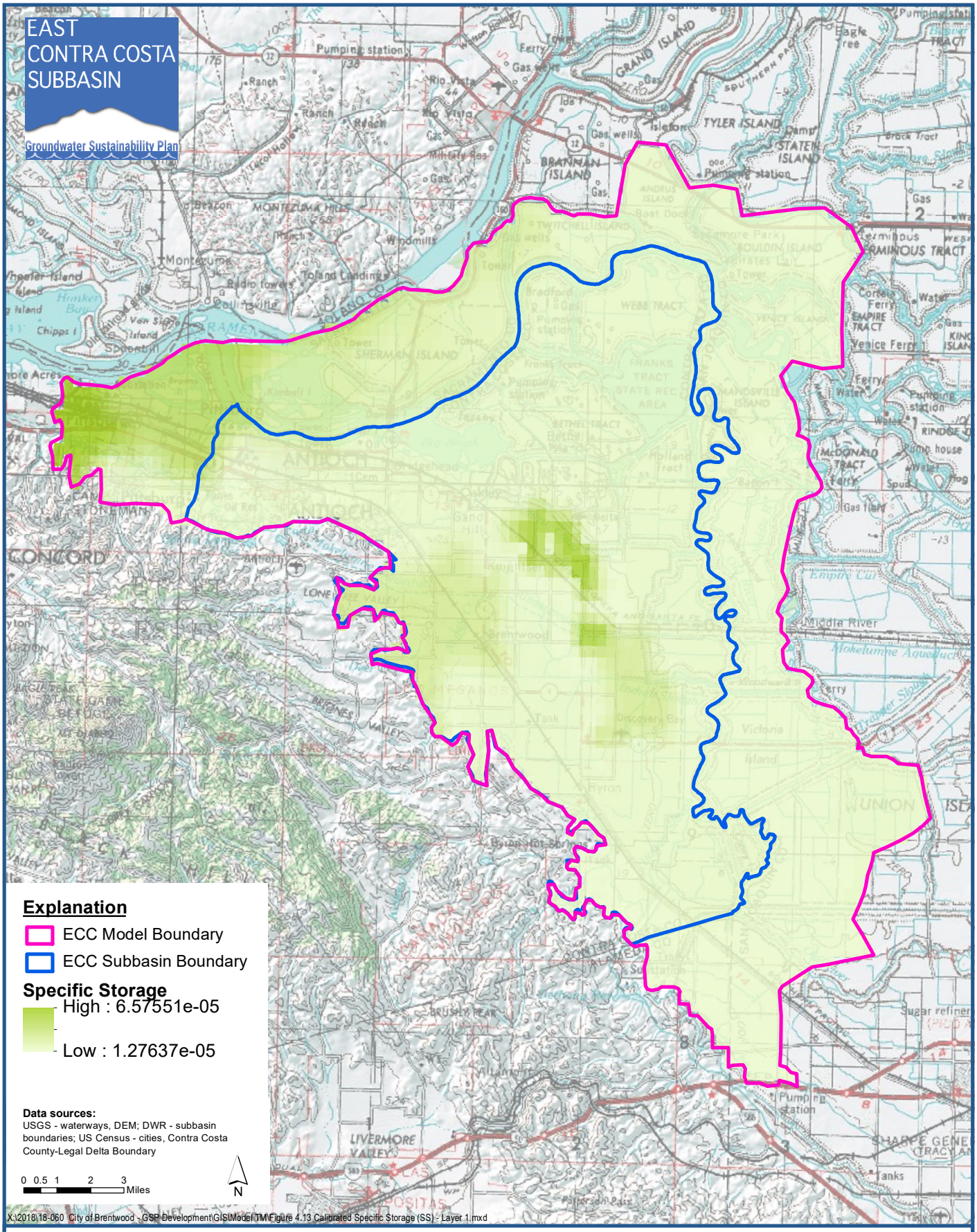
Calibrated Specific Yield (Sy) - Layer 4

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-12



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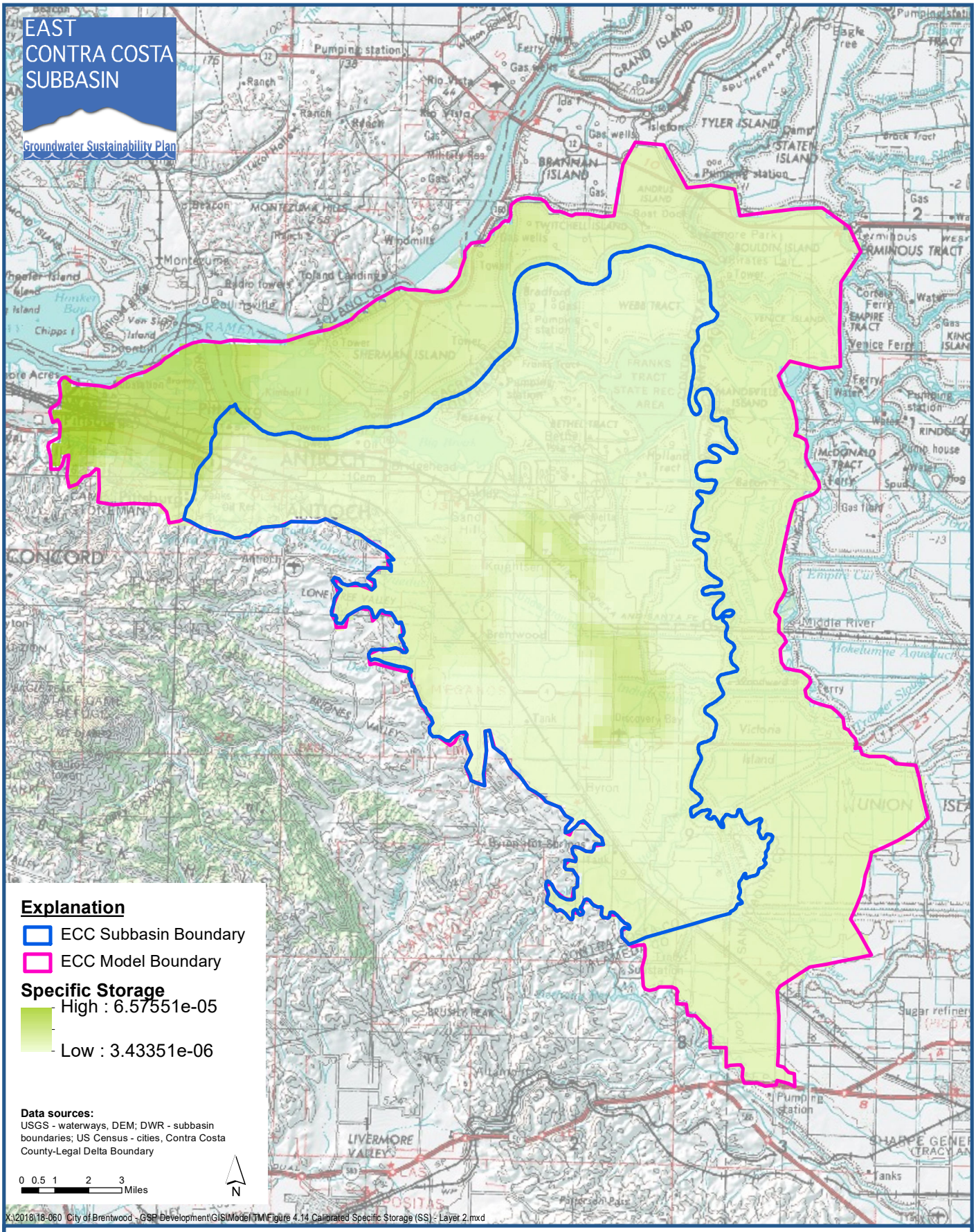
Calibrated Specific Storage (SS) - Layer 1

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-13



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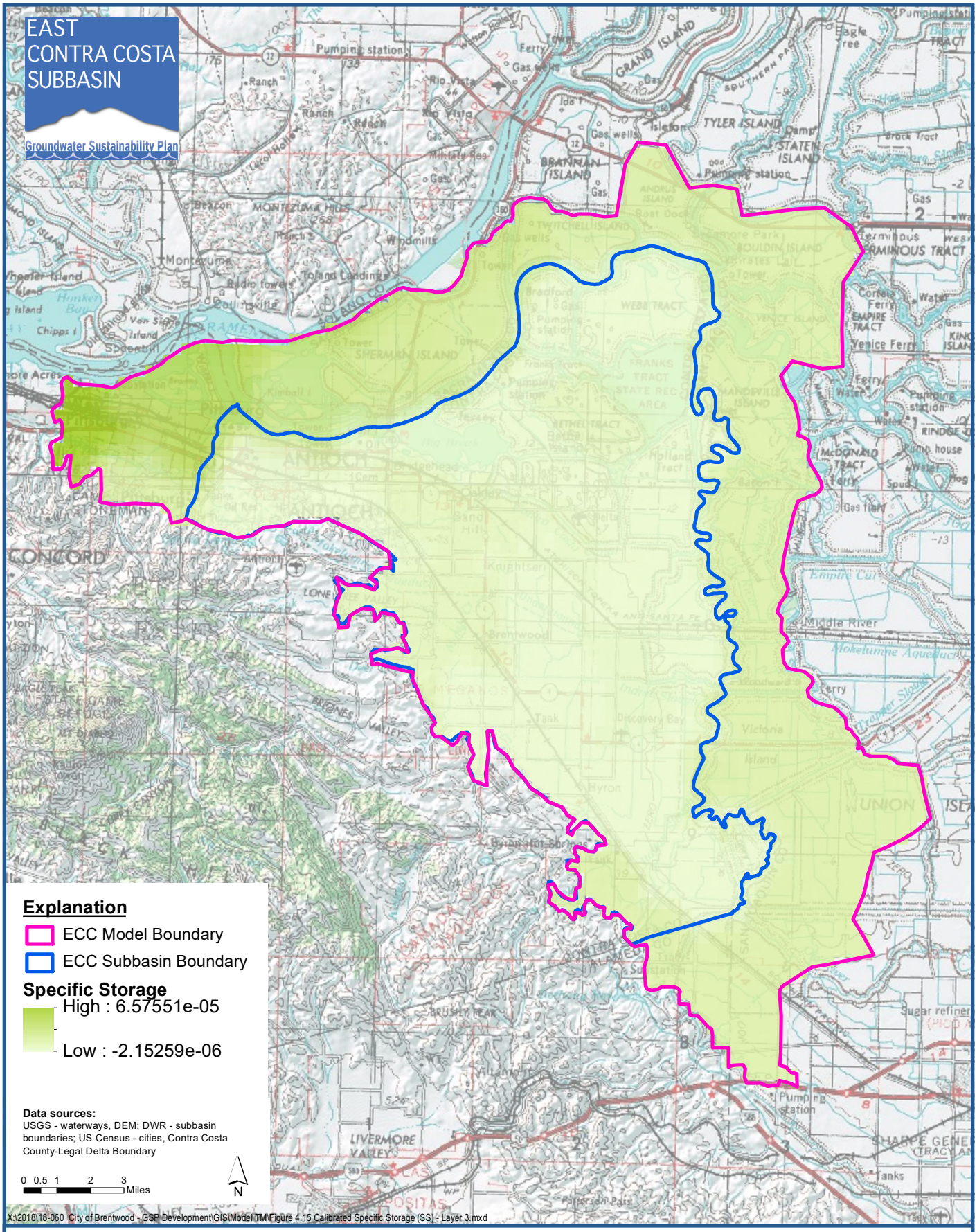
Calibrated Specific Storage (SS) - Layer 2

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-14



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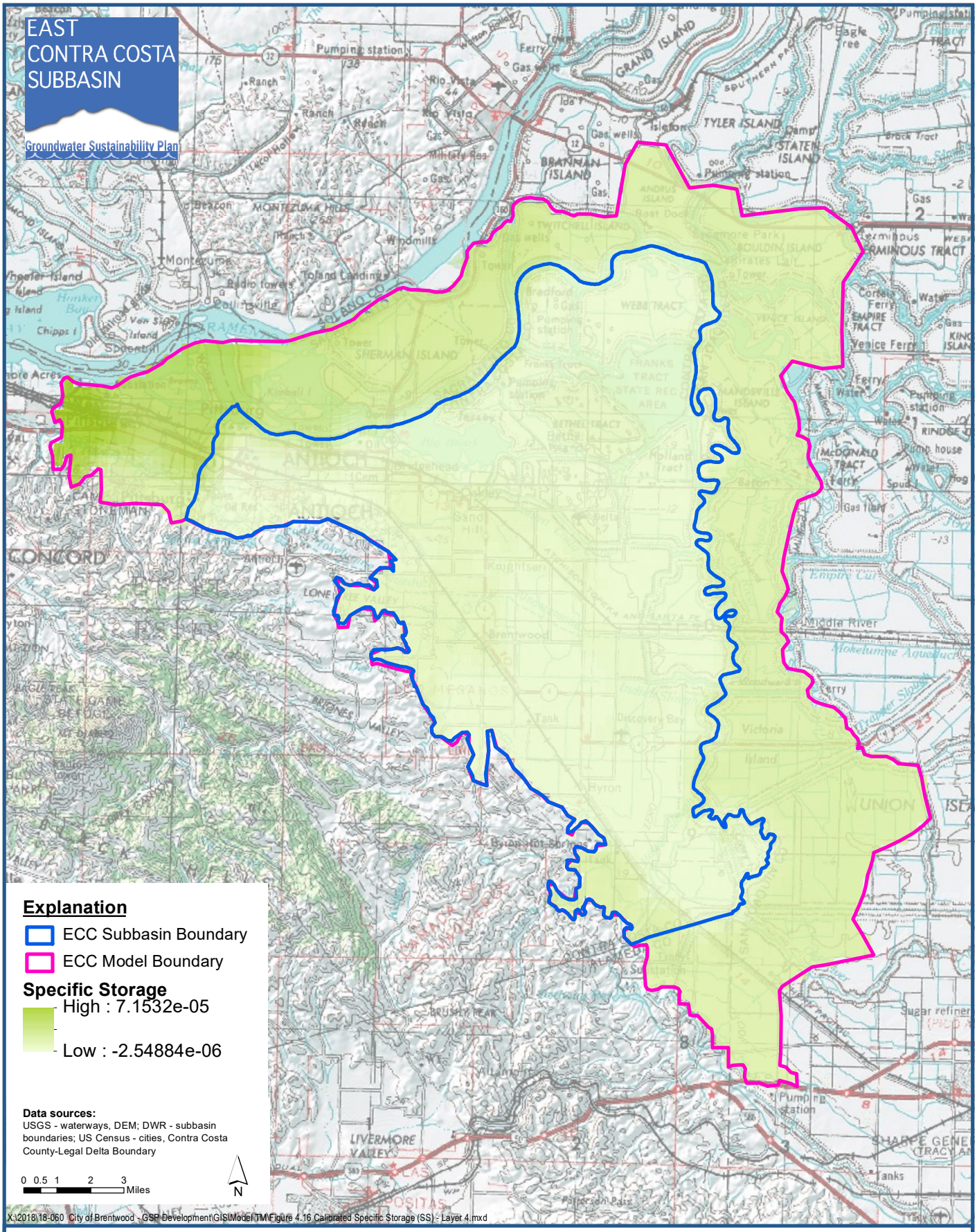
Calibrated Specific Storage (SS) - Layer 3

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-15



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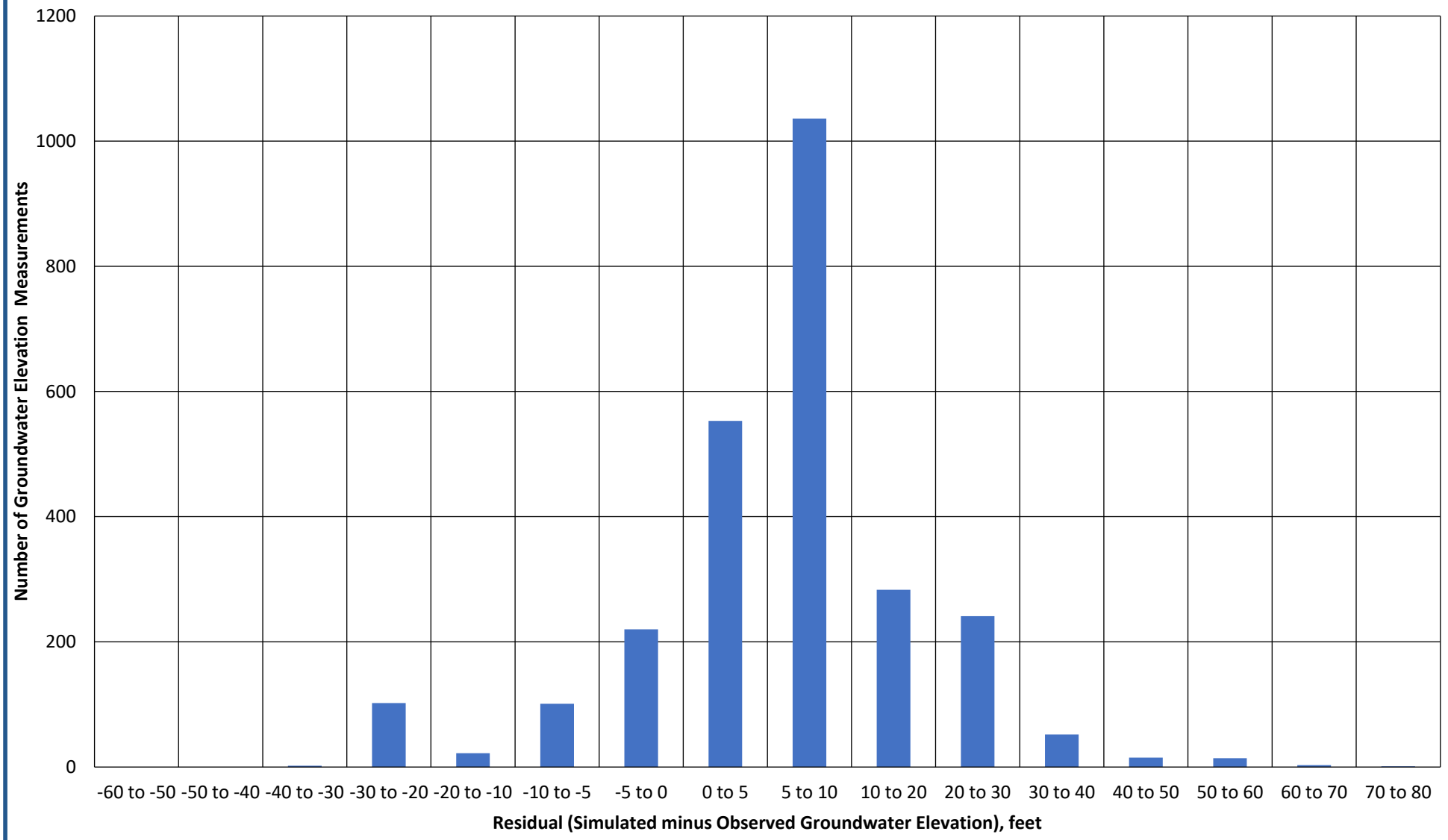
Calibrated Specific Storage (SS) - Layer 4

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Figure 4-16



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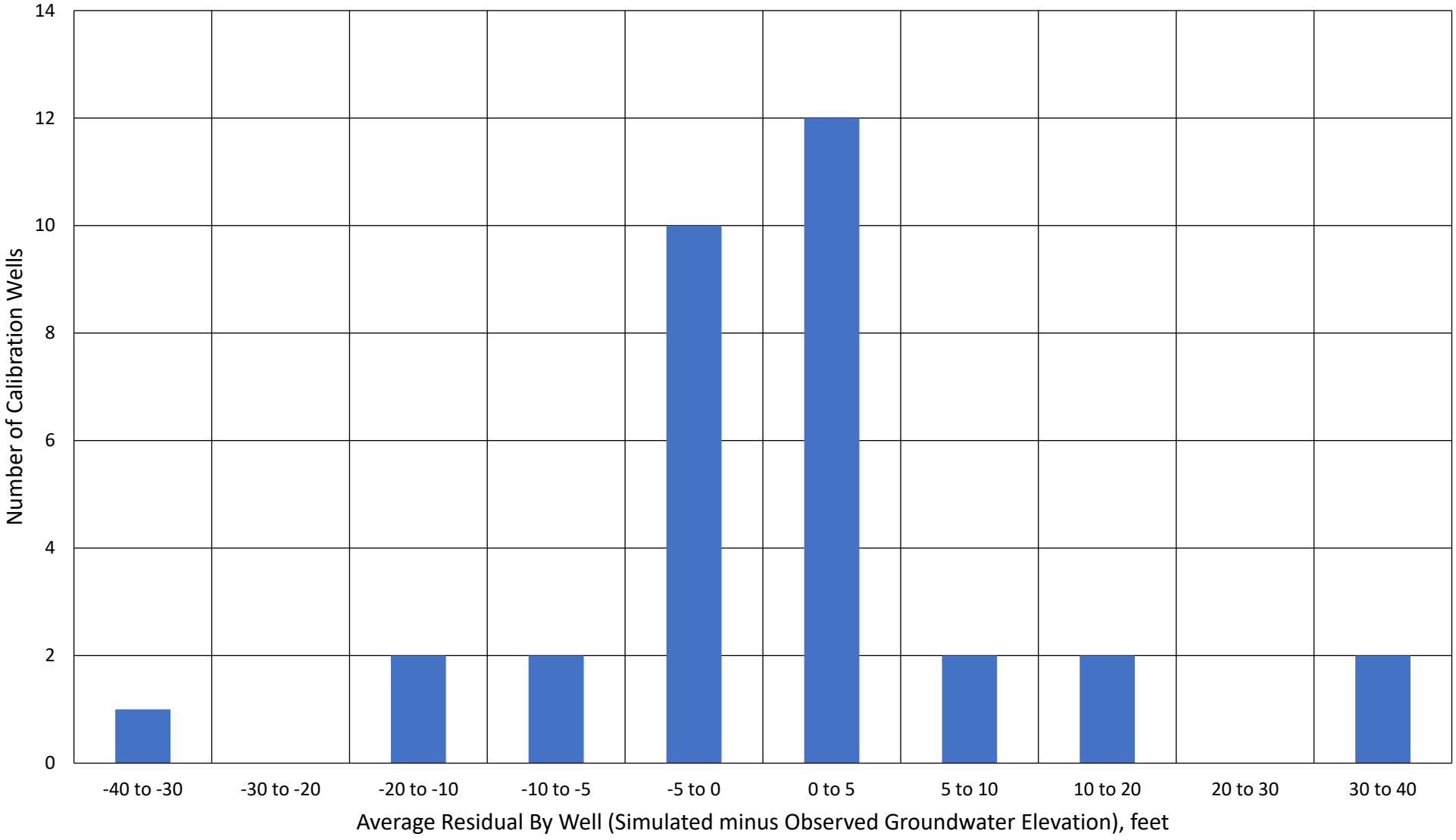
Histogram of Residual (Simulated minus Observed) Groundwater Elevations for All Observations

East Contra Costa Groundwater-Surface Water Simulation Model (ECCSim) Report

Figure 4-17



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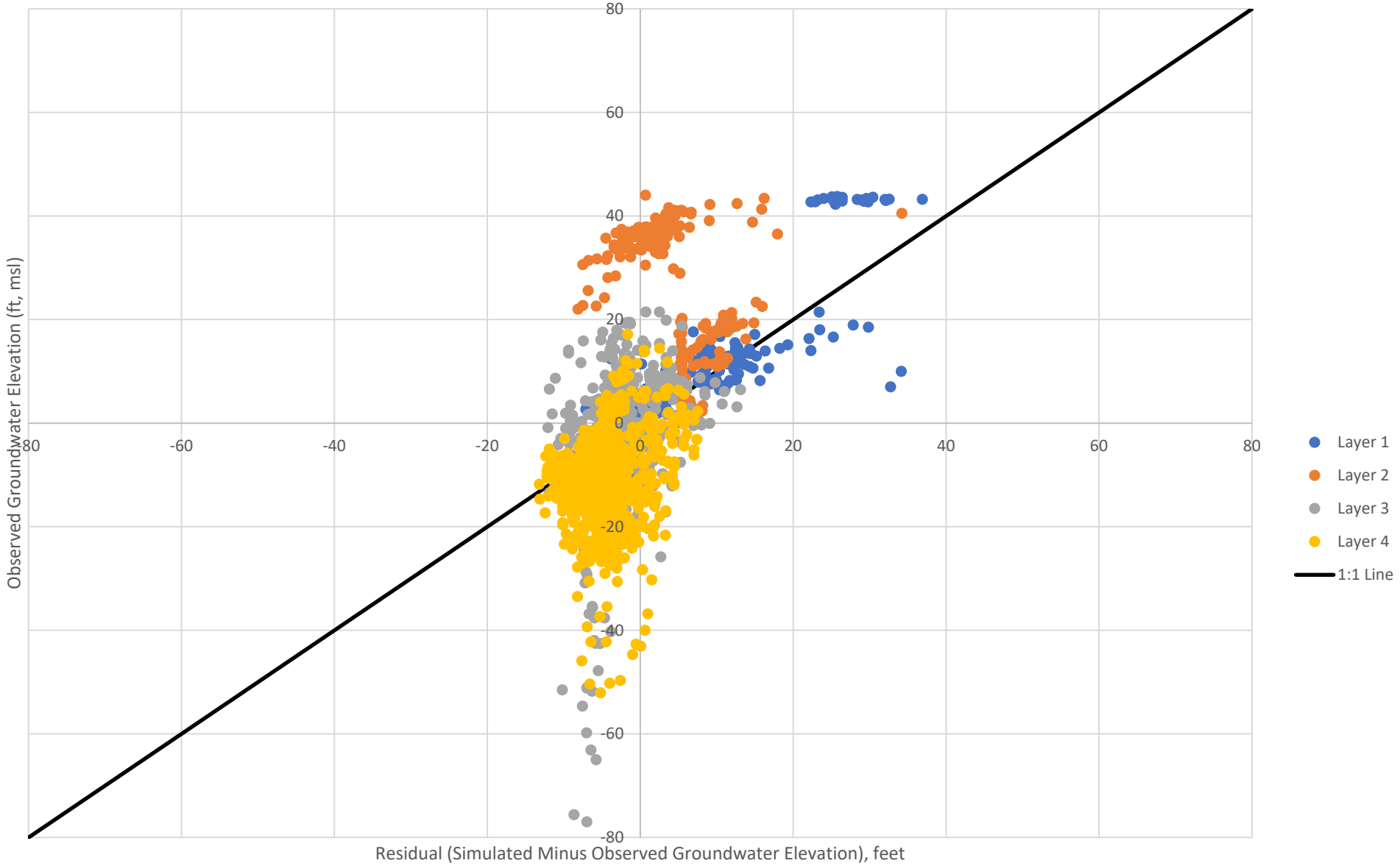
Histogram of Average Residual (Simulated minus Observed) Groundwater Elevation by Well

East Contra Costa Groundwater-Surface Water Simulation Model (ECCSim) Report

Figure 4-18



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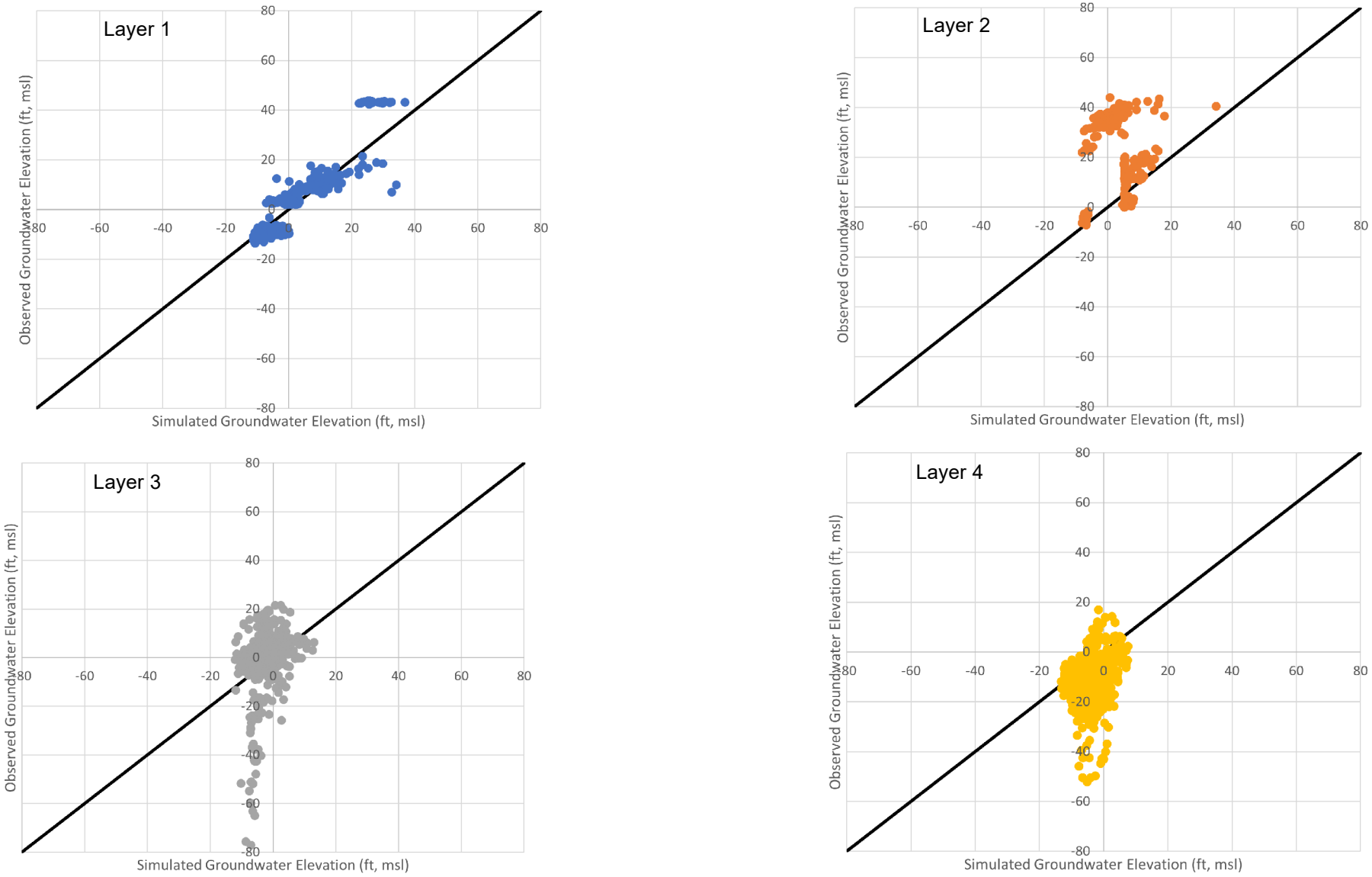
Simulated vs. Observed Groundwater Elevations, By Layer

East Contra Costa Groundwater-Surface Water Simulation Model (ECCSim) Report

Figure 4-19



X:\2018\18-060 City of Brentwood - GSP Development\GIS\Model TM\Figure 4.20 Simulated vs. Observed Groundwater Elevations.mxd

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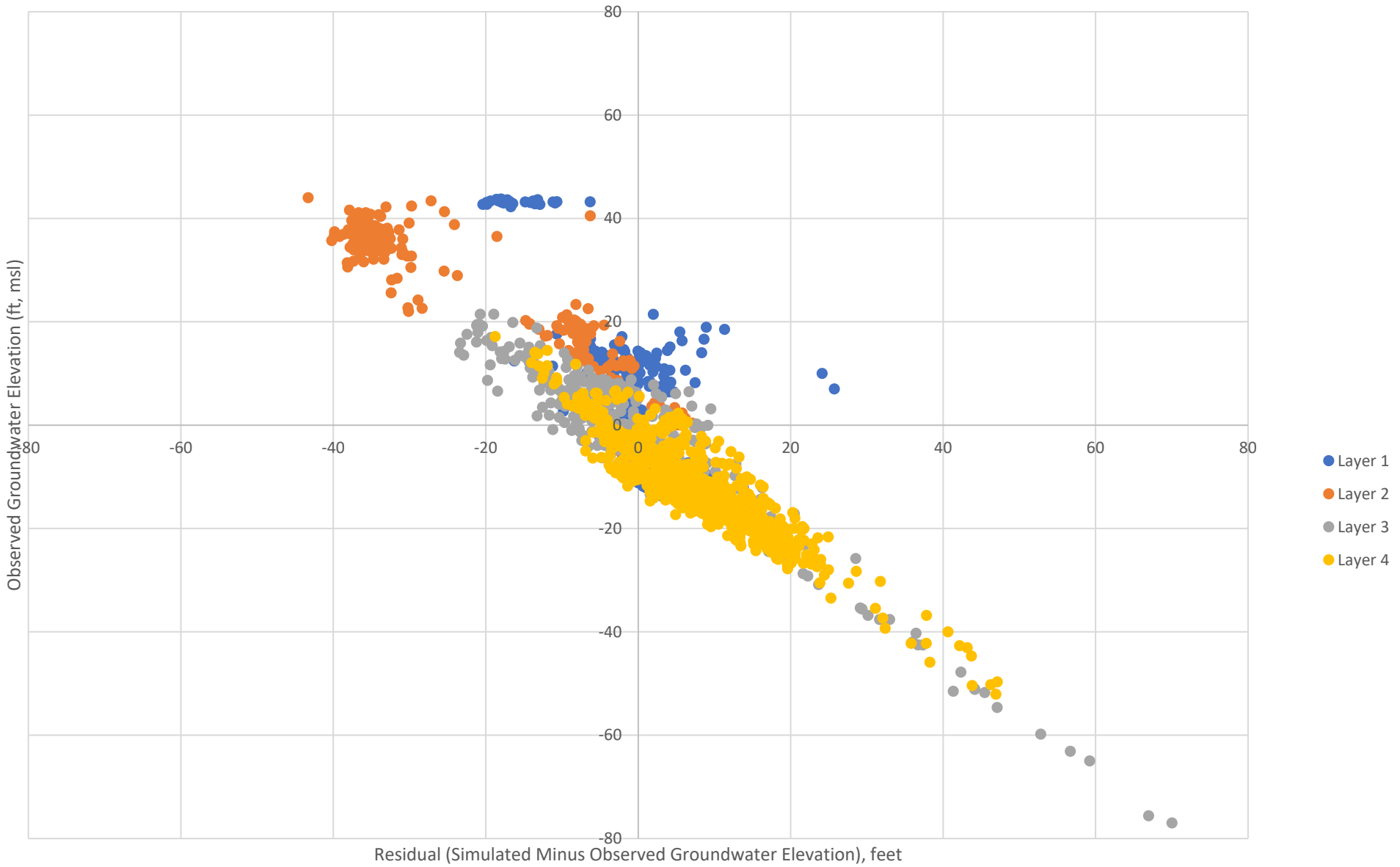
Simulated vs. Observed Groundwater Elevations By Layer

East Contra Costa Groundwater-Surface Water Simulation Model (ECCSim) Report

Figure 4-20



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Residual (Simulated minus Observed) vs. Observed Groundwater Elevations, By Layer

East Contra Costa Groundwater-Surface Water Simulation Model (ECCSim) Report

Figure 4-21

APPENDIX 6a

Monitoring Protocols

1 MONITORING PROTOCOLS

1.1 Protocols for Measuring Groundwater Levels

- Measure depth to water in the well using procedures appropriate for the measuring device. Equipment must be operated and maintained in accordance with manufacturer's instructions. Groundwater levels shall be measured to the nearest 0.1 foot relative to the Reference Point.
- For measuring wells that are under pressure, allow a period of time for the groundwater levels to stabilize. In these cases, multiple measurements shall be collected to ensure the well reached equilibrium such that no significant changes in water level are observed. Every effort shall be made to ensure that a representative stable depth to groundwater is recorded. If a well does not stabilize, the quality of the value shall be appropriately qualified as a questionable measurement.
- The groundwater elevation will be calculated using the following equation.

GWE = RPE − DTW

Where:

GWE = Groundwater Elevation in NAVD88 datum

RPE = Reference Point Elevation in NAVD88 datum

DTW = Depth to Water from the reference point

- The measurements of depth to water shall be consistent in units of feet, to an accuracy of tenths of feet or hundredths of feet.
- The well caps or plugs shall be secured following depth to water measurement.
- Groundwater level measurements are to be made on a semi-annual basis during periods of seasonal highs and lows.

1.1.1 Protocols for Recording Groundwater Level Measurements

- The field personnel shall record the well identifier, date, time (24-hour format), RPE, height of the reference point above or below ground surface, DTW, GWE, and provide comments regarding any factors that may influence the depth to water readings such as weather, nearby irrigation, pumping, flooding, potential for tidal influence, or well condition. If there is a questionable measurement or the measurement cannot be obtained, it shall be noted. Standardized field forms shall be used for all data collection.
- All data shall be entered into the GSP data management system (DMS) as soon as possible. Care shall be taken to avoid data entry errors and the entries shall be checked by a second person.
- Semi-annual groundwater level data collected from the wells in the CASGEM network will be submitted to DWR by March 31 (spring data) and October 31 (fall data) by the database manager.

1.1.2 Protocols for Installing Pressure Transducers and Downloading Data

- The field personnel must use an electronic sounder or chalked steel tape and follow the protocols listed above to measure the groundwater level and calculate the groundwater elevation in the monitoring well to properly program and reference the transducer. It is recommended that transducers record measured groundwater levels to conserve data storage capacity; groundwater elevations can be calculated at a later time after downloading.
- The field personnel must note the well identifier, the associated transducer serial number, transducer range, transducer accuracy, and cable serial number.
- Transducers must be able to record groundwater levels with an accuracy of at least 0.1 foot. Professional judgment will be used to ensure that the data being collected is meeting the Data Quality Objectives (DQO) and that the instrument is capable. Consideration of the battery life, data storage capacity, range of groundwater level fluctuations, and natural pressure drift of the transducers shall be included in the evaluation.
- The field personnel must note whether the pressure transducer uses a vented or non-vented cable for barometric compensation. Vented cables are preferred, but non-vented units provide accurate data if properly corrected for natural barometric pressure changes. This requires the consistent logging of barometric pressures to coincide with measurement intervals.
- Follow manufacturer specifications for installation, calibration, data logging intervals, battery life, correction procedure (if non-vented cables used), and anticipated life expectancy to assure that DQOs are being met for the GSP.
- Secure the cable to the well head with a well dock or another reliable method. Mark the cable at the elevation of the reference point with tape or an indelible marker to verify that the cable has not slipped.
- The transducer data shall periodically be checked against manually measured groundwater levels to monitor electronic drift or cable movement. This shall happen during routine site visits, at least annually to maintain data integrity.
- The data shall be downloaded as necessary to ensure no data is lost. Downloaded data shall be entered into the GSP DMS following the quality assurance/quality control (QA/QC) program established for the GSP. Data collected with non-vented data logger cables shall be corrected for atmospheric barometric pressure changes, as appropriate. After the field personnel is confident that the transducer data have been safely downloaded and stored, the data shall be deleted from the data logger to ensure that adequate data logger memory remains for new data.

1.1.3 Protocols for Groundwater Storage Measurements

Groundwater storage shall be determined from groundwater elevation measurements. Groundwater elevation contours shall be created annually and compared to the groundwater contours generated in the previous year. The change in groundwater elevation at each monitoring site will also be analyzed on annual basis to understand where the greatest decline in storage is occurring spatially. For the comparison of annual groundwater conditions, the highest groundwater elevations recorded in the spring of each year will be used.

Where groundwater levels indicate a change in storage, storage change in the unconfined to semi-confined Shallow Zone will be calculated as follows:

$\Delta Qs = (\Delta H) \times (Sy) \times (A)$

Where:

ΔQs = Change in Shallow Zone Storage

ΔH = change in groundwater elevation (or hydraulic head)

Sy = specific yield of the unconfined aquifer

A = surface area of the aquifer

Groundwater storage change in the semi-confined to confined Deep Zone shall be calculated with the equation below:

$\Delta Qd = (\Delta H) \times (Ss \times B) \times (A)$

Where:

ΔQd = Change in deep Zone Storage

ΔH = change in groundwater elevation (or hydraulic head)

Ss = specific storage of the confined aquifer

B = aquifer thickness

A = surface area of the aquifer

1.2 Protocols for Groundwater Quality Measurements including Seawater Intrusion

Water quality monitoring of production wells that are part of municipal and other public water systems are incorporated into the groundwater quality monitoring network. Data from these sources include initial monitoring and ongoing compliance monitoring. The data is comprised of regulated primary and secondary drinking water constituents from which a baseline of water quality conditions in the Deep Aquifer water supply source is derived. Selected key constituents identified as having the potential to influence sustainable management in the ECC Subbasin are discussed, along with baseline maps and tables, under Basin Setting **Section 3.5.5**. The key constituents are total dissolved solids (TDS), nitrate, chloride, arsenic, boron, and mercury. While there may be localized constituents of concern, including point-source contamination sites, within GSAs, the key constituents are intended to satisfy monitoring for the water quality degradation sustainability indicator. Annual monitoring of groundwater quality in new and existing dedicated monitoring wells will include sampling and laboratory analysis of the key constituents on an annual basis while recognizing that monitoring in the public supply sources may be less frequent. At the 5-year periodic evaluation (see **Section 6.10**), the monitoring frequency and the list of key constituents will be assessed with respect to sustainable management. At that time, for example,

monitoring frequency in the dedicated wells might be adjusted to coincide with drinking water compliance monitoring frequency.

During sampling events, field parameters shall be measured and recorded. The field parameters shall include electrical conductivity at 25 °C (EC) in µS/cm, pH, temperature (in °C), and dissolved oxygen (DO) in mg/L.

The GSP monitoring program will utilize the following protocols for collecting groundwater quality samples:

- Prior to sampling, the analytical laboratory will be contacted to schedule laboratory time, obtain appropriate sample containers, and clarify any sample holding times or sample preservation requirements.
- Verify well identification at the monitoring site (the well identifier may appear on the well housing or the well casing).
- In the case of wells with dedicated pumps, samples shall be collected at or near the wellhead following purging.
- Prior to sampling, the sampling port and sampling equipment shall be cleaned to remove any contaminants. The equipment shall be decontaminated between each sampling locations or wells to avoid cross-contamination.
- The groundwater elevation in the well shall be measured following appropriate protocols described above in the groundwater level measuring protocols.
- For any well not equipped with low-flow or passive sampling equipment, an adequate volume of water shall be purged from the well to ensure that the groundwater sample is representative of ambient groundwater and not stagnant water in the well casing. Purging three well casing volumes is generally considered adequate. Professional judgment will be employed to determine the proper configuration of the sampling equipment with respect to well construction such that a representative ambient groundwater sample is collected. If pumping causes a well to be evacuated (go dry), document the condition and allow well to recover to at least 90% of original water level prior to sampling.
- Field parameters of pH, electrical conductivity and temperature shall be collected during purging and prior to the collection of each sample. Field parameters monitored during the purging of the well shall stabilize prior to sampling. Measurements of pH shall only be taken in the field; laboratory pH analyses are typically unachievable due to short hold times. Other parameters, such as Oxidation-Reduction Potential (ORP), Dissolved Oxygen (DO) (in situ measurements preferable), or turbidity, may also be useful for assessing purge conditions. All field instruments shall be calibrated daily and evaluated for drift throughout the day.
- Sample containers shall be labeled prior to sample collection. The sample label must include sample ID (often well ID), sample date and time, sample personnel, sample location, preservative used, and analytes and analytical method.

- Samples shall be collected under laminar flow conditions. This may require reducing pumping rates prior to sample collection.
- All samples requiring preservation must be preserved as soon as practically possible, ideally at the time of sample collection. Ensure that samples are appropriately filtered as recommended for the specific analyte. Entrained solids can be dissolved by preservative leading to inconsistent results of dissolve analytes. Specifically, samples to be analyzed for metals shall be field filtered prior to preservation; do not collect an unfiltered sample in a preserved container.
- Samples should be chilled and maintained at 4 °C to prevent degradation of the sample. The laboratory's Quality Assurance Management Plan shall be followed.
- Samples must be shipped under chain of custody documentation to the appropriate laboratory promptly to avoid violating holding time restrictions.
- Groundwater quality samples shall be collected annually in new wells per **Table 6-8**.
- All data shall be entered into the GSP DMS as soon as possible. Data entries should be checked by a second person for quality assurance.

1.3 Protocols for Groundwater Pumping Measurements

Measurements of groundwater pumping are conducted in all public supply wells but pumping at privately-owned domestic and irrigation wells are not monitored. The following protocols shall be followed when recording groundwater pumping totals:

- Groundwater pumping amounts shall be reported in units of acre-feet on monthly basis.
- Amounts are to be determined by a totalizer/flowmeter or calculated using electric consumption records.
- Groundwater pumping totals shall be sourced from the well owner.
- Meters shall be periodically checked for accuracy utilizing manufacturers recommendations. If necessary, meters shall be periodically calibrated according to manufacturer specifications.
- All data shall be entered into the GSP DMS annually.

1.4 Protocols for Subsidence Measurements

Subsidence in the ECC Subbasin will be evaluated using the available data from UNAVCO PBO stations. The GSAs will not be responsible for collecting subsidence data. Available subsidence data from the four selected UNAVCO PBO stations (P256, P230, P248 and P257) will be downloaded annually and entered into the GSP DMS for inclusion in an Annual Report.

1.5 Protocols for Interconnected Surface Water Measurements

Shallow groundwater levels associated with Interconnected surface water measurements will be made by collecting groundwater elevation measurements from adjacent (or nested) Shallow and Deep Zone wells. Protocols for groundwater level measuring and groundwater level recording shall be followed when measuring and recording groundwater levels.

Vertical hydraulic gradient associated with the groundwater-surface water system will be calculated as follows:

$\Delta h = (h1 - h2) / (m1 - m2)$

Where:

Δh = vertical gradient

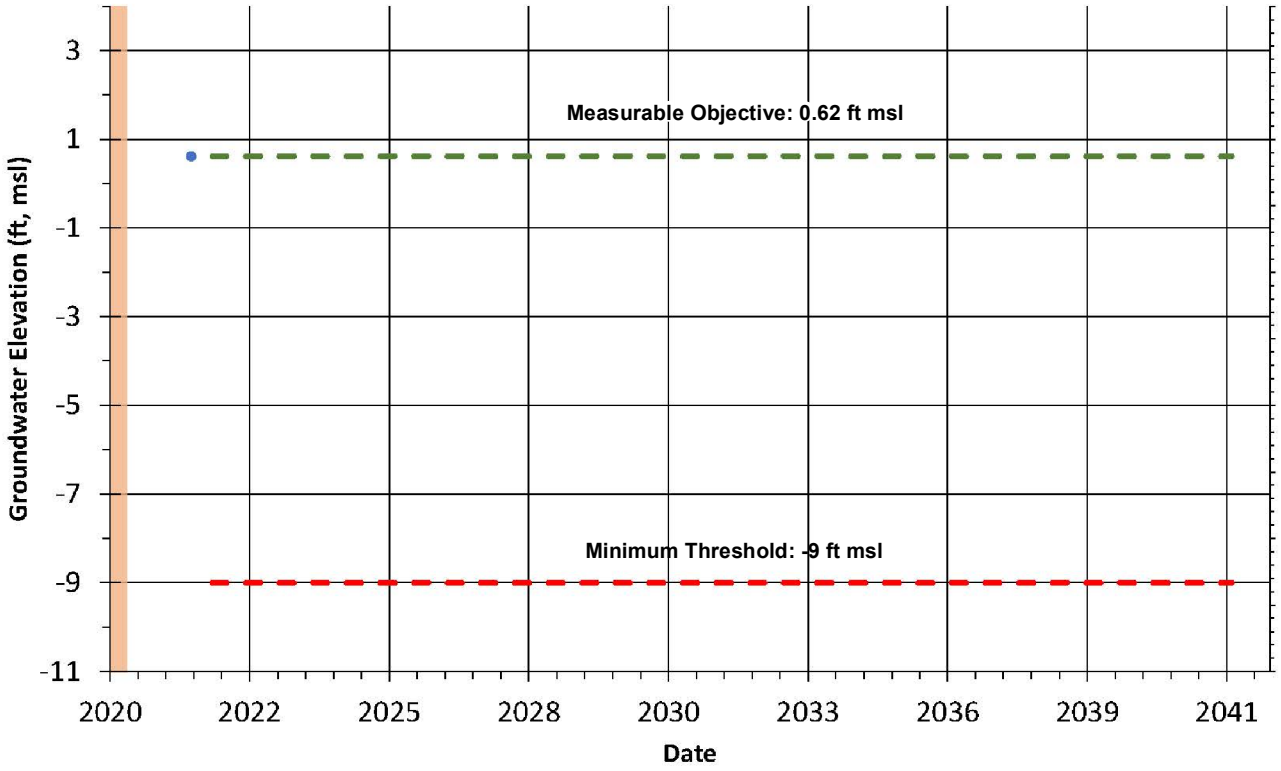
h1 and h2 = groundwater elevation in deep and shallow wells, respectively

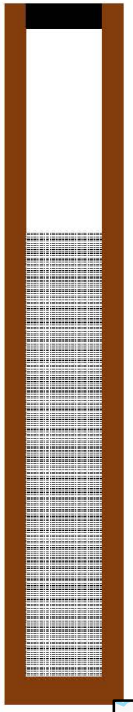
m1 and m2 = mid-point elevations of the screens in deep and shallow wells, respectively

Surface flow data of interconnected surface waters shall be downloaded by the database manager from public databases for annual reporting. Groundwater elevations, calculated vertical gradients, surface water flow rates (daily or monthly mean flow in cubic feet per second) and stage of surface water (elevation relative to NAVD88) shall be entered into the GSP DMS on an annual basis.

APPENDIX 7a

Representative Monitoring Sites Minimum Threshold, Measurable Objectives for Chronic Lowering of Groundwater Levels



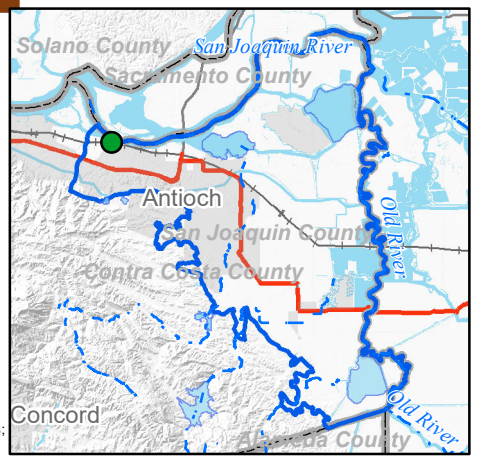


Reference Point of Elevation 4.12 from mean sea level (msl)

Casing

Perforations (Screen Interval) 5-15 ft bgs

Total Depth 30 ft bgs



Explanation

- Groundwater Elevation
- Measurable Objective
- Minimum Threshold

Water Year Hydrologic Classification[1]

- Wet Water Year
- Normal Water Year
- Dry Water Year

Note that the MT and MO may be revised as additional data becomes available.

Data sources:
USGS - waterways, DEM;
DWR - subbasin boundaries;
US Census - cities

1. Source of Water Year Type: https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST

X:\2018\18-060 City of Brentwood - GSP Development\GIS\Appendix 7a-1 MO MT Graphic Antioch MW-15.mxd

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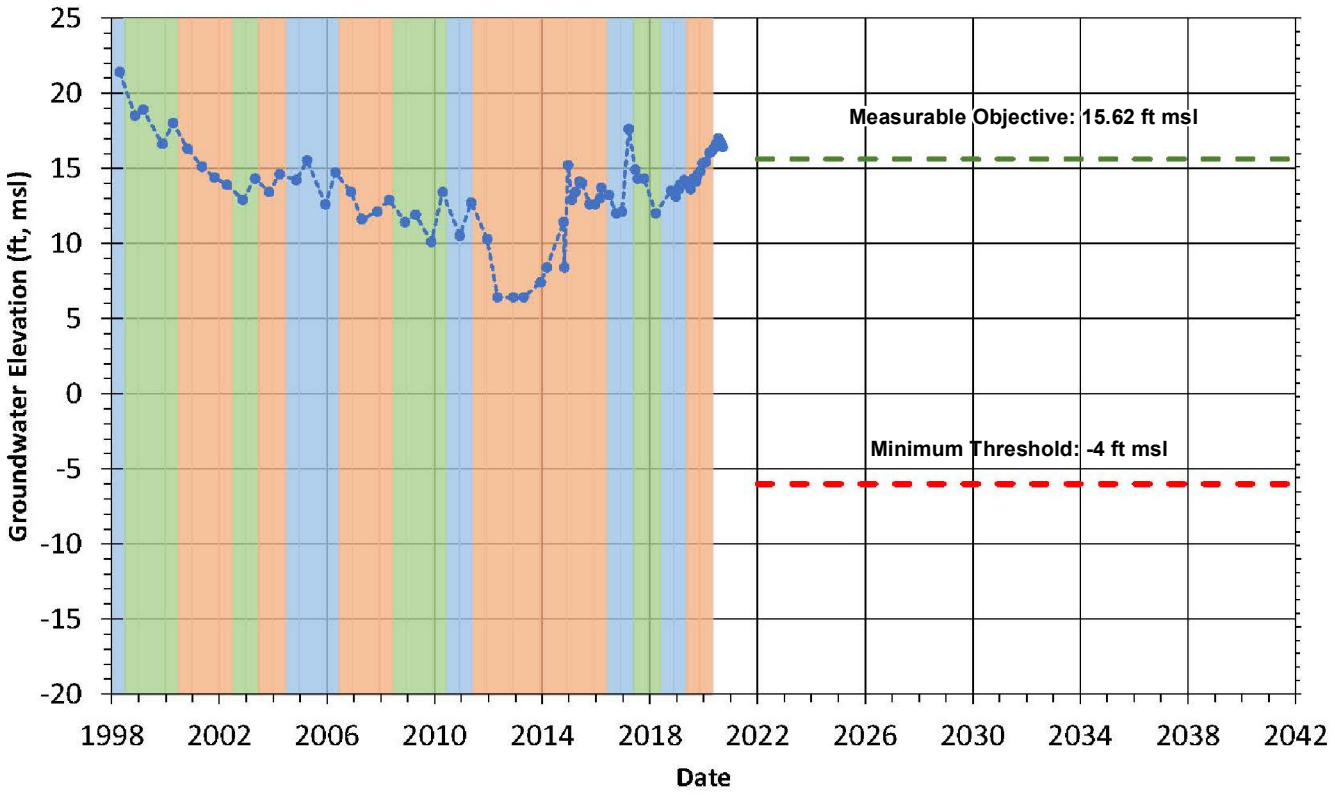
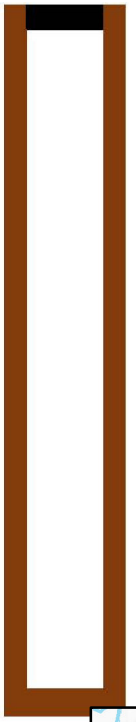
Measurable Objectives and Minimum Thresholds- Antioch MW-15

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Appendix 7a-1



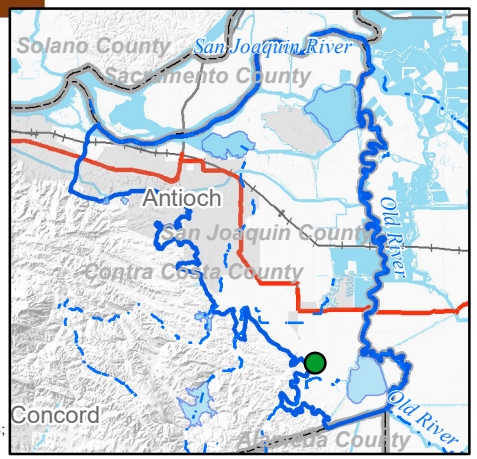


Reference Point of Elevation 23.46 from mean sea level (msl)

Casing

Perforations (Screen Interval) Unknown

Total Depth 45 ft bgs



Explanation

- Groundwater Elevation
- Measurable Objective
- Minimum Threshold

Water Year Hydrologic Classification[1]

- Wet Water Year
- Normal Water Year
- Dry Water Year

1. Source of Water Year Type: https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST

Data sources:
USGS - waterways, DEM;
DWR - subbasin boundaries;
US Census - cities

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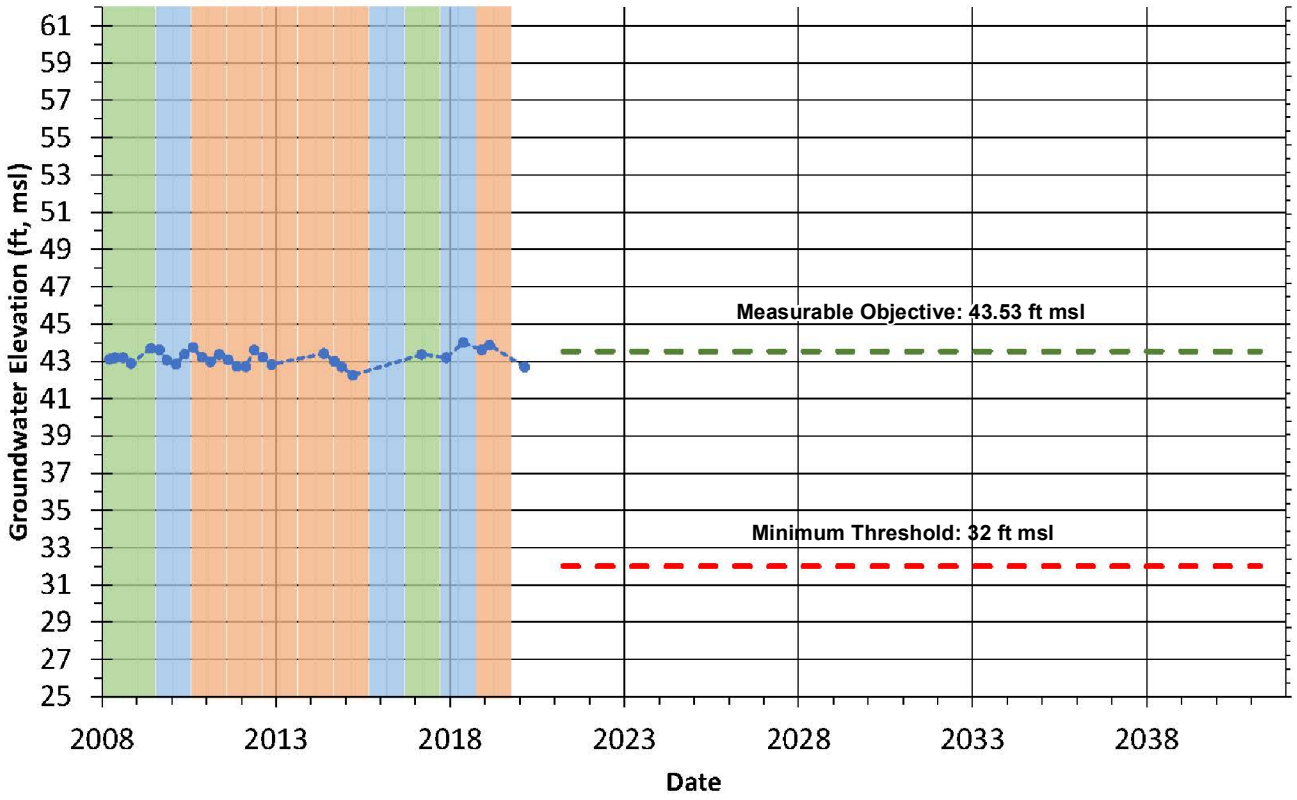
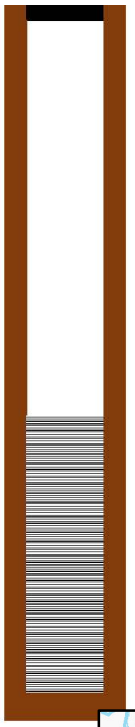
Measurable Objectives and Minimum Thresholds- 5 Binn

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Appendix 7a-2



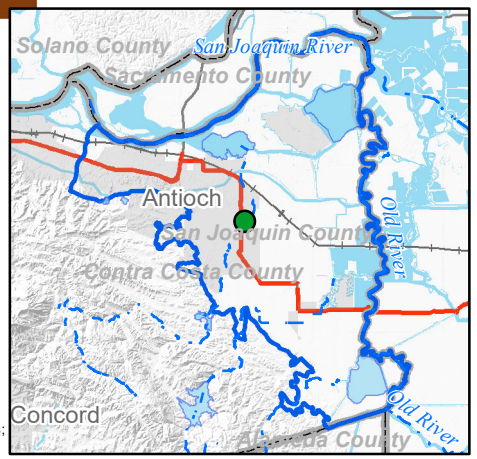


Reference Point of Elevation 62.09 from mean sea level (msl)

Casing

Perforations (Screen Interval) 22.5-37.5 ft bgs

Total Depth 37.5 ft bgs



Explanation

- Groundwater Elevation
- Measurable Objective
- Minimum Threshold

Water Year Hydrologic Classification[1]

- Wet Water Year
- Normal Water Year
- Dry Water Year

Data sources:
USGS - waterways, DEM;
DWR - subbasin boundaries;
US Census - cities

1. Source of Water Year Type: https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST

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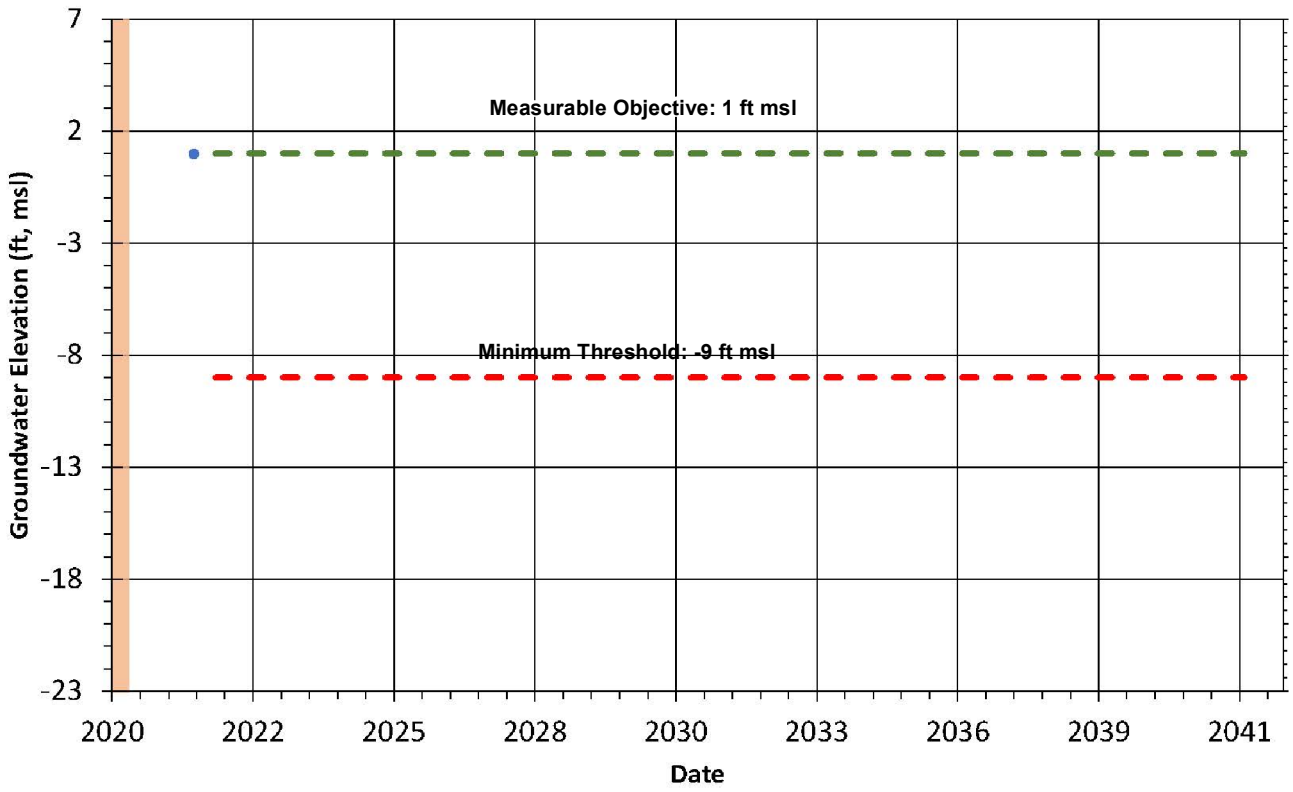
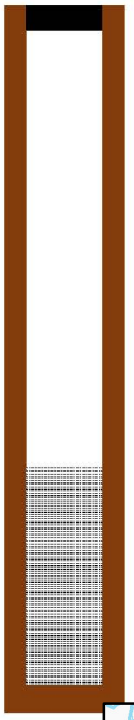
Measurable Objectives and Minimum Thresholds- BG-2

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Appendix 7a-3



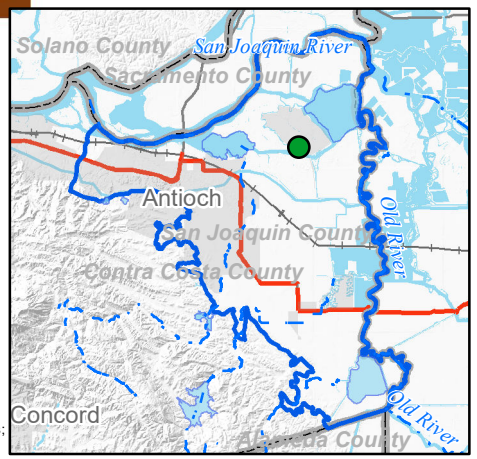


Reference Point of Elevation 7.26 from mean sea level (msl)

Casing

Perforations (Screen Interval) 20-30 ft bgs

Total Depth 30 ft bgs



Explanation

- Groundwater Elevation
- Measurable Objective
- Minimum Threshold

Water Year Hydrologic Classification[1]

- Wet Water Year
- Normal Water Year
- Dry Water Year

Note that the MT and MO may be revised as additional data becomes available.

Data sources:
USGS - waterways, DEM;
DWR - subbasin boundaries;
US Census - cities

1. Source of Water Year Type: https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST

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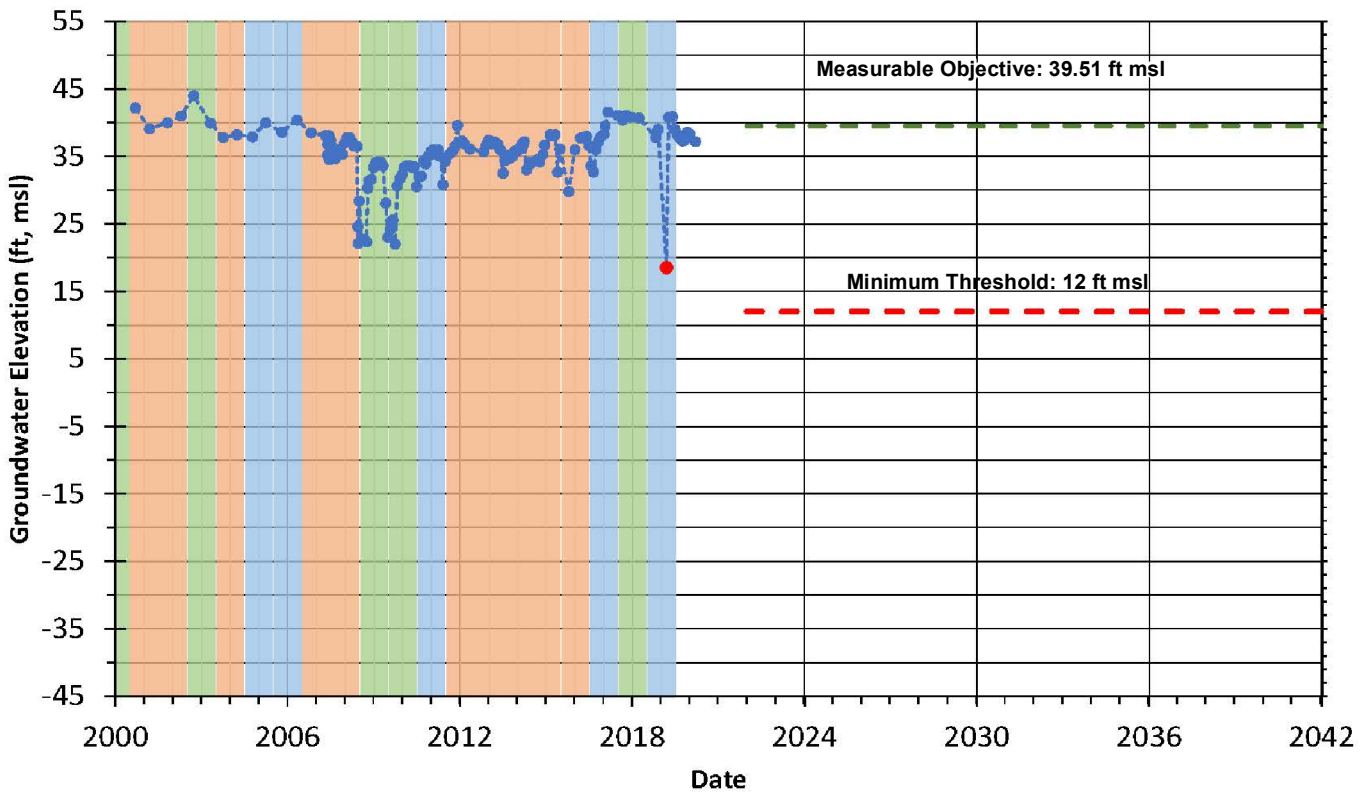
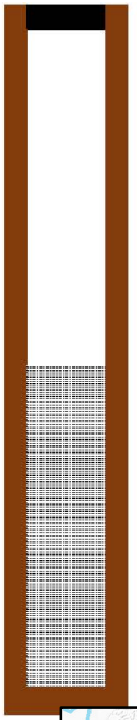
Measurable Objectives and Minimum Thresholds- DWD MW-30

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Appendix 7a-4



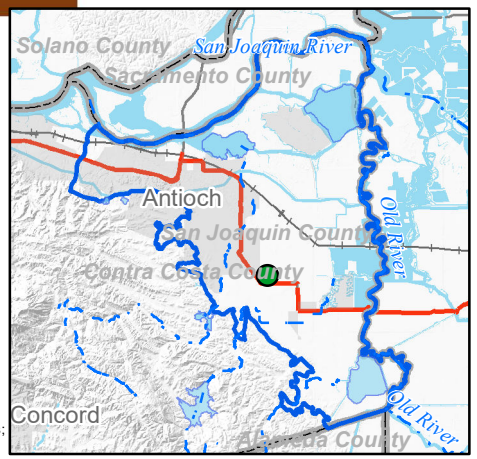


Reference Point of Elevation 55.5 from mean sea level (msl)

Casing

Perforations (Screen Interval) 50-100 ft bgs

Total Depth 100 ft bgs



Explanation

- Groundwater Elevation
- Measurable Objective
- Minimum Threshold
- Questionable Data

Water Year Hydrologic Classification[1]

- Wet Water Year
- Normal Water Year
- Dry Water Year

1. Source of Water Year Type: https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST

Data sources:
USGS - waterways, DEM;
DWR - subbasin boundaries;
US Census - cities

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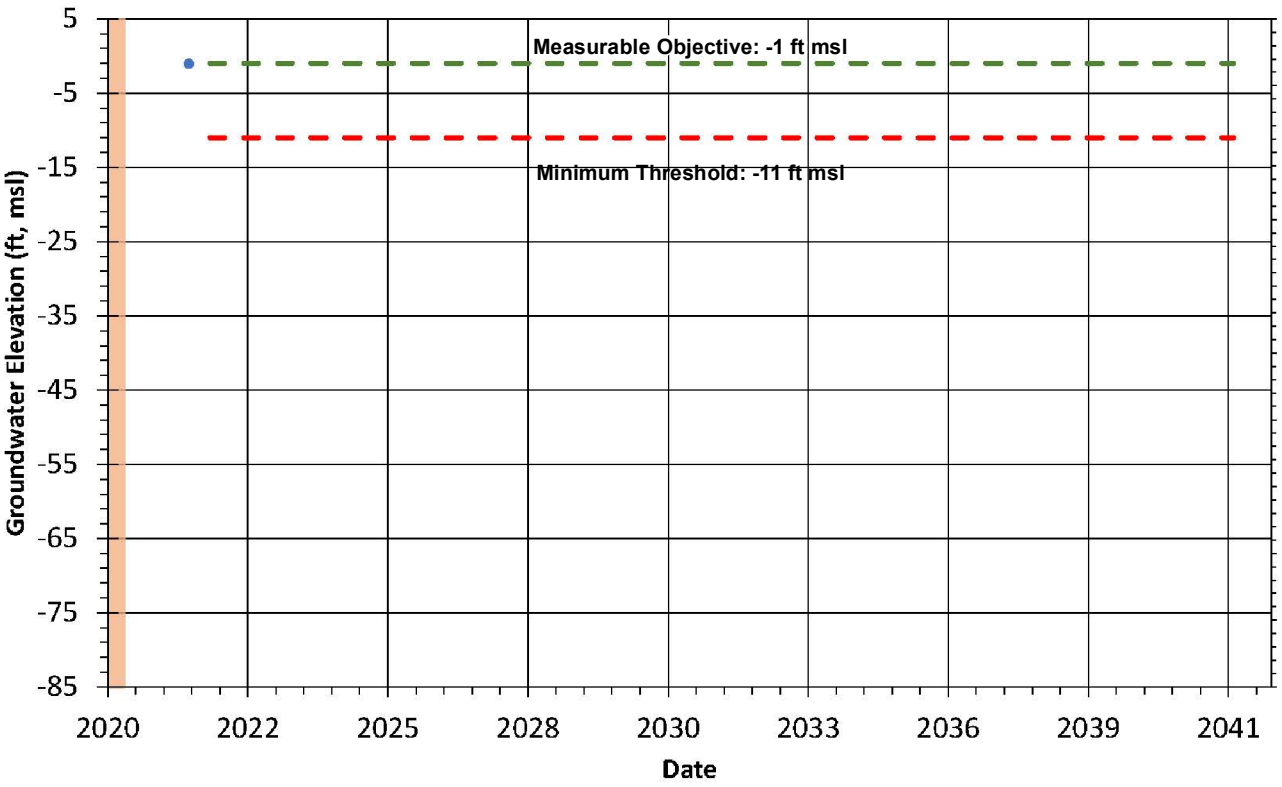
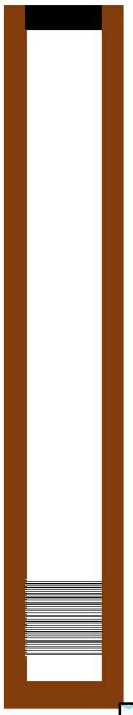
Measurable Objectives and Minimum Thresholds-ECCID Well #11

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Appendix 7a-5



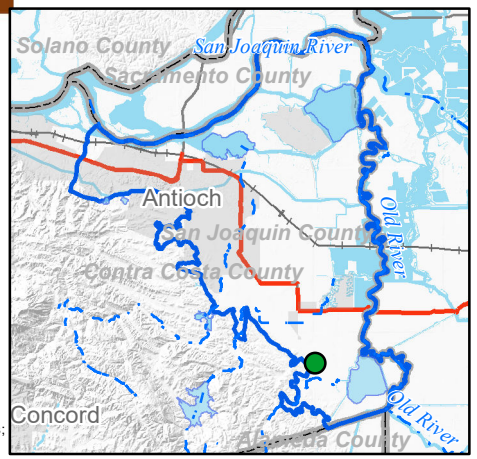


Reference Point of Elevation 4.77 from mean sea level (msl)

Casing

Perforations (Screen Interval) 75-85

Total Depth 90 ft bgs



Explanation

- Groundwater Elevation
- Measurable Objective
- Minimum Threshold

Water Year Hydrologic Classification[1]

- Wet Water Year
- Normal Water Year
- Dry Water Year

Note that the MT and MO may be revised as additional data becomes available.

Data sources:
USGS - waterways, DEM;
DWR - subbasin boundaries;
US Census - cities

1. Source of Water Year Type: https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST

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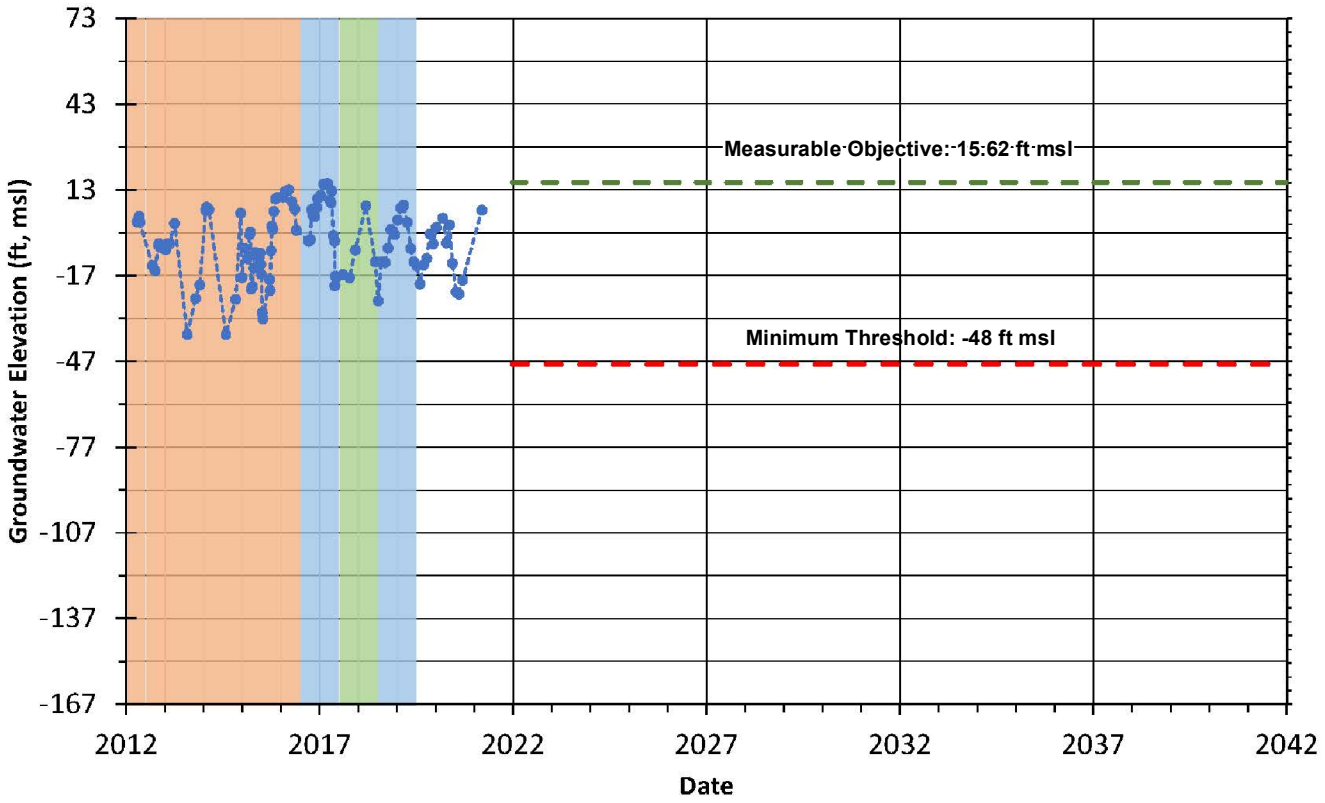
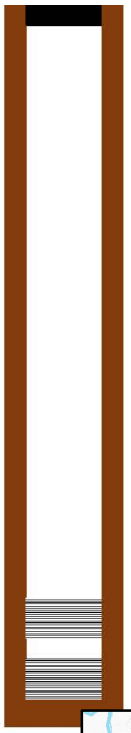
Measurable Objectives and Minimum Thresholds- Antioch MW-90

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Appendix 7a-6



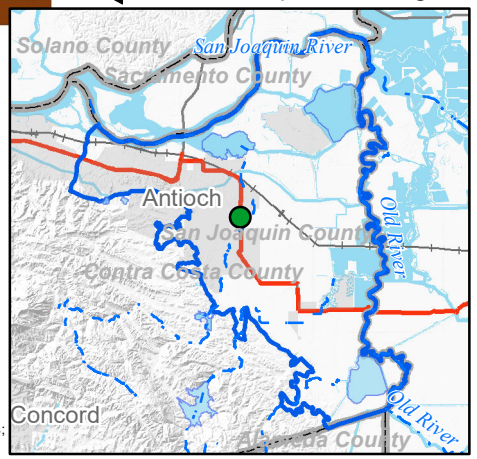


Reference Point of Elevation 72.76 from mean sea level (msl)

Casing

Perforations (Screen Interval) 285-315 ft bgs

Total Depth 340 ft bgs



Explanation

- Groundwater Elevation
- Measurable Objective
- Minimum Threshold

Water Year Hydrologic Classification[1]

- Wet Water Year
- Normal Water Year
- Dry Water Year

Data sources:
USGS - waterways, DEM;
DWR - subbasin boundaries;
US Census - cities

1. Source of Water Year Type: https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST

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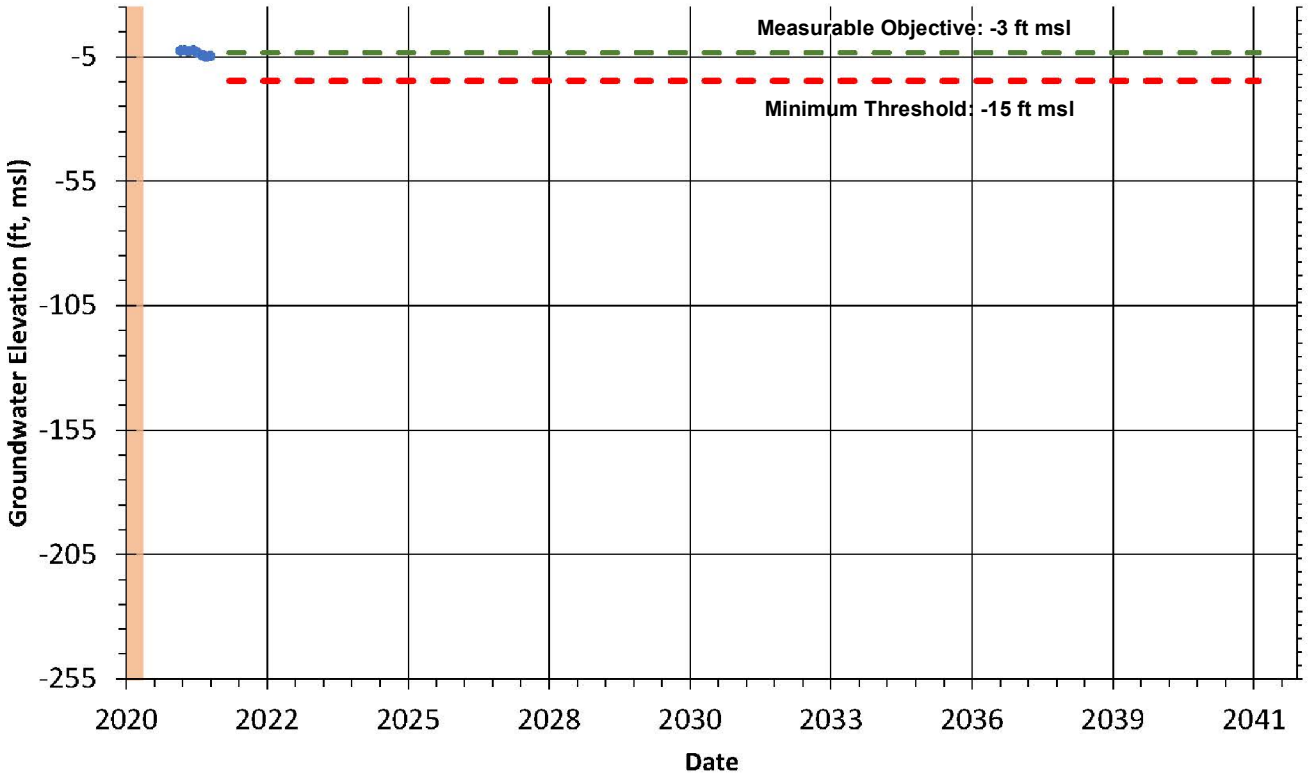
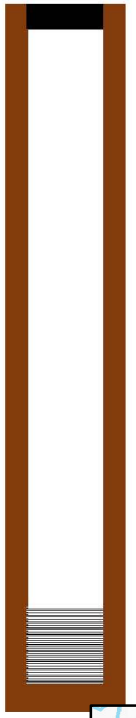
Measurable Objectives and Minimum Thresholds-Brentwood MW-14 Int.

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Appendix 7a-7



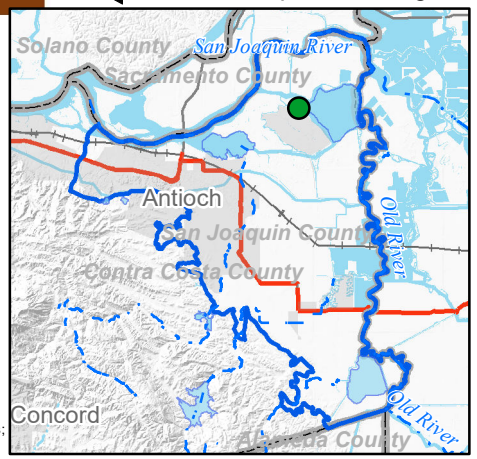


Reference Point of Elevation 4.69 from mean sea level (msl)

Casing

Perforations (Screen Interval) 230-260 ft bgs

Total Depth 260 ft bgs



Explanation

- Groundwater Elevation
- Measurable Objective
- Minimum Threshold

Water Year Hydrologic Classification[1]

- Wet Water Year
- Normal Water Year
- Dry Water Year

Note that the MT and MO may be revised as additional data becomes available.

Data sources:
USGS - waterways, DEM;
DWR - subbasin boundaries;
US Census - cities

1. Source of Water Year Type: https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST

X:\2018\18-060 City of Brentwood - GSP Development\GIS\Appendix 7a-8 MO MT Graphic Bethel-Willow Rd.mxd

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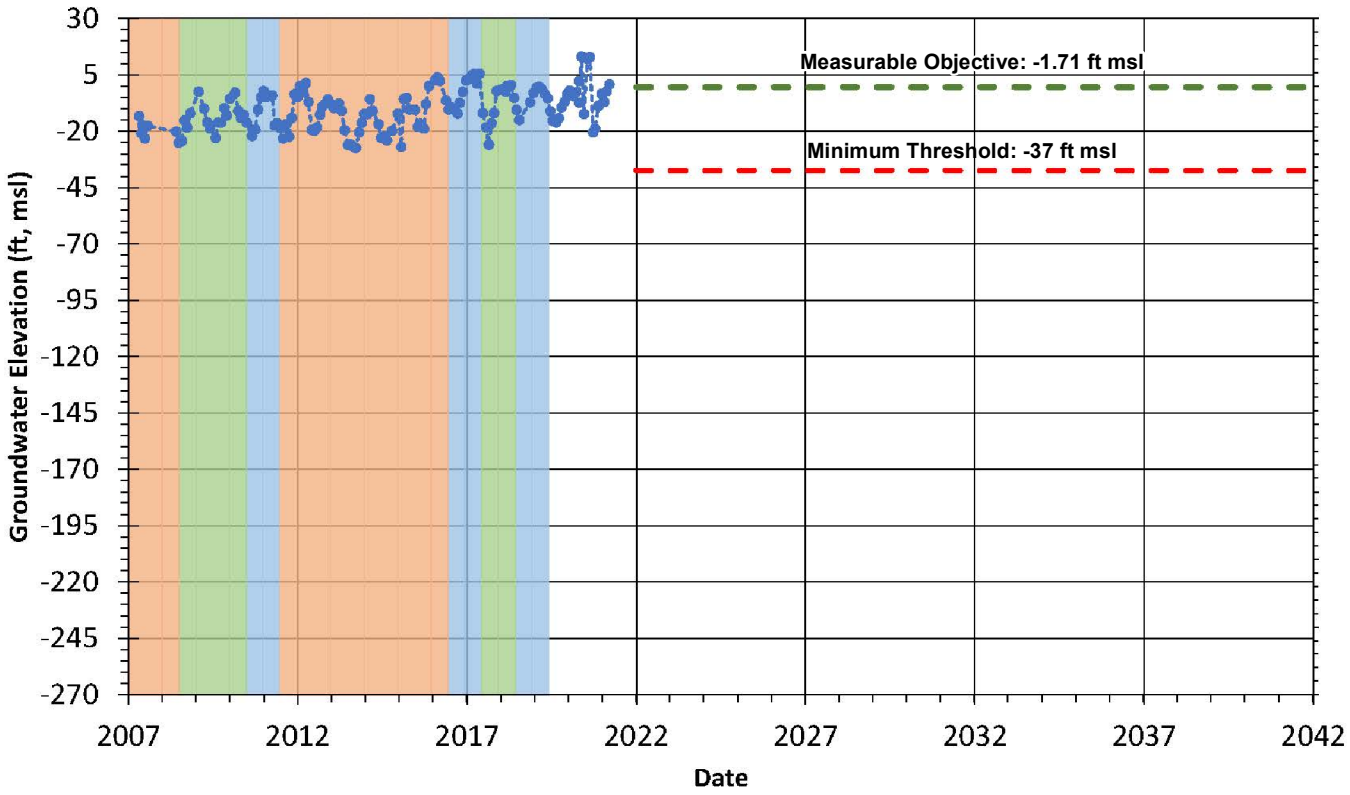
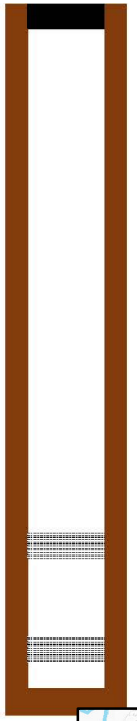
Measurable Objectives and Minimum Thresholds-Bethel-Willow Rd

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Appendix 7a-8



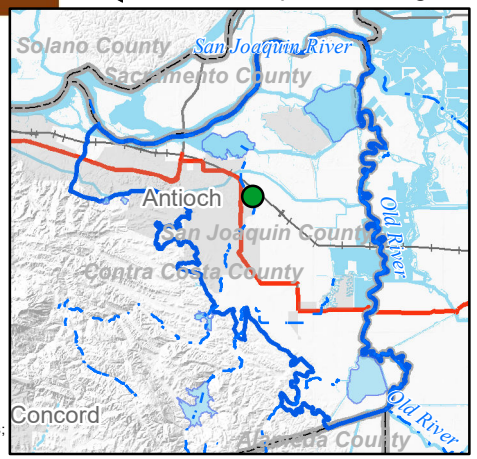


Reference Point of Elevation 30.47 from mean sea level (msl)

Casing

Perforations (Screen Interval) 230-240, 280-290 ft bgs

Total Depth 300 ft bgs



Explanation

- Groundwater Elevation
- Measurable Objective
- Minimum Threshold

Water Year Hydrologic Classification[1]

- Wet Water Year
- Normal Water Year
- Dry Water Year

1. Source of Water Year Type: https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST

Data sources:
USGS - waterways, DEM;
DWR - subbasin boundaries;
US Census - cities

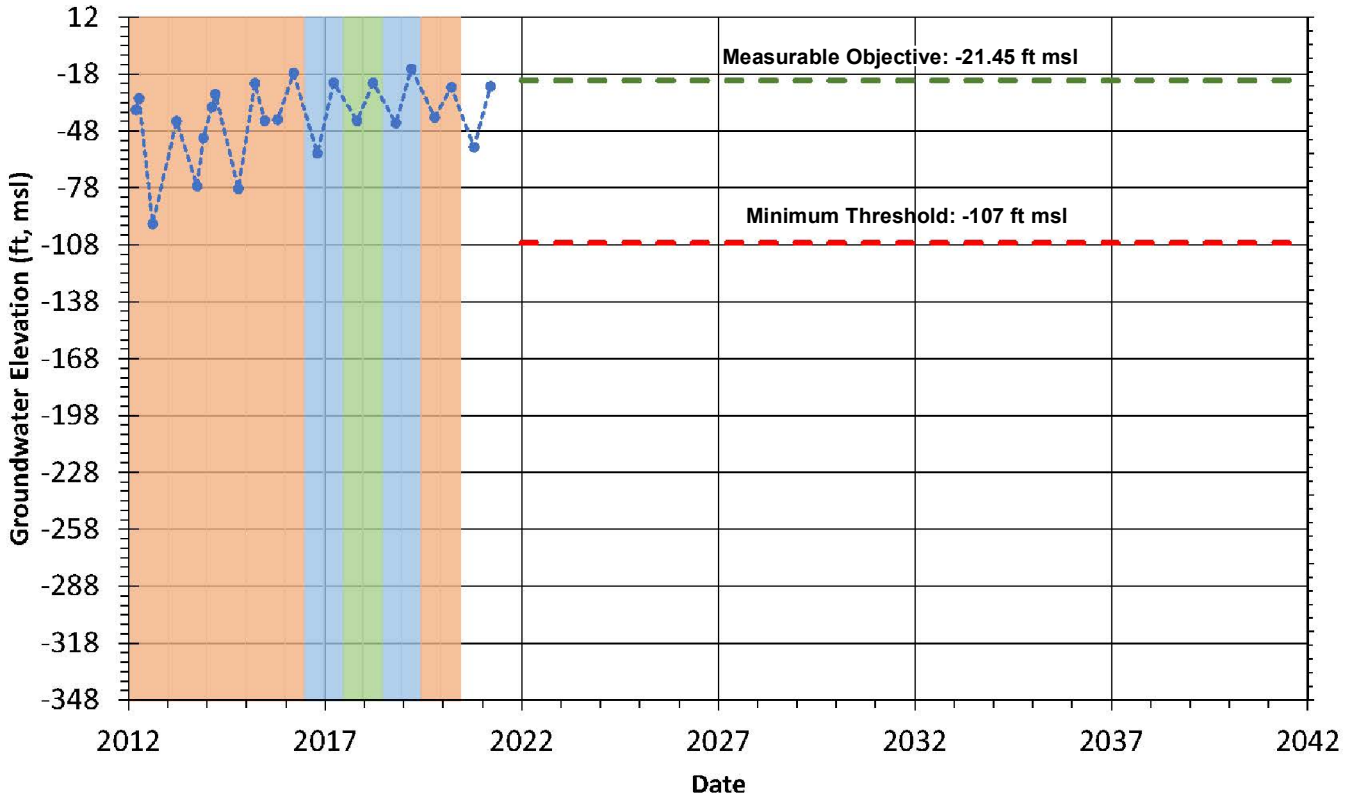
X:\2018\18-060 City of Brentwood - GSP Development\GIS\Appendix 7a-9 MO MT Graphic Stonecreek MW-300.mxd

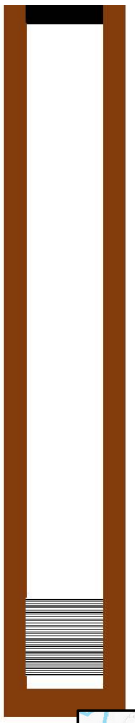
Luhdorff & Scalmanini
Consulting Engineers

Measurable Objectives and Minimum Thresholds- Stonecreek MW-300

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Appendix 7a-9



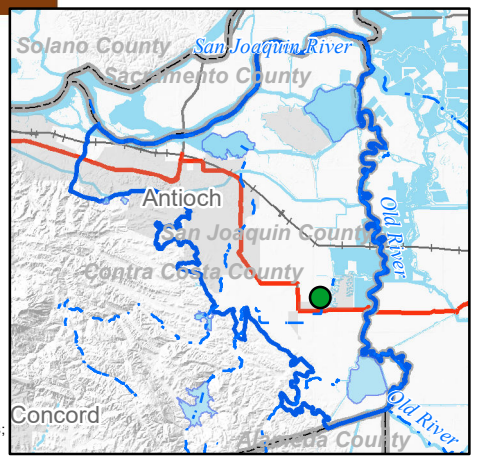


Reference Point of Elevation 11.54 from mean sea level (msl)

Casing

Perforations (Screen Interval) 307-347 ft bgs

Total Depth 357 ft bgs



Explanation

- Groundwater Elevation
- Measurable Objective
- Minimum Threshold

Water Year Hydrologic Classification[1]

- Wet Water Year
- Normal Water Year
- Dry Water Year

Data sources:
USGS - waterways, DEM;
DWR - subbasin boundaries;
US Census - cities

1. Source of Water Year Type: https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST

X:\2018\18-060 City of Brentwood - GSP Development\GIS\Appendix 7a-10 MO MT Graphic 4AM-357.mxd

Luhdorff & Scalmanini Consulting Engineers

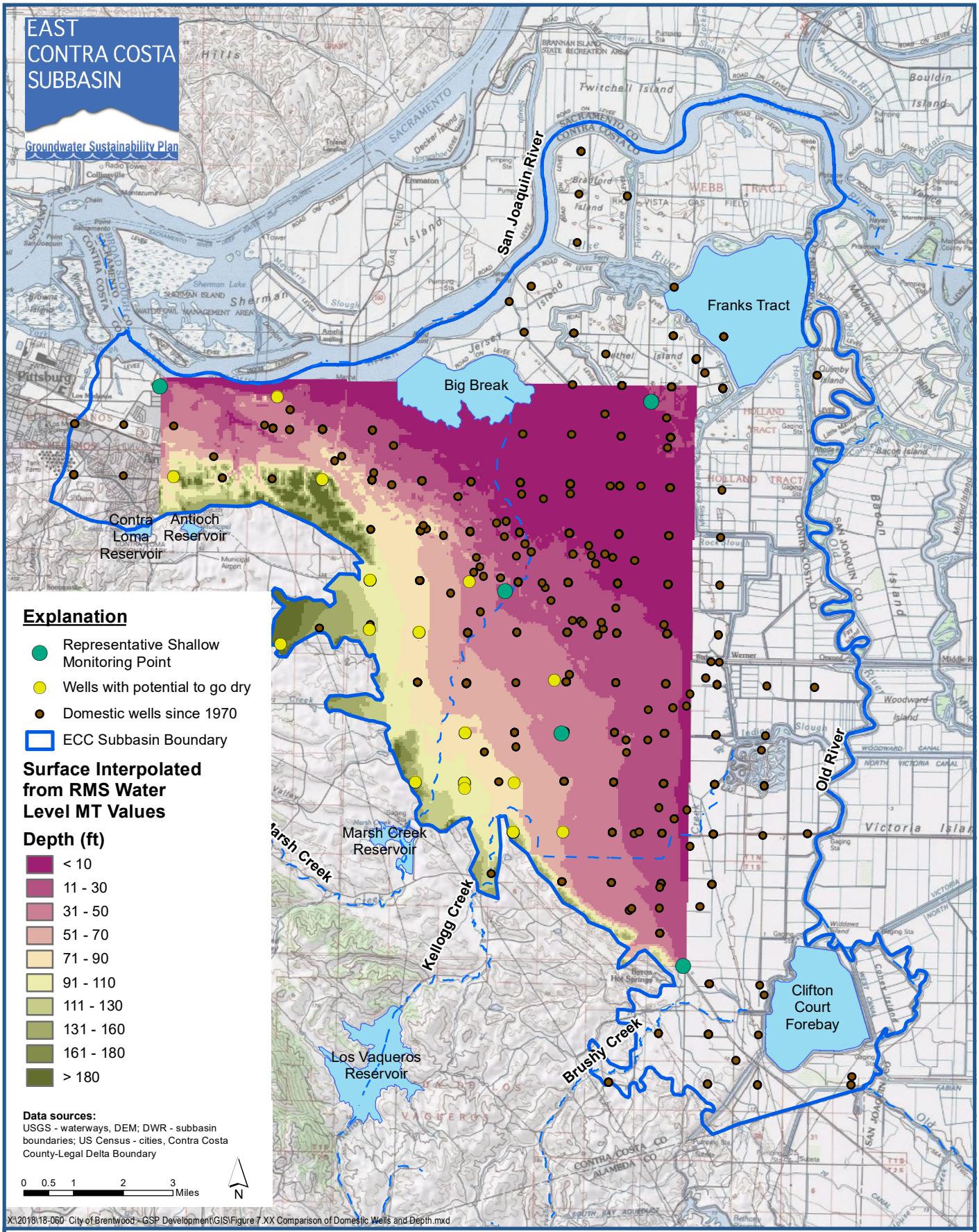
Measurable Objectives and Minimum Thresholds- 4AMW-357

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Appendix 7a-10

APPENDIX 7b

Comparison of Domestic Wells and Depth to Minimum Threshold



Luhdorff & Scalmanini Consulting Engineers

Comparison of Domestic Wells and Depth to Minimum Threshold

East Contra Costa Subbasin Groundwater Sustainability Plan
Contra Costa County, California

Appendix 7b-1

APPENDIX 9a

East Contra Costa Groundwater Sustainability Plan Implementation Budget

Appendix 9a East Contra Costa Groundwater Sustainability Plan

Implementation Budget

Category	2020/2022	Annual	5-Year
Community Outreach & Education			
Quarterly GSA meeting (4 times/year, consultant, $200* 2hrs=$1,600). Plus: agendas, meeting notes and setting up meetings.		$5,000	
Update ECC Online Visualization for public viewing of most recent groundwater levels (2 times/year*$1,000 each)		$2,000	
Board notifications (quarterly, 2 hours x $200=$400x4=1,600each)		$1,600	
Intra/Inter subbasin coordination (by GSA only for minimum of range)			
Newsletters to interested parties and others (by GSA for minimum of range)			
Update website (by GSA for minimum of range)			
Total		**$10,000 - $25,000**	
GSP Monitoring and Data Management			
Monitoring[1] and Well Maintenance			
Groundwater Elevation: nine new wells, take manual measurements 2x/yr, check SCADA equipment, maintenance is not expected the first two years and will be costed as the need arises.	$4,000	$4,000	
Groundwater Quality: nine new wells purged and sampled annually (one person, 3 days of 12 hours each=$7,000) and analyses describe in Section 6 (TDS, nitrate, chloride, arsenic, boron, and mercury, $2,000).		$9,000	
Total Monitoring and Well Maintenance		**$13,000**	
Data Management			
Data collection from online sources and GSAs. Includes groundwater levels, groundwater extractions, streamflow, water quality (groundwater and surface water), Geotracker, other.		$20,000	
Data Management System update with data from all sources.		$5,000	
Data analysis including graphing and upload 2x/yr. to DWR Portal		$7,000	
Total Data Management		**$32,000**	
Total GSP Monitoring and Data Management		**$45,000**	
GSP Reporting			
GSP Annual Reporting[2]			
Prepare excel files of: groundwater extraction (by GSA and methods), surface water supply, total water use, change in storage, and elements guide.	$20,000	$10,000 - $20,000	
Prepare figures: map of the subbasin and GSA boundaries, groundwater elevation contours by zone (2/yr.), hydrographs for basin-wide wells, map of location and volume of extractions, map of changes in GW storage by aquifer, graph of historical GW use by water year type.	$15,000	$8,000 - $15,000	

Table 1 Draft East Contra Costa Groundwater Sustainability Plan

Implementation Budget

Category	2020/2022	Annual	5-Year
Executive summary and narrative describing findings and recommendations for the period.	$12,000	$12,000	
Upload to Annual Report Module/Report Submittal	$3,000	$3,000	
Total GSP Annual Reporting	**$50,000**	**$33,000 - $50,000**	
GSP Five Year Update to include:			
Basin Setting Evaluation: any changes? Evaluate new information from the last 5 years.			$30,000
Monitoring Network: evaluation of network and description of data gaps and plan for new facilities if necessary.			$40,000 - $75000
Current Groundwater Conditions for each sustainability indicator. Includes **update of subbasin model**.[3]			$50,000 - $250000
Evaluation of Sustainability Management Criteria: revisions proposed if necessary. Progress toward meeting sustainability goal.			$20,000 - $35,000
Implementation of Projects evaluated			$5,000 - $30,000
Other: Relevant Actions taken by GSAs impacting the implementation of the GSP. Enforcement or legal actions by the GSA, GSP amendments to the GSP.			$5,000 - $30,000
Outreach and Coordination specific to 5-year update: of GSAs, adjacent subbasins, and others			$20,000 -$50,000
Total GSP Five Year Update			**$140,000 - $500,000**
Grant Writing		**$25,000**	
SGMA: to address comments from DWR on the GSP		**$15,000**	
Contingency (10%)		**10%**	

1. Assumes that each member agency will continue to monitor its own wells for groundwater levels and quality using its own resources. Only groundwater levels and quality from the nine new monitoring wells, that would not otherwise be conducted by the individual member agencies, is assumed to be covered by the ECC member agencies.

2. Assumes the first annual report covers 2020 to 2022.

3. The minimum modeling amount covers a one-time effort after 5 years to :extend the future scenarios, update surface water deliveries, pumping, precipitation and ET data; recalibration if necessary. Estimate 5 weeks x 40hrs x $200 = $8,000. Includes figure production, report writing for a total of $20,000. The maximum modeling amount is an expanded effort totalling $220,000

APPENDIX 10a

Summary List of Public Meetings and Outreach

Appendix 10a Summary List of Public Meetings and Outreach (as of 08.21.2021)

Jurisdiction	Topics covered in Outreach	Outreach Method	Presenter	Audience	Number of People	Date
Antioch	Notice of Public Hearing	Newspaper	Scott Buenting	General Public	10,000	3/9/17
Antioch	Notice of Public Hearing	Newspaper	Scott Buenting	General Public	10,000	3/16/17
Antioch	Public hearing and authorization to execute a MOU for GSP development	Council Report	Scott Buenting	General Public	200	3/28/17
Antioch	Update on GSA and GSP status	Council Report	Scott Buenting	General Public	200	11/13/18
Antioch	Update and First Amendment to GSP MOU	Council Report	Scott Buenting	General Public	200	11/28/17
Antioch	Info on how to receive more GSA/GSP/ SGMA info	Utility Bill	Tracy Shearer	General Public	33,000	10/1/19
Antioch	Info on how to receive more GSA/GSP/ SGMA info	Utility Bill	Tracy Shearer	General Public	33,000	11/15/19
Antioch	GSA Update and Second Amendment to GSP MOU	Council Report	Scott Buenting	General Public	200	1/28/20
Antioch	GSA Update	Council Report	Tracy Shearer	General Public	200	10/27/20
Antioch	GSP Workshop notification	Utility Bill	Scott Buenting	General Public	33,000	6/1/21
Antioch	GSP Workshop notification	City Website	Scott Buenting	General Public	25	6/21/21
BBID	GSP development updates	BBID webpage on SGMA (https://bbid.org/governance/groundwater-management/)	Nick Janes	General Public	300	Ongoing
BBID	comments sought on GSP development	Web posting	Nick Janes	General Public	300	5/7/2020
BBID	GSP development updates	Board report	Nick Janes	General Public	10	6/17/2020
BBID	Notice of Public Meeting on Draft ECC GSP	Web posting	Nick Janes	General Public	300	6/26/2020
BBID	GSP development updates	Board report	Nick Janes	General Public	10	9/29/2020
BBID	Notice of Public Meeting on Draft ECC GSP	Web posting	Nick Janes	General Public	300	11/30/2020
BBID	GSP development updates	Board report	Nick Janes	General Public	10	1/19/2021
BBID	GSP development updates	Board report	Nick Janes	General Public	10	4/20/21
BBID	Notice of Public Meeting on Draft ECC GSP	Web posting	Nick Janes	General Public	300	6/11/2021
BBID	GSP development updates	Board report	Nick Janes	General Public	10	6/29/2021

Jurisdiction	Topics covered in Outreach	Outreach Method	Presenter	Audience	Number of People	Date
Brentwood	BBM, East County MOU, SGMA, GSA, GSP	Board Report	Eric Brennan	General Public	50	3/28/2017
Brentwood	GSA MOU and Amendment - SGMA, GSA, GSP, Prop 1 Grant	Board Report	Eric Brennan	General Public	50	12/12/2017
Brentwood	Basin Boundary Modification (BBM), SGMA	Board Report	Eric Brennan	General Public	50	5/8/2018
Brentwood	SGMA, City's GSA Formation, GSP Development	fifty page views per month closing date 8.16.21		on going	1,650	11/1/2018
Brentwood	GSP Development Information	Utility Bill		General Public	20,300	10/1/2019
Brentwood	BBM, Tracy Subbasin, ECCC Subbasin, GSP Development, San Joaquin Project Agreement	Board Report	Eric Brennan	General Public	50	10.22.2019
Brentwood	GSP Development Information	Utility Bill		General Public	20,300	11/1/2019
Brentwood	SGMA -GSP Update	Provided SGMA / GSP update to East County Water Management Association Governing Board Meeting	Eric Brennan	Public water systems	25	5/14/2020
Brentwood	GSP Chapters 3 & 4	Website	Team	General Public	1,000	12/1/2020
Brentwood	GSP Chapters 6, 7, 8 ,9	Website	Team	General Public	1,000	8/18/2021
Brentwood	GSP Chapters 1 & 2	Website	N/A	General Public	1,000	
CCC	GSP Progress and Draft Chapters Available to review	Public Meeting before the CCC Transportation, Water, Infrastructure Committee	Ryan Hernandez	General Public	17	2/8/2021
CCC	Public Review of Section 6 Draft and Survey	Website	Ryan Hernandez	General Public		4/2/2021
CCC	Public Notice of Section 6 Draft and Optional Survey	District 3 News - Weekly E-newsletter	Supervisor Diane Burgis	General Public	1,400	4/8/2021
CCC	Public Review Notice of Section 6 and Survey	District 3 News - Weekly E-newsletter	Supervisor Diane Burgis	General Public	1,400	4/15/2021
CCC	Public Review of Section 6 Draft and optional Survey	Website	Supervisor Diane Burgis	General Public		4/15/2021
CCC	Notice of Public Meeting on Draft ECC GSP	District 3 News - Weekly E-newsletter	Supervisor Diane Burgis	General Public	1,400	6/17/2021
CCC	Public Review Notice of Sections 7-9 and Survey	Website Announcement/Content	Team	General Public		7/22/2021

Jurisdiction	Topics covered in Outreach	Outreach Method	Presenter	Audience	Number of People	Date
CCC	Public Review Notice of Sections 7-9 and Survey	District 3 News - Weekly E-newsletter	Supervisor Diane Burgis	General Public	1,400	7/29/2021
CCC	Public Review Notice of Sections 7-9 and Survey	District 3 News - Weekly E-newsletter	Supervisor Diane Burgis	General Public	1,400	8/5/2021
CCC	GSP Sections 7, 8 and 9	Public Meeting before the CCC Transportation, Water, Infrastructure Committee	Ryan Hernandez	General Public	16	8/9/2021
CCC	Public Review Notice of Sections 7-9 and Survey	District 3 News - Weekly E-newsletter	Supervisor Diane Burgis	General Public	1,400	8/12/2021
Diablo WD	Getting the public involved	Utility Bill		General Public	5,000	10/1/2019
Diablo WD	Prop 68 Letter of Support and GSP Update	Board Report	Dan Muelrath	General Public	10	10/23/2019
Diablo WD	GSP development status and Amended MOU adoption	Board Report	Dan Muelrath	General Public	10	1/22/2020
Diablo WD	DRAFT GROUNDWATER SUSTAINABILITY PLAN AND PUBLIC MEETING	Website		General Public	50	7/6/2020
Diablo WD	Recap of July's public workshop	Directors Report	Directors Seger and Pastor	General Public	10	7/22/2020
Diablo WD	GSP Plan Update	Board Report		General Public	10	8/26/2020
Diablo WD	GSP Update	Board Report		General Public	10	10/28/2020
Diablo WD	GSP Plan Overview and Update and GSP Policy	Board Report		General Public	50	2/17/2021
Diablo WD	GSP Protection	Board Report		General Public	15	3/10/2021
Diablo WD	GSP Survey	E-Newsletter		General Public	5,600	3/17/2021
Diablo WD	Public Comment Period for GSP	Facebook post linking to article		General Public	200	4/16/2021
Diablo WD	GSP	Board Report	Dan Muelrath	General Public	20	5/10/2021
Diablo WD	GSP Presentation	Sierra Club presentation	Dan Muelrath	Enviros/NGOs	10	6/10/2021
Diablo WD	GSP Public Workshop	Website		General Public		
Diablo WD	GSP Chapter 7, 8, 9	Website		General Public	1,000	
Diablo WD	GSP Workshop	Facebook post		General Public	200	
Diablo WD	GSP Public Notice	posted notice of public meeting		General Public		
Diablo WD	GSP Public Hearing Notice	Website		General Public	40	
Diablo WD	GSP Workshop	Website		General Public	40	
Diablo WD	Special Board Meeting regarding groundwater	Website		General Public	50	

Jurisdiction	Topics covered in Outreach	Outreach Method	Presenter	Audience	Number of People	Date
	sustainability and future planning efforts					
Diablo WD	GSA Education	Website		General Public	50	
Diablo WD	GSP Outreach	Website		General Public	50	
Diablo WD	Groundwater Sustainability Plan Update	Website		General Public	50	
Diablo WD	East Contra Costa Sub basin public workshop	Website		General Public	50	
Discovery Bay	Citizen Comments to Draft Chapters 1 & 2	Website	Michael Davies	General Public	176	
Discovery Bay	Overview of GSAs and GSP	Website		General Public	176	
Discovery Bay	Overview of GSAs and GSP	Utility Bill		General Public	6,200	
ECCID	Basin Boundary Modification 2020 GSP Scope and Budget Working Group Minutes	Board Report	Pat Corey	General Public	50	2/12/2019
ECCID	Basin Boundary Modification- Update 2020 GSP Scope/Budget approval	Board Report	Pat Corey	General Public	50	3/19/2019
ECCID	General GSP plan update Grant Funding Update	Board Report	Aaron Trott	General Public	50	11/19/2019
ECCID	General GSP plan update Grant Funding Update	Board Report	Aaron Trott	General Public	50	12/10/2019
ECCID	GSP Draft Section 3 open for comment, July 9th Public Workshop/ Outcome review.	Board Report	Aaron Trott	General Public	50	1/11/2020
ECCID	Amended MOU update	Board Report	Aaron Trott	General Public	50	1/14/2020
ECCID	DRAFT GROUNDWATER SUSTAINABILITY PLAN AND PUBLIC MEETING	Website Announcement/Content	Aaron Trott	General Public	250	1/15/2020
ECCID	Amended and restated MOU	Board Report	Aaron Trott	Agricultural users	8	3/9/2020
ECCID	Board update	Board Report	Aaron Trott	Agricultural users	10	5/12/2020
ECCID	GSP development status, Budget Update, Public outreach meeting schedule/ agenda	Board Report	Aaron Trott	General Public	50	6/9/2020

Jurisdiction	Topics covered in Outreach	Outreach Method	Presenter	Audience	Number of People	Date
ECCID	Info on how to receive more GSA/GSP/ SGMA info	Utility Bill		General Public	500	7/14/2020
ECCID	Info on how to receive more GSA/GSP/ SGMA info	Utility Bill		General Public	500	8/13/2020
ECCID	GSP Draft Section 4 in development, working group update.	Board Report	Aaron Trott	General Public	50	9/8/2020
ECCID	ECC Groundwater Sustainability Plan Update	Website Announcement/Content	Aaron Trott	General Public	250	9/15/2020
ECCID	Info on how to receive more GSA/GSP/ SGMA info	Utility Bill		General Public	500	9/16/2020
ECCID	Info on how to receive more GSA/GSP/ SGMA info	Utility Bill		General Public	500	10/12/2020
ECCID	GSP Draft Section 4 in development, reviewed elements.	Board Report	Aaron Trott	General Public	50	10/13/2020
ECCID	GSP Draft Section 4 near completion, reviewed status and working group update.	Board Report	Aaron Trott	General Public	50	11/10/2020
ECCID	Info on how to receive more GSA/GSP/ SGMA info	Utility Bill		General Public	500	11/12/2020
ECCID	Draft Sections 4 Website Update	Website Announcement/Content	Aaron Trott	General Public	250	11/20/2020
ECCID	GSP Draft Section 4 Posted for public comment, reviewed budget, and GSP status.	Board Report	Aaron Trott	General Public	20	12/8/2020
ECCID	GSP Draft Section 4 Posted for public comment, reviewed budget, and GSP status.	Board Report	Aaron Trott	General Public	20	12/8/2020
ECCID	GSP Draft Section 6 in development, reviewed budget, and GSP status.	Board Report	Aaron Trott	General Public	50	1/12/2021

Jurisdiction	Topics covered in Outreach	Outreach Method	Presenter	Audience	Number of People	Date
ECCID	Draft Sections 6 Website Update	Website Announcement/Content	Aaron Trott	General Public	250	3/1/2021
ECCID	GSP Draft Chapter 1-4 & 6 posted for public comment, GSP Draft Sections 5-9 in development, Reviewed draft GSP adoption schedule.	Board Report	Aaron Trott	General Public	50	3/10/2021
ECCID	Info on how to receive more GSA/GSP/ SGMA info	Utility Bill		General Public	500	3/17/2021
ECCID	Info on how to receive more GSA/GSP/ SGMA info	Utility Bill		General Public	500	4/15/2021
ECCID	GSP Draft Section 7,8,9 in development, reviewed budget, and GSP status	Board Report	Aaron Trott	General Public	50	5/12/2021
ECCID	Info on how to receive more GSA/GSP/ SGMA info	Utility Bill		General Public	500	5/12/2021
ECCID	Info on how to receive more GSA/GSP/ SGMA info	Utility Bill		General Public	500	6/16/2021
ECCID	DRAFT GROUNDWATER SUSTAINABILITY PLAN ANNOUNCEMENT FOR JUNE-23 PUBLIC MEETING	Website	Aaron Trott	General Public	50	6/18/2021
ECCID	Draft Sections 7,8,9 Website Update	Request for Chapter Review	Aaron Trott	General Public	50	6/18/2021
ECCID	General GSP status and review June-23 public outreach Workshop.	Board Report	Aaron Trott	General Public	50	7/14/2021
ECCID	Info on how to receive more GSA/GSP/ SGMA info	Utility Bill		General Public	500	7/14/2021
ECCID	Section 10 status review, General GSP status and upcoming September 14 Workshop.	Board Report	Aaron Trott	General Public	50	8/11/2021

Jurisdiction	Topics covered in Outreach	Outreach Method	Presenter	Audience	Number of People	Date
ECCID	Info on how to receive more GSA/GSP/ SGMA info	Utility Bill		General Public	1,500	8/16/2021
ECCID	DRAFT GROUNDWATER SUSTAINABILITY PLAN ANNOUNCEMENT FOR SEPTEMBER 14 PUBLIC WORKSHOP	Website	Aaron Trott	General Public	50	8/18/2021
General	Public Review Notice and Public Meeting, Sections 1 and 2	East Contra Costa News	Team	General Public	4,792	6/19/2020
General GSP	Public Meeting and Review of Draft Sections 1 and 2 of GSP	Brentwood Press	Team	General Public	100,000	6/19/2020
General GSP	Intro to SGMA and the ECC Subbasin and GSP. Status and findings of technical work.	Public workshop	Team	General Public	33	7/9/2020
General	Public Review Notice of Sections 3 and 4	East County News	Team	General Public	4,792	11/21/2020
General	Public Review Notice of Section 6 and Survey	East County News	Team	General Public	4,792	4/1/2021
General	Notice of Public Meeting on Draft ECC GSP	East County News	Team	General Public	4,792	6/12/2021
General	Notice of Public Meeting ECC GSP	Brentwood Press	Team	General Public	100,000	6/18/2021
General	Intro to SGMA and the ECC Subbasin and GSP. Status and findings of technical work.	Public workshop	Working Group, Consultant Team, and Supervisor Burgis	General Public	47	6/23/2021
General	Public Review Notice Sections 7-9 and Survey	East County News	Team	General Public	4,792	7/23/2021
General GSP	Public Notice of Section 6 Draft and Optional Survey	Interested Party List	Team	Email Interested Parties List	126	4/13/2021
General GSP	Intro to SGMA and the ECC Subbasin and GSP. Status and findings of technical work.	Public workshop	Team	General Public	47	6/23/2021
General GSP	Public Review of Sections 3 and 4 of Draft GSP	Interested Party List	Team	Email Interested Parties List	132	11/24/2021

Jurisdiction	Topics covered in Outreach	Outreach Method	Presenter	Audience	Number of People	Date
				TOTAL	424,413	

Notes: Antioch=City of Antioch; BBID=Byron-Bethany Irrigation District; Brentwood=City of Brentwood; CCC=Contra Costa County; Diablo WD=Diablo Water District; Discovery Bay=Town of Discovery Bay; ECCID=East Contra Costa Irrigation District.

APPENDIX 10b

Summary of Public Comments on the Draft ECC GSP and Responses

ECC GSP – Section Review
ON-LINE COMMENTS

Section	Date	From	Comment	Notes
6	*05.11.21*	Katherine Perez Nototomne Cultural Preservation	Presented Information is somewhat clear. Our interest is in protecting Cultural Resources. We need to know if there has been a literature search and if so can you please forward that to us. We would like to offer Mitigation Measures from the perspective of the Native Americans. We would like to see cultural awareness and pre-construction training from the perspective of Native Americans before any ground disturbance accurse. We would like to see some archaeological testing implemented to determine cultural sensitivity and be included in that process. Etc.	Contacted by Lisa Beutler. May be a need for follow-up.
4	*05.11.21*	Jody London Contra Costa County	I am the Sustainability Coordinator for Contra Costa County, in charge of implementation of the County's Climate Action Plan. The report does not in my opinion do enough to describe the coming reality of drought combined with increased heat and sea level rise. I find it hard to believe that with expected population increases there will be sufficient conservation to meet water demand. I didn't see any mention of the Adapting to Rising Tides studies. It is highly likely that water treatment facilities will be impacted by rising water levels in the delta. Not to mention that Bethel Island and Discovery Bay could be flooded by 2050.	At the time this comment was posted, Section 5 Water Budget was not yet posted that considers climate change and sea level rise. Also, the potential for an increase in salinity baywater intrusion is discuss in Section 3.

Section	Date	From	Comment	Notes
			The report also does not discuss the possibility of increasing salinity from the intrusion of waters from the Bay. My recommendation is the report be reviewed and amended by an entity that is more familiar with the realities of climate change and water supply, like the Pacific Institute.	

Questions and Comments Received
During East Contra Costa Subbasin Public Workshops

Workshop Date	Commenter	Comment	Response
July 9, 2020	Dan Muelrath, Diablo Water District General Manager	Has subsidence been documented in the East Contra Costa Subbasin?	Not that we know of, but we are still analyzing and gathering data.
July 9, 2020	Liz Elias, Attendee	Are the GSP Working Group meetings open to the public?	Not right now, but the public is invited to attend GSA Board Meetings. That's something we can take back to the working group. Note, no formal decisions are made at working group meeting.
July 9, 2020	Karen Converse, Attendee	How were GSAs formed? Was this a "mandated" structure, or did municipalities decide themselves to form a GSA?	Not everyone can become a GSA, SGMA requires that an entity has existing land use authority and/or water supply authority. It was determined early by the county, cities, and water districts who was using groundwater and what the boundaries would be.
July 9, 2020	Campbell Ingram, Sacramento San Joaquin Delta Conservancy Executive Director	Looking into the future at places like the City of Oakley, Bethel Island, etc., how does sea level rise relate to seawater intrusion?	We recognize it's important to have a monitoring network in place to look at both groundwater levels and water quality. Levels by themselves don't tell the whole picture. Through modeling, we will look at conditions 50 years out which will include sea level. Modeling will show where there are data gaps and a plan developed for additional monitoring needs.
July 9, 2020	Dan Muelrath, Diablo Water District General Manager	What about the delta...is the sea water line moving farther inland?	We are looking at groundwater-surface water interaction, including salinity, through monitoring. If there are areas that have additional salinity occurring as a result of sea level rise or groundwater development activities, that's something we want to know. It will provide an

Workshop Date	Commenter	Comment	Response
			important piece of information for adaptive management.
July 9, 2020	Liz Elias, Attendee	What procedures, requirements, precautions will be put in place to prevent developers from overusing the supply and urban development?	The GSAs' powers and authorities are determined locally. DWR likes to emphasize that SGMA is not intended to solve everything, it would not supersede County Plans. GSAs could look at how groundwater pumping would impact the GSP in terms of measurable objectives. In the County General Plan, there is an urban limit line. How it relates to groundwater and management? Those are the questions we are trying to ask. The GSAs want to track development and want to thoughtfully respond. The cities also have General Plans, I'm not familiar if they have urban limit lines.
July 9, 2020	Campbell Ingram, Sacramento San Joaquin Delta Conservancy Executive Director	Subsidence is a problem on the islands due to microbial oxidation, but not due to groundwater management and or depletion. Because these areas are in the basin, it would be good to make that distinction.	We have additional information from previously worked with the Water Foundation, DWR, and USGS, on land subsidence on all of California.
July 9, 2020	Liz Elias, Attendee	Will you monitor private wells? Or is there a way to keep track of what's happening with that water?	The GSAs are trying to use public wells for monitoring, not trying to monitor private wells unless a private well owner volunteers. The GSAs have established a monitoring network to maintain the continued health of the basin, but monitoring private wells is not something we are currently considering. De minimis user (well that pumps less than 2 acre-feet per year) are exempt from SGMA.

Workshop Date	Commenter	Comment	Response
July 9, 2020	Jon Duta, Well Owner	I have a small water system (well) that feeds an apartment in a rural area. What kind of restrictions may be placed on my system?	Sounds like you are already complying with the county's well permitting program. The GSAs are looking to maintain the current requirements. No changes are being proposed and we invite you to participate in the future. • **Follow-up Question from John Duta**: The well gets tested monthly, would the results be useful for GSP process? Yes, it would be helpful, thank you so much.
July 9, 2020	Liz Elias, Attendee	I'm just wondering about the threat of some of the oil drilling that's going on. And there seems to always be accidents associated, and that seems like a threat to groundwater.	For oil and gas well drilling, they have to meet criteria in the zoning ordinance such as land use permit. We would need to look into regulations to see if there is anything SGMA would allow us to do anything about that.
July 9, 2020	Paul Seger Diablo Water District Director	SGMA provides an opportunity to have a public advisory committee, however he hasn't seen that discussed or brought up. Are people in community interested in participating in a more formal way? Has that been discussed previously?	This topic is related to a stakeholder process-determined by GSAs. GSAs determine how they want stakeholders engaged. The GSAs sent out some surveys last year. They did not receive a lot of responses. The responses received said, "keep me posted when you have something to tell me". There is no barrier to doing a public advisory committee; it can be accommodated. • **Follow-up Question from Paul Seger**: East Bay Municipal District has something like this laid out in their plan, is this something that should be commented by the 20th? You could comment on it. Ryan could bring it up to the GSP Working Group and then work with Lisa on how to go forward.

Workshop Date	Commenter	Comment	Response
June 23, 2021	Marylin Tiernan, Diablo Water District	I am an Oakley citizen on well and have seen water quality degradation over the past 37 years. It has degraded more recently. The community is very built out. We do have seawater intrusion; I see sea lions in the Delta. Also, my neighbors didn't know about the meeting—who's responsible for the outreach?	Each GSA is responsible for doing outreach which includes a website, flyers, ads in the newspaper, workshops and so on. We can follow up after the meeting with more information. As for your other questions, we will get to them later in the presentation.
June 23, 2021	Bruce Rank	Is Discovery Bay running out of water?	Our projections show that nobody will run out of water. We understand it's an important question because they are 100 percent on groundwater, but our projections show that there is no reason for concern.
June 23, 2021	Not recorded	Will the raw data be available in one of the draft versions? Or the final version? Interested in the sample space (i.e., density of measurement points, and location of the points).	A technical appendix will be posted online on the SGMA website: SGMA Documents & Reports — East Contra Costa County Integrated Regional Water Management (eccc-irwm.org)
June 23, 2021	Marylin Tiernan, Diablo Water District	What growth (uncontrolled continued building) was considered in this "plan"?	GSP Section 4 looks at the future demands for each GSA. This takes into account projected growth as defined by the general plans. If the projected growth is inconsistent with what we are seeing, it's something we can reevaluate as needed. The GSAs have the authority to limit growth that is unsustainable.
June 23, 2021	Not recorded	Would you test water from private wells as we know it's bad for residents and clearly affecting people? A commercial well is substantially different from a personal well.	We are looking at representative wells in the monitoring network to give an overall picture, but we can do private well testing if people are interested.

Workshop Date	Commenter	Comment	Response
June 23, 2021	Not recorded	Will Contra Costa County make reuse of graywater mandatory so that landscaping may still be part of a homeowner/property owner experience and can Contra Costa County demand that new subdivisions have these installed? Landscaping/gardens actually help groundwater retention based on all the reading I have done.	Graywater isn't something that would show up in the model because it's a small amount of water, but we know that jurisdictions have plans to implement recycled water. Eventually it will get into the ground. There isn't anything specific in the GSP on this topic.
June 23, 2021	Marylin Tiernan, Diablo Water District	How do future land use planning decisions made by government agencies affect future recharge potential? i.e., impermeable surface increases, reduction of native trees, ground cover, construction of flood control channels in new developments.	We know that more urban areas have a flashier system (water moves faster), but we are also trying to implement runoff programs in some developments. The groundwater models include land use changes that are part of the city and County general plans such as conversion of agricultural land to urban which would create more runoff and less recharge. GSAs have a responsibility too—if the GSP identifies a recharge area, but the County comes in with a development plan in the same area, GSAs have the responsibility to work with County to say that impacts sustainability. The County has urban limit line which limits development in unincorporated portion of the County.
June 23, 2021	Not recorded	Will the GSP Working Group meeting agendas with teleconference links be posted on the website going forward? To	Diablo Water District has GSA meetings that are open to the public; we would love to have public participation and hope they attend. Discovery Bay and City of Brentwood have done a lot of outreach

Workshop Date	Commenter	Comment	Response
		date, only minutes have been posted after meetings are held.	too. The GSP Working Group is about the data and purposefully kept small. We do want input from the community though so someone can read the minutes and can then participate through the GSA board.

October 6, 2021

East Contra Costa Groundwater Sustainability Agencies (GSAs)

Submitted via email: groundwaterinfo@dcd.cccounty.us

Re: Public Comment Letter for East Contra Costa Subbasin Draft GSP

Dear James Wolfe,

On behalf of the above-listed organizations, we appreciate the opportunity to comment on the Draft Groundwater Sustainability Plan (GSP) for the East Contra Costa Subbasin being prepared under the Sustainable Groundwater Management Act (SGMA). Our organizations are deeply engaged in and committed to the successful implementation of SGMA because we understand that groundwater is critical for the resilience of California's water portfolio, particularly in light of changing climate. Under the requirements of SGMA, Groundwater Sustainability Agencies (GSAs) must consider the interests of all beneficial uses and users of groundwater, such as domestic well owners, environmental users, surface water users, federal government, California Native American tribes and disadvantaged communities (Water Code 10723.2).

As stakeholder representatives for beneficial users of groundwater, our GSP review focuses on how well disadvantaged communities, drinking water users, tribes, climate change, and the environment were addressed in the GSP. While we appreciate that some basins have consulted us directly via focus groups, workshops, and working groups, we are providing public comment letters to all GSAs as a means to engage in the development of 2022 GSPs across the state. Recognizing that GSPs are complicated and resource intensive to develop, the intention of this letter is to provide constructive stakeholder feedback that can improve the GSP prior to submission to the State.

Based on our review, we have some concerns regarding the treatment of key beneficial users in the Draft GSP and consider the GSP to be **insufficient** under SGMA. We highlight the following findings:

1. Beneficial uses and users **are not sufficiently** considered in GSP development.
    a. Human Right to Water considerations **are not sufficiently** incorporated.
    b. Public trust resources **are not sufficiently** considered.
    c. Impacts of Minimum Thresholds, Measurable Objectives and Undesirable Results on beneficial uses and users **are not sufficiently** analyzed.
2. Climate change **is not sufficiently** considered.

3. Data gaps **are not sufficiently** identified and the GSP **needs additional plans** to eliminate them.
4. Projects and Management Actions **do not sufficiently consider** potential impacts or benefits to beneficial uses and users.

Our specific comments related to the deficiencies of the East Contra Costa Subbasin Draft GSP along with recommendations on how to reconcile them, are provided in detail in **Attachment A.**

Please refer to the enclosed list of attachments for additional technical recommendations:

Attachment A	GSP Specific Comments
Attachment B	SGMA Tools to address DAC, drinking water, and environmental beneficial uses and users
Attachment C	The Nature Conservancy's "Identifying GDEs under SGMA: Best Practices for using the NC Dataset"

Thank you for fully considering our comments as you finalize your GSP.

Best Regards,

Ngodoo Atume
Water Policy Analyst
Clean Water Action/Clean Water Fund

J. Pablo Ortiz-Partida, Ph.D.
Western States Climate and Water Scientist
Union of Concerned Scientists

Samantha Arthur
Working Lands Program Director
Audubon California

Danielle V. Dolan
Water Program Director
Local Government Commission

E.J. Remson
Senior Project Director, California Water Program
The Nature Conservancy

Melissa M. Rohde
Groundwater Scientist
The Nature Conservancy

Attachment A

Specific Comments on the East Contra Costa Subbasin Draft Groundwater Sustainability Plan

1. Consideration of Beneficial Uses and Users in GSP development

Consideration of beneficial uses and users in GSP development is contingent upon adequate identification and engagement of the appropriate stakeholders. The (A) identification, (B) engagement, and (C) consideration of disadvantaged communities, drinking water users, tribes, groundwater dependent ecosystems, streams, wetlands, and freshwater species are essential for ensuring the GSP integrates existing state policies on the Human Right to Water and the Public Trust Doctrine.

A. Identification of Key Beneficial Uses and Users

Disadvantaged Communities and Drinking Water Users

The identification of Disadvantaged Communities (DACs) and drinking water users is **sufficient**. The GSP identified and mapped each DAC and Severely Disadvantaged Community (SDAC) and described the population of each. The water sources for DACs and SDACs were identified in Section 2 of the GSP. The GSP provides maps and graphs of domestic well density and depths in the subbasin.

Interconnected Surface Waters

The identification of Interconnected Surface Waters (ISWs) is **insufficient**, due to lack of supporting information provided for the ISW analysis. For example, groundwater levels from only 2018 are included, and while these data are considered "conservative" because it was a wet water year, the temporal variability in gaining, losing and disconnected reaches are not incorporated. Note the GSP Regulations [23 CCR § 354.16(f)] state that plans should include "Identification of interconnected surface water systems within the basin and an estimate of the quantity and timing of depletions of those systems". Thus, using groundwater elevation data from multiple years is essential to identify ISWs.

RECOMMENDATIONS

- On the depth to shallow groundwater map (Figure 3-25a), the title of the figure (depth to groundwater) contradicts the legend label (groundwater elevation). Also, the figure title says 2012 but the text refers to spring 2018 depth to groundwater. Correct the figure and text as needed.
- Overlay the stream reaches shown with depth-to-groundwater contour maps to illustrate groundwater depths and the groundwater gradient near the stream reaches. For the depth-to-groundwater contour maps, use the best practices presented in Attachment C. Specifically, ensure that the first step is contouring groundwater elevations, and then subtracting this layer from land surface elevations from a Digital Elevation Model (DEM) to estimate depth-to-groundwater contours across the landscape. This will provide accurate contours of depth to groundwater along streams and other land surface depressions where GDEs are commonly found.

- Use seasonal data over multiple water year types to capture the variability in environmental conditions inherent in California's climate, when mapping ISWs. We recommend the 10-year pre-SGMA baseline period of 2005 to 2015.

- On the ISW map (Figure 3-25b), clearly label the areas with data gaps. While the GSP discusses data gaps in the text, we recommend that the GSP considers any segments with data gaps as potential ISWs and clearly marks them as such on maps provided in the GSP.

Groundwater Dependent Ecosystems

The identification of Groundwater Dependent Ecosystems (GDEs) is **sufficient**. The GSP identified and mapped GDEs using the Natural Communities Commonly Associated with Groundwater dataset (NC dataset) and other sources. The GSP acknowledges that groundwater level data is lacking in some of the western areas of the subbasin and thus did not make changes to the NC dataset, except to eliminate small acreage with agricultural or urban land use. The GSP discusses shallow zone data gaps near GDEs. Table 3-4 presents the vegetation species in the subbasin and Figure 3-27 maps the critical habitat in the subbasin. The GSP used The Nature Conservancy's (TNC's) GDE Pulse Tool to evaluate GDE health.

The GSP mentions using a depth threshold to analyze GDEs, but does not use it to eliminate them. The GSP states (p. 3-66): "Further analysis of GDEs in ECC was conducted by identifying areas where depth to groundwater is greater than 30 feet, the general vegetation maximum rooting depth." While we recommend using a 30-foot depth threshold when identifying GDEs, utilize a deeper threshold for plants with greater rooting depths (e.g., 80-foot threshold for valley oak, *Quercus lobata*). See Attachment B of this letter for more information on this and other tools to help address beneficial users of groundwater.

RECOMMENDATION

- Refer to Attachment B for more information on TNC's plant rooting depth database. Utilize a deeper threshold for plants with greater rooting depths (e.g., 80-foot threshold for valley oak (*Quercus lobata*).

Native Vegetation and Managed Wetlands

Native vegetation and managed wetlands are water use sectors that are required[1,2] to be included into the water budget. The integration of these ecosystems into the water budget is **insufficient**. The water budget did explicitly include the current, historical, and projected demands of native vegetation, but did not include the current, historical, and projected demands of managed wetlands. Managed wetlands are not mentioned in the GSP, but are present in DWR's statewide cropping dataset. The omission of explicit water demands for managed wetlands is problematic because key environmental uses of groundwater are not being accounted for as water supply

[1] "'Water use sector' refers to categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation." [23 CCR §351(al)]

[2] "The water budget shall quantify the following, either through direct measurements or estimates based on data: (3) Outflows from the groundwater system by water use sector, including evapotranspiration, groundwater extraction, groundwater discharge to surface water sources, and subsurface groundwater outflow." [23 CCR §354.18]

decisions are made using this budget, nor will they likely be considered in project and management actions.

RECOMMENDATION

- Discuss and map the presence of managed wetlands in the subbasin. Quantify and present all water use sector demands in the historical, current, and projected water budgets with individual line items for each water use sector, including managed wetlands.

B. Engaging Stakeholders

Stakeholder Engagement during GSP development

Stakeholder engagement during GSP development is **insufficient**. SGMA's requirement for public notice and engagement of stakeholders[3] is not fully met by the description in the Communication and Engagement Plan (Appendix 10C). The opportunities for public involvement and engagement for DACs and environmental stakeholders during the GSP development and implementation processes are described in very general terms. They include outreach surveys, board meetings and workshops, speaking engagements, and press releases. The plan mentions messages developed and tailored to DACs, domestic well owners, and environmental stakeholders, but details on what the messaging entails and the nature of the engagement process are not provided in the Communication and Engagement Plan.

RECOMMENDATION

- In the Communication and Engagement Plan, describe active and targeted outreach to engage DAC members and environmental stakeholders throughout the GSP development and implementation phases. Refer to Attachment B for specific recommendations on how to actively engage stakeholders during all phases of the GSP process.

C. Considering Beneficial Uses and Users When Establishing Sustainable Management Criteria and Analyzing Impacts on Beneficial Uses and Users

The consideration of beneficial uses and users when establishing sustainable management criteria (SMC) is **insufficient**. The consideration of potential impacts on all beneficial users of groundwater in the basin are required when defining undesirable results[4] and establishing minimum thresholds.[5,6]

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[3] "A communication section of the Plan shall include a requirement that the GSP identify how it encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin." [23 CCR §354.10(d)(3)]

[4] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results." [23 CCR §354.26(b)(3)]

[5] "The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]

[6] "The description of minimum thresholds shall include [...] how state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the agency shall explain the nature of and the basis for the difference." [23 CCR §354.28(b)(5)]

Disadvantaged Communities and Drinking Water Users

For chronic lowering of groundwater levels, the GSP considers drinking water users when establishing SMC. Figure 7-3 presents the minimum top of screened interval for domestic wells, plotted by square mile section. The established minimum thresholds consider the undesirable result of dropping below the top perforations of domestic wells per section. The GSP does not however, specifically analyze direct and indirect impacts on DACs or evaluate the cumulative or indirect impacts of proposed minimum thresholds on DACs.

The GSP identifies the following as constituents of concern (COCs) in the subbasin: total dissolved solids (TDS), nitrate, chloride, arsenic, boron, and mercury. Water quality standards are provided as the following (Table 7-3): maximum contaminant level (MCL) for nitrate, arsenic, and mercury; secondary MCL for TDS and chloride; and the US EPA Health Advisory for non-cancer health effect for boron.

The GSP states (p. 7-24): "The minimum threshold at a given RMS in the ECC Subbasin is the three-year running average exceedance of an MCL for a key monitoring constituent." This is not an adequate methodology for establishing a minimum threshold since concentrations averaged over three years can not adequately detect impacts to beneficial users of groundwater.

For degraded water quality, the GSP only includes a very general discussion of impacts to drinking water users when defining undesirable results and evaluating the impacts of proposed minimum thresholds. The GSP does not, however, mention or discuss direct and indirect impacts on DACs when defining undesirable results for degraded water quality, nor does it evaluate the cumulative or indirect impacts of proposed minimum thresholds on DACs.

RECOMMENDATIONS

Chronic Lowering of Groundwater Levels

- Describe direct and indirect impacts on DACs when describing undesirable results and defining minimum thresholds for chronic lowering of groundwater levels (in addition to describing impacts to drinking water users).

Degraded Water Quality

- Describe direct and indirect impacts on drinking water users and DACs when defining undesirable results for degraded water quality. For specific guidance on how to consider these users, refer to "Guide to Protecting Water Quality Under the Sustainable Groundwater Management Act."[7]
- Evaluate the cumulative or indirect impacts of proposed minimum thresholds for degraded water quality on drinking water users and DACs.
- Set minimum thresholds that are based on individual exceedances of regulatory standards, not based on a 3-year running average.

[7] Guide to Protecting Water Quality under the Sustainable Groundwater Management Act https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide_to_Protecting_Drinking_Water_Quality_Under_the_Sustainable_Groundwater_Management_Act.pdf?1559328858.

Groundwater Dependent Ecosystems and Interconnected Surface Waters

The GSP only considers GDEs with respect to the depletion of interconnected surface water sustainability indicator, but not the chronic lowering of groundwater levels sustainability indicator. No analysis or discussion is provided in the GSP that describes impacts to GDEs or establishes SMC for GDEs that are directly dependent on groundwater. This is problematic because without identifying potential impacts to GDEs, minimum thresholds may compromise these environmental beneficial users. Since GDEs are present in the subbasin, they must be considered when developing SMC for chronic lowering of groundwater levels.

Sustainable management criteria for depletion of interconnected surface water are established based on groundwater flow model results. However, the GSP makes no attempt to evaluate the impacts of the proposed minimum threshold on environmental beneficial users of surface water. The GSP does not explain how the chosen minimum thresholds and measurable objectives avoid significant and unreasonable effects on surface water beneficial users in the subbasin, such as increased mortality and inability to perform key life processes (e.g., reproduction, migration).

RECOMMENDATIONS

- When defining undesirable results for chronic lowering of groundwater levels, provide specifics on what biological responses (e.g., extent of habitat, growth, recruitment rates) would best characterize a significant and unreasonable impact to GDEs. Undesirable results to environmental users occur when 'significant and unreasonable' effects on beneficial users are caused by one of the sustainability indicators (i.e., chronic lowering of groundwater levels, degraded water quality, or depletion of interconnected surface water). Thus, potential impacts on environmental beneficial uses and users need to be considered when defining undesirable results[8] in the subbasin. Defining undesirable results is the crucial first step before the minimum thresholds[9] can be determined.

- When defining undesirable results for depletion of interconnected surface water, include a description of potential impacts on instream habitats within ISWs when minimum thresholds in the subbasin are reached[10]. The GSP should confirm that minimum thresholds for ISWs avoid adverse impacts to environmental beneficial users of interconnected surface waters as these environmental users could be left unprotected by the GSP. These recommendations apply especially to environmental beneficial users that are already protected under pre-existing state or federal law[6,11].

[8] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results". [23 CCR §354.26(b)(3)]

[9] The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]

[10] "The minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results." [23 CCR §354.28(c)(6)]

[11] Rohde MM, Seapy B, Rogers R, Castañeda X, editors. 2019. Critical Species LookBook: A compendium of California's threatened and endangered species for sustainable groundwater management. The Nature Conservancy, San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/Critical_Species_LookBook_91819.pdf

2. Climate Change

The SGMA statute identifies climate change as a significant threat to groundwater resources and one that must be examined and incorporated in the GSPs. The GSP Regulations[12] require integration of climate change into the projected water budget to ensure that projects and management actions sufficiently account for the range of potential climate futures.

The integration of climate change into the projected water budget is **insufficient**. The GSP does incorporate climate change into the projected water budget using DWR change factors for 2070. However, the GSP did not consider multiple climate scenarios (e.g., the 2070 extremely wet and extremely dry climate scenarios) in the projected water budget. The GSP should clearly and transparently incorporate the extremely wet and dry scenarios provided by DWR into projected water budgets or select more appropriate extreme scenarios for their basins. While these extreme scenarios may have a lower likelihood of occurring, their consequences could be significant, therefore they should be included in groundwater planning.

The GSP includes climate change into precipitation, evapotranspiration, surface water flow, and sea level terms of the projected water budget. The GSP does not adjust imported water for climate change within the projected water budget. The sustainable yield is calculated based on the projected pumping with climate change incorporated. However, if the water budgets are incomplete, including the omission of extremely wet and dry scenarios and exclusion of imported water with climate change incorporated, then there is increased uncertainty in virtually every subsequent calculation used to plan for projects, derive measurable objectives, and set minimum thresholds. Plans that do not adequately include climate change projections may underestimate future impacts on vulnerable beneficial users of groundwater such as ecosystems, DACs, and domestic well owners.

RECOMMENDATIONS

- Integrate climate change, including extremely wet and dry scenarios, into all elements of the projected water budget to form the basis for development of sustainable management criteria and projects and management actions.
- Incorporate climate change into imported water inputs for the projected water budget.
- Incorporate climate change scenarios into projects and management actions.

3. Data Gaps

The consideration of beneficial users when establishing monitoring networks is **insufficient**, due to lack of specific plans to increase the Representative Monitoring Points (RMPs) in the monitoring network that represent water quality conditions and shallow groundwater elevations around DACs and domestic wells in the subbasin.

[12] "Each Plan shall rely on the best available information and best available science to quantify the water budget for the basin in order to provide an understanding of historical and projected hydrology, water demand, water supply, land use, population, climate change, sea level rise, groundwater and surface water interaction, and subsurface groundwater flow." [23 CCR §354.18(e)]

Figure 6-2 (Representative Groundwater Level Monitoring Network) and Figure 6-5 (Representative Groundwater Quality Monitoring Network) show that no monitoring wells are located across portions of the subbasin near DACs and domestic wells. Beneficial users of groundwater may remain unprotected by the GSP without adequate monitoring and identification of data gaps in the shallow aquifer. The Plan therefore fails to meet SGMA's requirements for the monitoring network[13].

The GSP provides comprehensive discussion of data gaps for GDEs and ISWs in Sections 6.2.2.5 (Plan to Fill Groundwater Level Data Gaps) and Section 6.2.6 (Interconnected Surface Water Monitoring Network).

RECOMMENDATIONS

- Provide maps that overlay current and proposed monitoring well locations with the locations of DACs and domestic wells to clearly identify potentially impacted areas. Increase the number of RMPs in the shallow aquifer across the subbasin as needed to adequately monitor all groundwater condition indicators. Prioritize proximity to DACs and drinking water users when identifying new RMPs.
- Describe the biological monitoring that can be used to assess the potential for significant and unreasonable impacts to GDEs or ISWs due to groundwater conditions in the subbasin.

4. Addressing Beneficial Users in Projects and Management Actions

The consideration of beneficial users when developing projects and management actions is **insufficient**, due to the failure to completely identify benefits or impacts of identified projects and management actions to key beneficial users of groundwater such as GDEs, aquatic habitats, surface water users, DACs, and drinking water users. Therefore, potential project and management actions may not protect these beneficial users. Groundwater sustainability under SGMA is defined not just by sustainable yield, but by the avoidance of undesirable results for *all* beneficial users.

RECOMMENDATIONS

- For DACs and domestic well owners, include a drinking water well impact mitigation program to proactively monitor and protect drinking water wells through GSP implementation. Refer to Attachment B for specific recommendations on how to implement a drinking water well mitigation program.
- For DACs and domestic well owners, include a discussion of whether potential impacts to water quality from projects and management actions could occur and how the GSA plans to mitigate such impacts.
- Recharge ponds, reservoirs, and facilities for managed stormwater recharge can be designed as multiple-benefit projects to include elements that act functionally as

[13] "The monitoring network objectives shall be implemented to accomplish the following: [...] (2) Monitor impacts to the beneficial uses or users of groundwater." [23 CCR §354.34(b)(2)]

wetlands and provide a benefit for wildlife and aquatic species. For guidance on how to integrate multi-benefit recharge projects into your GSP, refer to the “Multi-Benefit Recharge Project Methodology Guidance Document”[14].

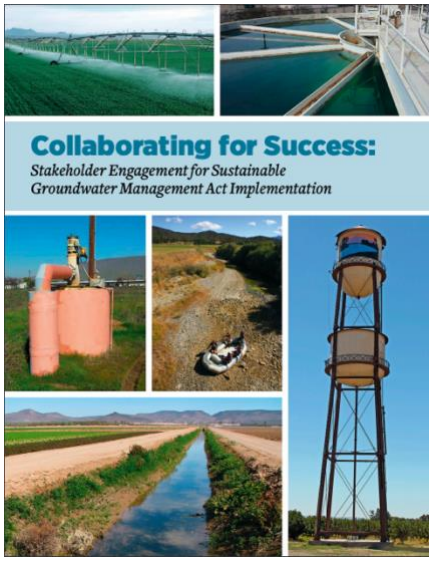
- Develop management actions that incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results.

[14] The Nature Conservancy. 2021. Multi-Benefit Recharge Project Methodology for Inclusion in Groundwater Sustainability Plans. Sacramento. Available at: https://groundwaterresourcehub.org/sgma-tools/multi-benefit-recharge-project-methodology-guidance/

Attachment B

SGMA Tools to address DAC, drinking water, and environmental beneficial uses and users

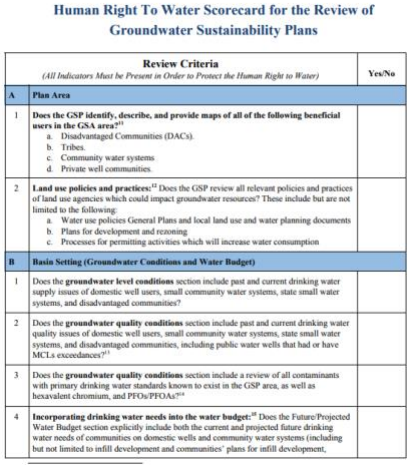
Stakeholder Engagement and Outreach



Clean Water Action, Community Water Center and Union of Concerned Scientists developed a guidance document called Collaborating for success: Stakeholder engagement for Sustainable Groundwater Management Act Implementation. It provides details on how to conduct targeted and broad outreach and engagement during Groundwater Sustainability Plan (GSP) development and implementation. Conducting a targeted outreach involves:

- Developing a robust Stakeholder Communication and Engagement plan that includes outreach at frequented locations (schools, farmers markets, religious settings, events) across the plan area to increase the involvement and participation of disadvantaged communities, drinking water users and the environmental stakeholders.
- Providing translation services during meetings and technical assistance to enable easy participation for non-English speaking stakeholders.
- GSP should adequately describe the process for requesting input from beneficial users and provide details on how input is incorporated into the GSP.

The Human Right to Water

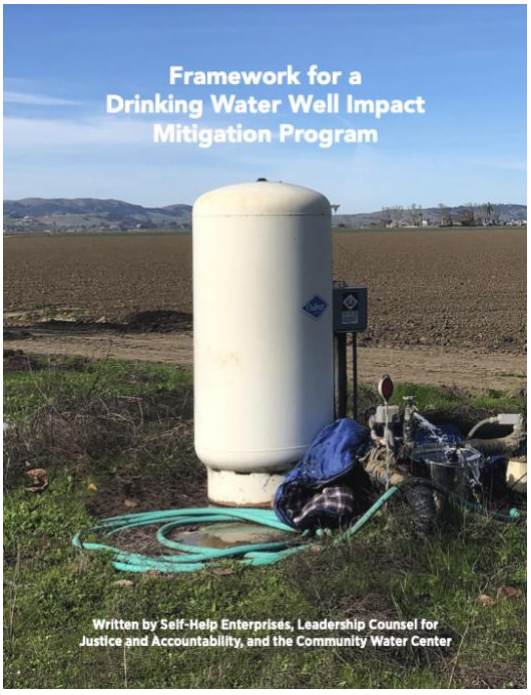


Human Right To Water Scorecard for the Review of Groundwater Sustainability Plans

	Review Criteria *(All Indicators Must be Present in Order to Protect the Human Right to Water)*	Yes/No
A	**Plan Area**	
1	**Does the GSP identify, describe, and provide maps of all of the following beneficial users in the GSA area?**[43] a. Disadvantaged Communities (DACs). b. Tribes. c. Community water systems. d. Private well communities.	
2	**Land use policies and practices:**[44] Does the GSP review all relevant policies and practices of land use agencies which could impact groundwater resources? These include but are not limited to the following: a. Water use policies General Plans and local land use and water planning documents b. Plans for development and rezoning c. Processes for permitting activities which will increase water consumption	
B	**Basin Setting (Groundwater Conditions and Water Budget)**	
1	Does the **groundwater level conditions** section include past and current drinking water supply issues of domestic well users, small community water systems, state small water systems, and disadvantaged communities?	
2	Does the **groundwater quality conditions** section include past and current drinking water quality issues of domestic well users, small community water systems, state small water systems, and disadvantaged communities, including public water wells that had or have MCLs exceedances?[45]	
3	Does the **groundwater quality conditions** section include a review of all contaminants with primary drinking water standards known to exist in the GSP area, as well as hexavalent chromium, and PFOs/PFOAs?[46]	
4	**Incorporating drinking water needs into the water budget:**[47] Does the Future/Projected Water Budget section explicitly include both the current and projected future drinking water needs of communities on domestic wells and community water systems (including but not limited to infill development and communities' plans for infill development,	

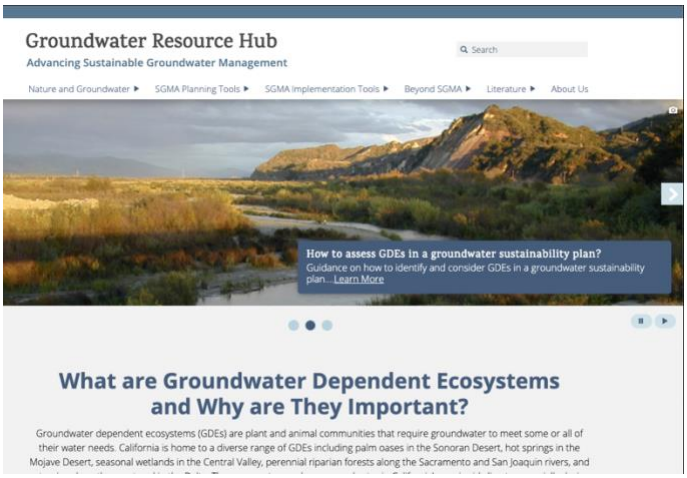
The Human Right to Water Scorecard was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid Groundwater Sustainability Agencies (GSAs) in prioritizing drinking water needs in SGMA. The scorecard identifies elements that must exist in GSPs to adequately protect the Human Right to Drinking water.

Drinking Water Well Impact Mitigation Framework



The Drinking Water Well Impact Mitigation Framework was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid GSAs in the development and implementation of their GSPs. The framework provides a clear roadmap for how a GSA can best structure its data gathering, monitoring network and management actions to proactively monitor and protect drinking water wells and mitigate impacts should they occur.

Groundwater Resource Hub



The Nature Conservancy has developed a suite of tools based on best available science to help GSAs, consultants, and stakeholders efficiently incorporate nature into GSPs. These tools and resources are available online at GroundwaterResourceHub.org. The Nature Conservancy's tools and resources are intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

Rooting Depth Database

The Plant Rooting Depth Database provides information that can help assess whether groundwater-dependent vegetation are accessing groundwater. Actual rooting depths will depend on the plant species and site-specific conditions, such as soil type and

availability of other water sources. Site-specific knowledge of depth to groundwater combined with rooting depths will help provide an understanding of the potential groundwater levels are needed to sustain GDEs.

How to use the database

The maximum rooting depth information in the Plant Rooting Depth Database is useful when verifying whether vegetation in the Natural Communities Commonly Associated with Groundwater (NC Dataset) are connected to groundwater. A 30 ft depth-to-groundwater threshold, which is based on averaged global rooting depth data for phreatophytes[1], is relevant for most plants identified in the NC Dataset since most plants have a max rooting depth of less than 30 feet. However, it is important to note that deeper thresholds are necessary for other plants that have reported maximum root depths that exceed the averaged 30 feet threshold, such as valley oak (*Quercus lobata*), Euphrates poplar (*Populus euphratica*), salt cedar (*Tamarix spp.*), and shadescale (*Atriplex confertifolia*). The Nature Conservancy advises that the reported max rooting depth for these deeper-rooted plants be used. For example, a depth-to groundwater threshold of 80 feet should be used instead of the 30 ft threshold, when verifying whether valley oak polygons from the NC Dataset are connected to groundwater. It is important to re-emphasize that actual rooting depth data are limited and will depend on the plant species and site-specific conditions such as soil and aquifer types, and availability to other water sources.

The Plant Rooting Depth Database is an Excel workbook composed of four worksheets:

1. California phreatophyte rooting depth data (included in the NC Dataset)
2. Global phreatophyte rooting depth data
3. Metadata
4. References

How the database was compiled

The Plant Rooting Depth Database is a compilation of rooting depth information for the groundwater-dependent plant species identified in the NC Dataset. Rooting depth data were compiled from published scientific literature and expert opinion through a crowdsourcing campaign. As more information becomes available, the database of rooting depths will be updated. Please Contact Us if you have additional rooting depth data for California phreatophytes.

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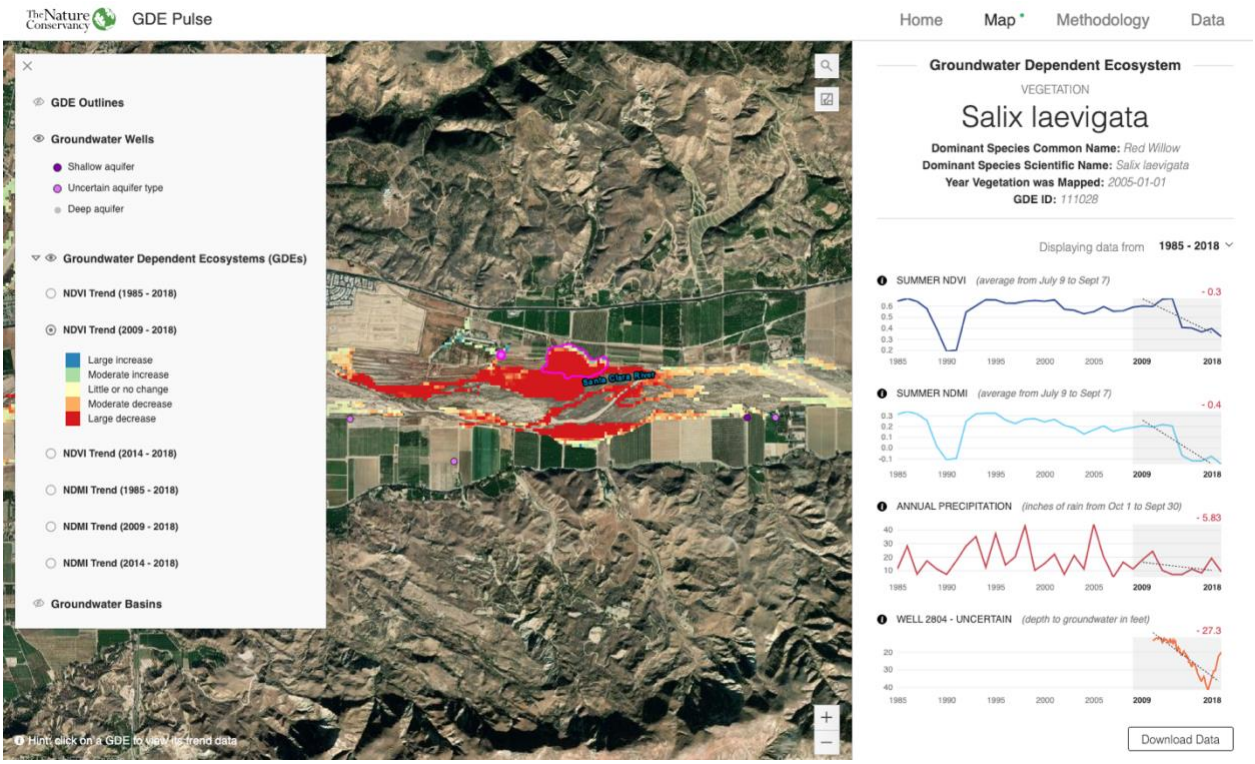
[1] Canadell, J., Jackson, R.B., Ehleringer, J.B. et al. 1996. Maximum rooting depth of vegetation types at the global scale. Oecologia 108, 583–595. https://doi.org/10.1007/BF00329030

GDE Pulse



GDE Pulse is a free online tool that allows Groundwater Sustainability Agencies to assess changes in groundwater dependent ecosystem (GDE) health using satellite, rainfall, and groundwater data. Remote sensing data from satellites has been used to monitor the health of vegetation all over the planet. GDE pulse has compiled 35 years of satellite imagery from NASA's Landsat mission for every polygon in the Natural Communities Commonly Associated with Groundwater Dataset. The following datasets are available for downloading:

Normalized Difference Vegetation Index (NDVI) is a satellite-derived index that represents the greenness of vegetation. Healthy green vegetation tends to have a higher NDVI, while dead leaves have a lower NDVI. We calculated the average NDVI during the driest part of the year (July - Sept) to estimate vegetation health when the plants are most likely dependent on groundwater.

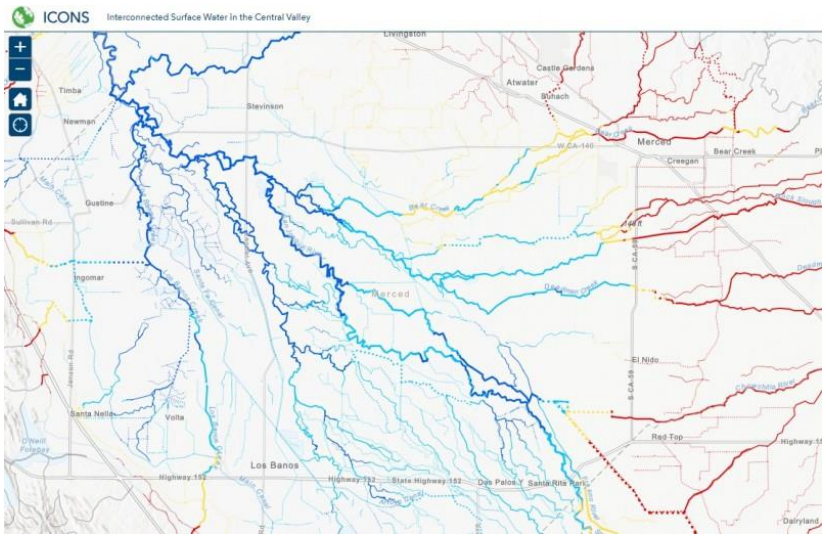
Normalized Difference Moisture Index (NDMI) is a satellite-derived index that represents water content in vegetation. NDMI is derived from the Near-Infrared (NIR) and Short-Wave Infrared (SWIR) channels. Vegetation with adequate access to water tends to have higher NDMI, while vegetation that is water stressed tends to have lower NDMI. We calculated the average NDVI during the driest part of the year (July–September) to estimate vegetation health when the plants are most likely dependent on groundwater.

Annual Precipitation is the total precipitation for the water year (October 1st – September 30th) from the PRISM dataset. The amount of local precipitation can affect vegetation with more precipitation generally leading to higher NDVI and NDMI.

Depth to Groundwater measurements provide an indication of the groundwater levels and changes over time for the surrounding area. We used groundwater well measurements from nearby (<1km) wells to estimate the depth to groundwater below the GDE based on the average elevation of the GDE (using a digital elevation model) minus the measured groundwater surface elevation.

ICONOS Mapper

Interconnected Surface Water in the Central Valley



ICONS maps the likely presence of interconnected surface water (ISW) in the Central Valley using depth to groundwater data. Using data from 2011-2018, the ISW dataset represents the likely connection between surface water and groundwater for rivers and streams in California's Central Valley. It includes information on the mean, maximum, and minimum depth to groundwater for each stream segment over the years with available data, as well as the likely presence of ISW based on the minimum depth to groundwater. The Nature Conservancy developed this database, with guidance and input from expert academics, consultants, and state agencies.

We developed this dataset using groundwater elevation data available online from the California Department of Water Resources (DWR). DWR only provides this data for the Central Valley. For GSAs outside of the valley, who have groundwater well measurements, we recommend following our methods to determine likely ISW in your region. The Nature Conservancy's ISW dataset should be used as a first step in reviewing ISW and should be supplemented with local or more recent groundwater depth data.

Attachment C

The Nature Conservancy

July 2019

IDENTIFYING GDEs UNDER SGMA

Best Practices for using the NC Dataset

The Sustainable Groundwater Management Act (SGMA) requires that groundwater dependent ecosystems (GDEs) be identified in Groundwater Sustainability Plans (GSPs). As a starting point, the Department of Water Resources (DWR) is providing the Natural Communities Commonly Associated with Groundwater Dataset (NC Dataset) online[1] to help Groundwater Sustainability Agencies (GSAs), consultants, and stakeholders identify GDEs within individual groundwater basins. To apply information from the NC Dataset to local areas, GSAs should combine it with the best available science on local hydrology, geology, and groundwater levels to verify whether polygons in the NC dataset are likely supported by groundwater in an aquifer (Figure 1)[2]. This document highlights six best practices for using local groundwater data to confirm whether mapped features in the NC dataset are supported by groundwater.

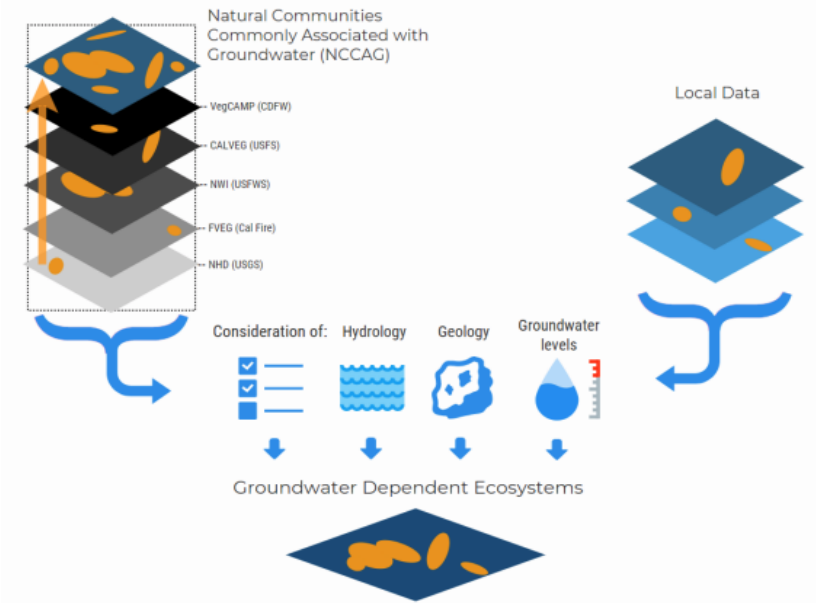


Figure 1. Considerations for GDE identification.
Source: DWR[2]

[1] NC Dataset Online Viewer: https://gis.water.ca.gov/app/NCDatasetViewer/
[2] California Department of Water Resources (DWR). 2018. Summary of the "Natural Communities Commonly Associated with Groundwater" Dataset and Online Web Viewer. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Data-and-Tools/Files/Statewide-Reports/Natural-Communities-Dataset-Summary-Document.pdf

The NC Dataset identifies vegetation and wetland features that are good indicators of a GDE. The dataset is comprised of 48 publicly available state and federal datasets that map vegetation, wetlands, springs, and seeps commonly associated with groundwater in California[3]. It was developed through a collaboration between DWR, the Department of Fish and Wildlife, and The Nature Conservancy (TNC). TNC has also provided detailed guidance on identifying GDEs from the NC dataset[4] on the Groundwater Resource Hub[5], a website dedicated to GDEs.

BEST PRACTICE #1. Establishing a Connection to Groundwater

Groundwater basins can be comprised of one continuous aquifer (Figure 2a) or multiple aquifers stacked on top of each other (Figure 2b). In unconfined aquifers (Figure 2a), using the depth-to-groundwater and the rooting depth of the vegetation is a reasonable method to infer groundwater dependence for GDEs. If groundwater is well below the rooting (and capillary) zone of the plants and any wetland features, the ecosystem is considered disconnected and groundwater management is not likely to affect the ecosystem (Figure 2d). However, it is important to consider local conditions (e.g., soil type, groundwater flow gradients, and aquifer parameters) and to review groundwater depth data from multiple seasons and water year types (wet and dry) because intermittent periods of high groundwater levels can replenish perched clay lenses that serve as the water source for GDEs (Figure 2c). Maintaining these natural groundwater fluctuations are important to sustaining GDE health.

Basins with a stacked series of aquifers (Figure 2b) may have varying levels of pumping across aquifers in the basin, depending on the production capacity or water quality associated with each aquifer. If pumping is concentrated in deeper aquifers, SGMA still requires GSAs to sustainably manage groundwater resources in shallow aquifers, such as perched aquifers, that support springs, surface water, domestic wells, and GDEs (Figure 2). This is because vertical groundwater gradients across aquifers may result in pumping from deeper aquifers to cause adverse impacts onto beneficial users reliant on shallow aquifers or interconnected surface water. The goal of SGMA is to sustainably manage groundwater resources for current and future social, economic, and environmental benefits. While groundwater pumping may not be currently occurring in a shallower aquifer, use of this water may become more appealing and economically viable in future years as pumping restrictions are placed on the deeper production aquifers in the basin to meet the sustainable yield and criteria. Thus, identifying GDEs in the basin should done irrespective to the amount of current pumping occurring in a particular aquifer, so that future impacts on GDEs due to new production can be avoided. A good rule of thumb to follow is: *if groundwater can be pumped from a well - it's an aquifer*.

[3] For more details on the mapping methods, refer to: Klausmeyer, K., J. Howard, T. Keeler-Wolf, K. Davis-Fadtke, R. Hull, A. Lyons. 2018. Mapping Indicators of Groundwater Dependent Ecosystems in California: Methods Report. San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/iGDE_data_paper_20180423.pdf
[4] "Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans" is available at: https://groundwaterresourcehub.org/gde-tools/gsp-guidance-document/
[5] The Groundwater Resource Hub: www.GroundwaterResourceHub.org

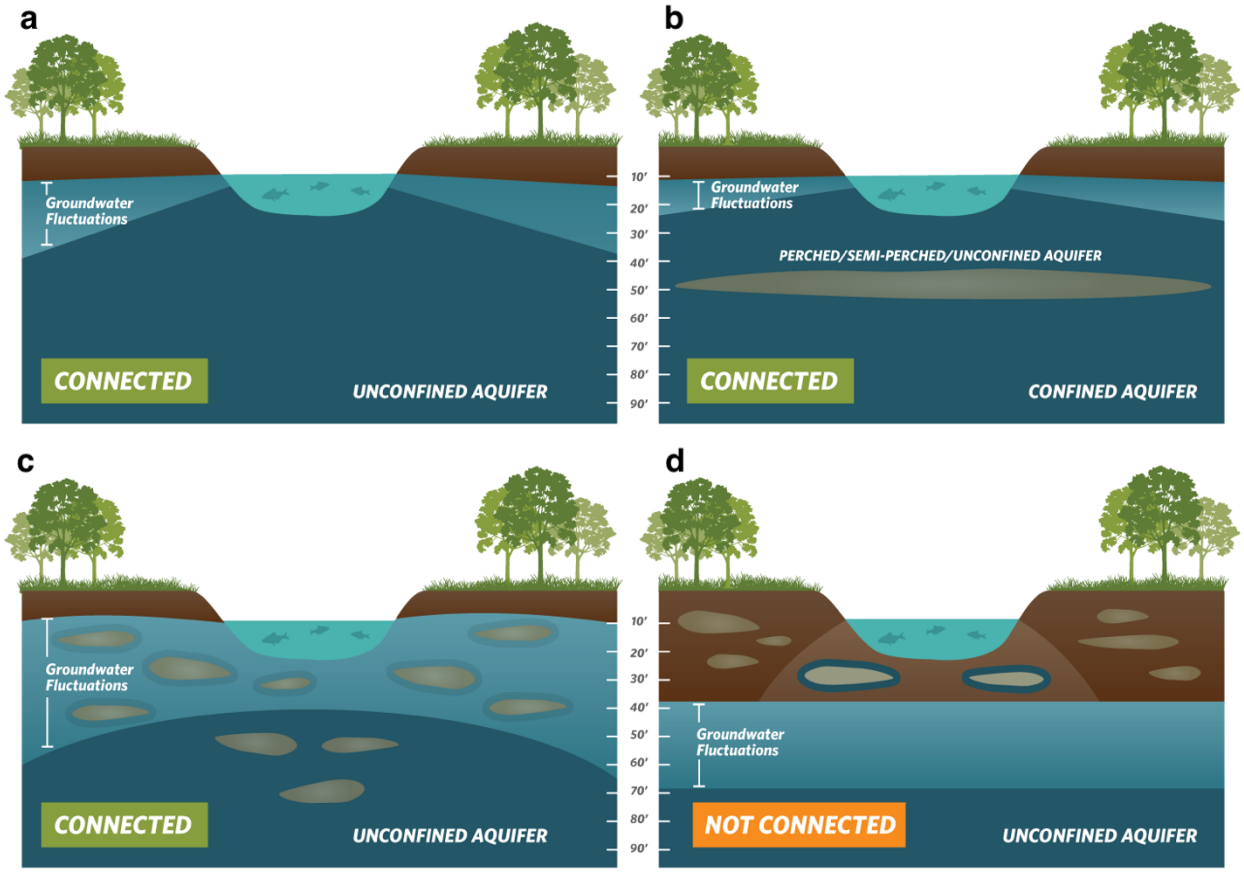


Figure 2. Confirming whether an ecosystem is connected to groundwater. Top: (a) Under the ecosystem is an unconfined aquifer with depth-to-groundwater fluctuating seasonally and interannually within 30 feet from land surface. **(b)** Depth-to-groundwater in the shallow aquifer is connected to overlying ecosystem. Pumping predominately occurs in the confined aquifer, but pumping is possible in the shallow aquifer. **Bottom: (c)** Depth-to-groundwater fluctuations are seasonally and interannually large, however, clay layers in the near surface prolong the ecosystem's connection to groundwater. **(d)** Groundwater is disconnected from surface water, and any water in the vadose (unsaturated) zone is due to direct recharge from precipitation and indirect recharge under the surface water feature. These areas are not connected to groundwater and typically support species that do not require access to groundwater to survive.

BEST PRACTICE #2. Characterize Seasonal and Interannual Groundwater Conditions

SGMA requires GSAs to describe current and historical groundwater conditions when identifying GDEs [23 CCR §354.16(g)]. Relying solely on the SGMA benchmark date (January 1, 2015) or any other single point in time to characterize groundwater conditions (e.g., depth-to-groundwater) is inadequate because managing groundwater conditions with data from one time point fails to capture the seasonal and interannual variability typical of California's climate. DWR's Best Management Practices document on water budgets[6] recommends using 10 years of water supply and water budget information to describe how historical conditions have impacted the operation of the basin within sustainable yield, implying that a baseline[7] could be determined based on data between 2005 and 2015. Using this or a similar time period, depending on data availability, is recommended for determining the depth-to-groundwater.

GDEs depend on groundwater levels being close enough to the land surface to interconnect with surface water systems or plant rooting networks. The most practical approach[8] for a GSA to assess whether polygons in the NC dataset are connected to groundwater is to rely on groundwater elevation data. As detailed in TNC's GDE guidance document[4], one of the key factors to consider when mapping GDEs is to contour depth-to-groundwater in the aquifer that is supporting the ecosystem (see Best Practice #5).

Groundwater levels fluctuate over time and space due to California's Mediterranean climate (dry summers and wet winters), climate change (flood and drought years), and subsurface heterogeneity in the subsurface (Figure 3). Many of California's GDEs have adapted to dealing with intermittent periods of water stress, however if these groundwater conditions are prolonged, adverse impacts to GDEs can result. While depth-to-groundwater levels within 30 feet[4] of the land surface are generally accepted as being a proxy for confirming that polygons in the NC dataset are supported by groundwater, it is highly advised that fluctuations in the groundwater regime be characterized to understand the seasonal and interannual groundwater variability in GDEs. Utilizing groundwater data from one point in time can misrepresent groundwater levels required by GDEs, and inadvertently result in adverse impacts to the GDEs. Time series data on groundwater elevations and depths are available on the SGMA Data Viewer[9]. However, if insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons in the GSP until data gaps are reconciled in the monitoring network (see Best Practice #6).

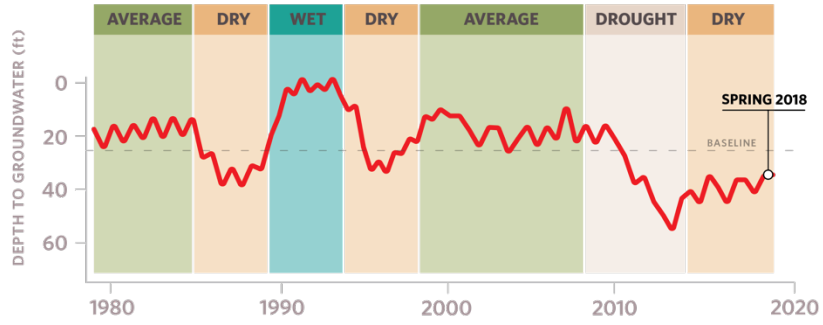


Figure 3. Example seasonality and interannual variability in depth-to-groundwater over time. Selecting one point in time, such as Spring 2018, to characterize groundwater conditions in GDEs fails to capture what groundwater conditions are necessary to maintain the ecosystem status into the future so adverse impacts are avoided.

[6] DWR. 2016. Water Budget Best Management Practice. Available at: https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/BMP_Water_Budget_Final_2016-12-23.pdf

[7] Baseline is defined under the GSP regulations as "historic information used to project future conditions for hydrology, water demand, and availability of surface water and to evaluate potential sustainable management practices of a basin." [23 CCR §351(e)]

[8] Groundwater reliance can also be confirmed via stable isotope analysis and geophysical surveys. For more information see The GDE Assessment Toolbox (Appendix IV, GDE Guidance Document for GSPs[4]).

[9] SGMA Data Viewer: https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer

BEST PRACTICE #3. Ecosystems Often Rely on Both Groundwater and Surface Water

GDEs are plants and animals that rely on groundwater for all or some of its water needs, and thus can be supported by multiple water sources. The presence of non-groundwater sources (e.g., surface water, soil moisture in the vadose zone, applied water, treated wastewater effluent, urban stormwater, irrigated return flow) within and around a GDE does not preclude the possibility that it is supported by groundwater, too. SGMA defines GDEs as "ecological communities and species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" [23 CCR §351(m)]. Hence, depth-to-groundwater data should be used to identify whether NC polygons are supported by groundwater and should be considered GDEs. In addition, SGMA requires that significant and undesirable adverse impacts to beneficial users of surface water be avoided. Beneficial users of surface water include environmental users such as plants or animals[10], which therefore must be considered when developing minimum thresholds for depletions of interconnected surface water.

GSAs are only responsible for impacts to GDEs resulting from groundwater conditions in the basin, so if adverse impacts to GDEs result from the diversion of applied water, treated wastewater, or irrigation return flow away from the GDE, then those impacts will be evaluated by other permitting requirements (e.g., CEQA) and may not be the responsibility of the GSA. However, if adverse impacts occur to the GDE due to changing groundwater conditions resulting from pumping or groundwater management activities, then the GSA would be responsible (Figure 4).

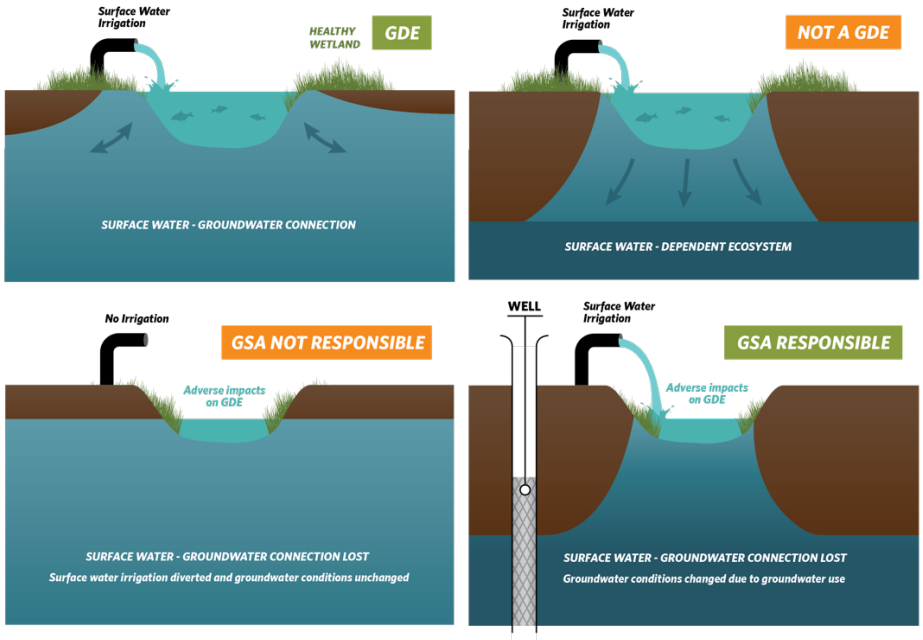


Figure 4. Ecosystems often depend on multiple sources of water. Top: (Left) Surface water and groundwater are interconnected, meaning that the GDE is supported by both groundwater and surface water. **(Right)** Ecosystems that are only reliant on non-groundwater sources are not groundwater-dependent. **Bottom: (Left)** An ecosystem that was once dependent on an interconnected surface water, but loses access to groundwater solely due to surface water diversions may not be the GSA's responsibility. **(Right)** Groundwater dependent ecosystems once dependent on an interconnected surface water system, but loses that access due to groundwater pumping is the GSA's responsibility.

[10] For a list of environmental beneficial users of surface water by basin, visit: https://groundwaterresourcehub.org/gde-tools/environmental-surface-water-beneficiaries/

BEST PRACTICE #4. Select Representative Groundwater Wells

Identifying GDEs in a basin requires that groundwater conditions are characterized to confirm whether polygons in the NC dataset are supported by the underlying aquifer. To do this, proximate groundwater wells should be identified to characterize groundwater conditions (Figure 5). When selecting representative wells, it is particularly important to consider the subsurface heterogeneity around NC polygons, especially near surface water features where groundwater and surface water interactions occur around heterogeneous stratigraphic units or aquitards formed by fluvial deposits. The following selection criteria can help ensure groundwater levels are representative of conditions within the GDE area:

- Choose wells that are within 5 kilometers (3.1 miles) of each NC Dataset polygons because they are more likely to reflect the local conditions relevant to the ecosystem. If there are no wells within 5km of the center of a NC dataset polygon, then there is insufficient information to remove the polygon based on groundwater depth. Instead, it should be retained as a potential GDE until there are sufficient data to determine whether or not the NC Dataset polygon is supported by groundwater.

- Choose wells that are screened within the surficial unconfined aquifer and capable of measuring the true water table.

- Avoid relying on wells that have insufficient information on the screened well depth interval for excluding GDEs because they could be providing data on the wrong aquifer. This type of well data should not be used to remove any NC polygons.

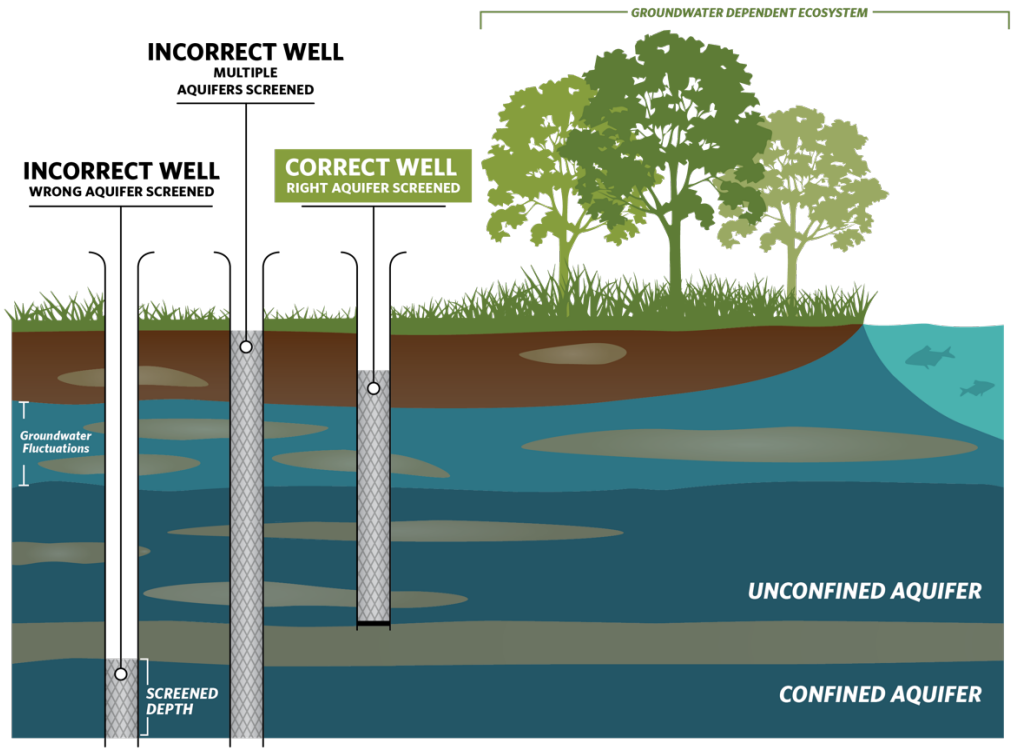


Figure 5. Selecting representative wells to characterize groundwater conditions near GDEs.

BEST PRACTICE #5. Contouring Groundwater Elevations

The common practice to contour depth-to-groundwater over a large area by interpolating measurements at monitoring wells is unsuitable for assessing whether an ecosystem is supported by groundwater. This practice causes errors when the land surface contains features like stream and wetland depressions because it assumes the land surface is constant across the landscape and depth-to-groundwater is constant below these low-lying areas (Figure 6a). A more accurate approach is to interpolate **groundwater elevations** at monitoring wells to get groundwater elevation contours across the landscape. This layer can then be subtracted from land surface elevations from a Digital Elevation Model (DEM)[11] to estimate depth-to-groundwater contours across the landscape (Figure b; Figure 7). This will provide a much more accurate contours of depth-to-groundwater along streams and other land surface depressions where GDEs are commonly found.

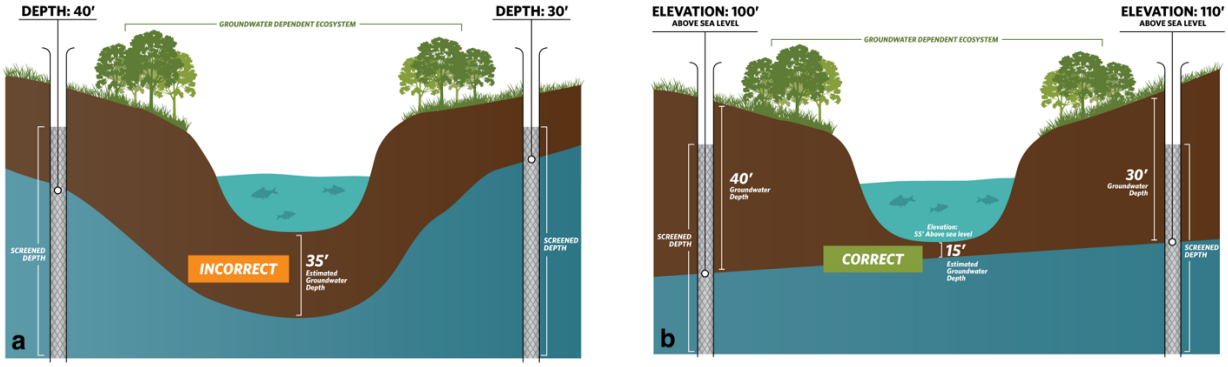


Figure 6. Contouring depth-to-groundwater around surface water features and GDEs. (a) Groundwater level interpolation using depth-to-groundwater data from monitoring wells. **(b)** Groundwater level interpolation using groundwater elevation data from monitoring wells and DEM data.

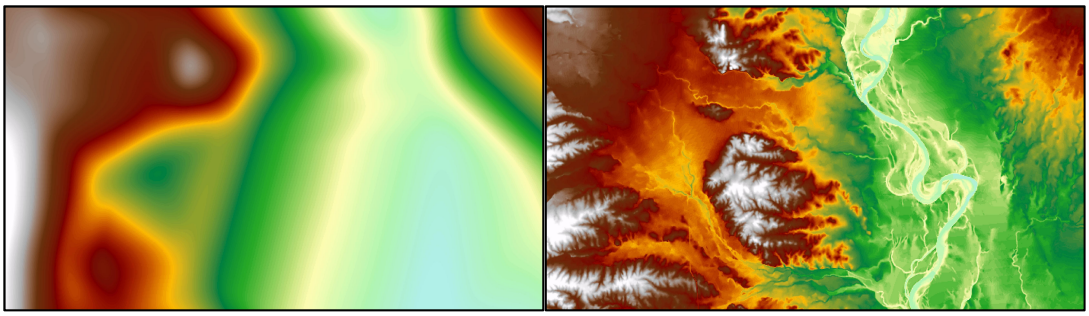


Figure 7. Depth-to-groundwater contours in Northern California. (Left) Contours were interpolated using depth-to-groundwater measurements determined at each well. **(Right)** Contours were determined by interpolating groundwater elevation measurements at each well and superimposing ground surface elevation from DEM spatial data to generate depth-to-groundwater contours. The image on the right shows a more accurate depth-to-groundwater estimate because it takes the local topography and elevation changes into account.

[11] USGS Digital Elevation Model data products are described at: https://www.usgs.gov/core-science-systems/ngp/3dep/about-3dep-products-services and can be downloaded at: https://iewer.nationalmap.gov/basic/

BEST PRACTICE #6. Best Available Science

Adaptive management is embedded within SGMA and provides a process to work toward sustainability over time by beginning with the best available information to make initial decisions, monitoring the results of those decisions, and using the data collected through monitoring programs to revise decisions in the future. In many situations, the hydrologic connection of NC dataset polygons will not initially be clearly understood if site-specific groundwater monitoring data are not available. If sufficient data are not available in time for the 2020/2022 plan, **The Nature Conservancy strongly advises that questionable polygons from the NC dataset be included in the GSP until data gaps are reconciled in the monitoring network.** Erring on the side of caution will help minimize inadvertent impacts to GDEs as a result of groundwater use and management actions during SGMA implementation.

KEY DEFINITIONS

Groundwater basin is an aquifer or stacked series of aquifers with reasonably well-defined boundaries in a lateral direction, based on features that significantly impede groundwater flow, and a definable bottom. *23 CCR §341(g)(1)*

Groundwater dependent ecosystem (GDE) are ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface. *23 CCR §351(m)*

Interconnected surface water (ISW) surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted. *23 CCR §351(o)*

Principal aquifers are aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems. *23 CCR §351(aa)*

ABOUT US

The Nature Conservancy is a science-based nonprofit organization whose mission is *to conserve the lands and waters on which all life depends*. To support successful SGMA implementation that meets the future needs of people, the economy, and the environment, TNC has developed tools and resources (www.groundwaterresourcehub.org) intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

APPENDIX 10c

East Contra Costa Subbasin Communications Plan

East Contra Costa Subbasin Sustainable Groundwater Management Act

Communications Plan

DECEMBER 2018

Prepared for:
East Contra Costa Subbasin GSAs

Prepared by: Lisa Beutler, Stantec
Kirsten Pringle, Stantec

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

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Abbreviations

	Description
Communications Plan	East Contra Costa Subbasin, Sustainable Groundwater Management Act, Working Draft Communications Plan
DWR	California Department of Water Resources
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
PDF	Portable Document Format
SGMA	Sustainable Groundwater Management Act
State Board	State Water Resources Control Board
Subbasin	East Contra Costa Subbasin

Revision History

Revision/Section Title #	Date of Release	Author	Summary of Changes
Working Draft	September 2018	Beutler	N/A
Final Draft	December 2018	Beutler	Incorporates Group and Consultant Edits

1.0 INTRODUCTION AND BACKGROUND

The purpose of this Communication Plan is to assist the GSAs of the East Contra Costa Subbasin with stakeholder outreach and other related actions as required by SGMA. Its chapters identify key stakeholders and provide a high-level overview of near and long-term outreach and engagement strategies, tactics, and tools. The content of this Communications Plan was developed, in part, through discussions with GSA representatives at Groundwater Sustainability Plan (GSP) Coordination Group meetings and a survey sent out to GSA representatives. This Communications Plan was created with technical support provided by DWR's SGMA Facilitation Support Services Program.

Public Stakeholder Process

Depending on the number of stakeholders and varying interests, the public process can include the following categories:

- Citizens Groups and General Public
- Governmental and Land Use Agencies
- Commercial and Industrial Self-Supplied
- Private and Public Water Purveyors
- Tribal Governments and Communities
- Agricultural and Aquiculture Interests
- Environmental and Ecosystem Interests
- Remediation and Groundwater Cleanup

Existing groundwater management agencies formed using well-documented interest-based stakeholder processes can continue to use current stakeholder engagement methods and document the process in a **communications section of the GSP**, in addition to any additional requirements per Article 5, Subarticle 1 of the regulations. Given the broad diversity of California's interested stakeholders, the regulations allow the GSA flexibility in deciding how the stakeholder process is conducted.

1.1 SGMA BASICS[1]

After decades of debate, California lawmakers adopted SGMA in 2014. This far-reaching law seeks to bring the state's critically important groundwater basins into a sustainable regime of pumping and recharge. The change in water management laws has created new obligations for residents and water managers in the Subbasin

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

1.1.1 GSAs & GSPs

Any local public agency that has water supply, water management, or land use responsibilities in a basin can decide to become a GSA. A single local agency can decide to become a GSA, or a combination of local agencies can decide to form a GSA by using either a Joint Power

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

Authority, a memorandum of agreement, or other legal agreement. If no agency assumes this role the GSA responsibility defaults to the County; however, the County may decline.

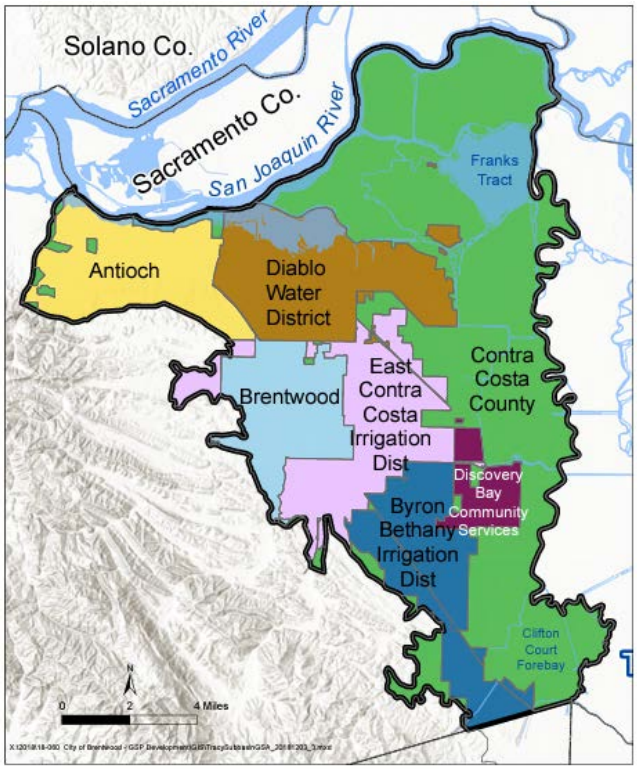
- A GSP may be any of the following (California Water Code Section 10727(b)):
  - A single plan covering the entire basin developed and implemented by one GSA.
  - A single plan covering the entire basin developed and implemented by multiple GSAs.
- Subject to California Water Code Section 10727.6, multiple plans implemented by multiple GSAs and coordinated pursuant to a single coordination agreement that covers the entire basin.

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

1.2 SGMA AND THE EAST CONTRA COSTA SUBBASIN

1.2.1 East Contra Costa Subbasin

Figure 1. Map of the East Contra Costa Subbasin



The East Contra Costa Subbasin (DWR Bulletin 118, 5-22.15) (**Figure 1**) is a medium-priority subbasin within the larger San Joaquin Valley Groundwater Basin. The Subbasin covers the eastern portion of Contra Costa County. The northern boundary (from west to east) of the Subbasin follows the San Joaquin River west until its convergence with the Mokelumne River by Webb Tract. The eastern boundary (from north to south) follows the Old River south until the Contra Cost-San Joaquin-Alameda County intersection. The southern boundary (from east to west) continues to follow the Contra Costa-Alameda County line. The western boundary (from south to north) follows the Diablo Range north up to the section of the San Joaquin River near the City of Antioch. Adjacent subbasins include the Tracy Subbasin on the east and south, which is also part of the larger San Joaquin Valley Groundwater Basin; as well as the Solano Subbasin of the Sacramento Groundwater Basin to the north.

The East Contra Costa Subbasin is drained by the San Joaquin River and west side tributaries; Marsh Creek. The San Joaquin River flows northward into the Sacramento and San Joaquin Delta and discharges into the San Francisco Bay.

1.2.2 Boundary Modification

Agencies of the Tracy Subbasin submitted a Basin Boundary Modification Request (BBMR) to DWR in September 2018. In order to better facilitate jurisdictional issues, they requested separation of the Tracy Subbasin into two subbasins along the Old River to form the East Contra Costa and Tracy Subbasins. DWR announced a draft decision to approve the basin boundary modification requests (BBMR) in November 2018. Therefore, the new East Contra Costa Subbasin is the subject of this Plan.

1.2.3 East Contra Costa Subbasin GSP Decision Making

The GSAs in the Subbasin intend to work together to meet SGMA requirements and collaboratively prepare **a single GSP by January 31, 2022**. The GSAs currently meet in regular coordination meetings to discuss GSP development and public outreach and engagement activities. This GSP Coordination Group is comprised of representatives from each GSA within the Subbasin and follows a consensus-based decision-making structure, where each GSA representative receives an equal vote.

This Communications Plan is offered for the voluntary use of all the GSAs in the Subbasin. A full schedule including calendared outreach timeframes is provided in Appendix A. should be developed in conjunction with the overall GSP development schedule. An important additional step will be establishing the roles and responsibilities outlined in Section 10 of this Communications Plan.

1.2.4 East Contra Costa Subbasin GSAs

Following are the DWR identified GSAs (as of December, 2018):

- Byron-Bethany Irrigation District
- City of Antioch
- City of Brentwood
- Contra Costa County
- Diablo Water District
- Discovery Bay Community Services District
- East Contra Costa Irrigation District

2.0 SGMA COMMUNICATIONS AND ENGAGEMENT REQUIREMENTS

SGMA includes specific requirements for communications and engagement by each planning phase. **Figure 2** (next page) illustrates the requirements and provides water code references. The GSP submittal guidelines also describe the outreach and engagement documentation to be submitted with the plan. California Code of Regulations Section 354.10 states that each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:

(a) A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties.

(b) A list of public meetings at which the Plan was discussed or considered by the Agency.

(c) Comments regarding the Plan received by the Agency and a summary of any responses by the Agency.

(d) A communication section of the Plan that includes the following:

(1) An explanation of the Agency's decision-making process.

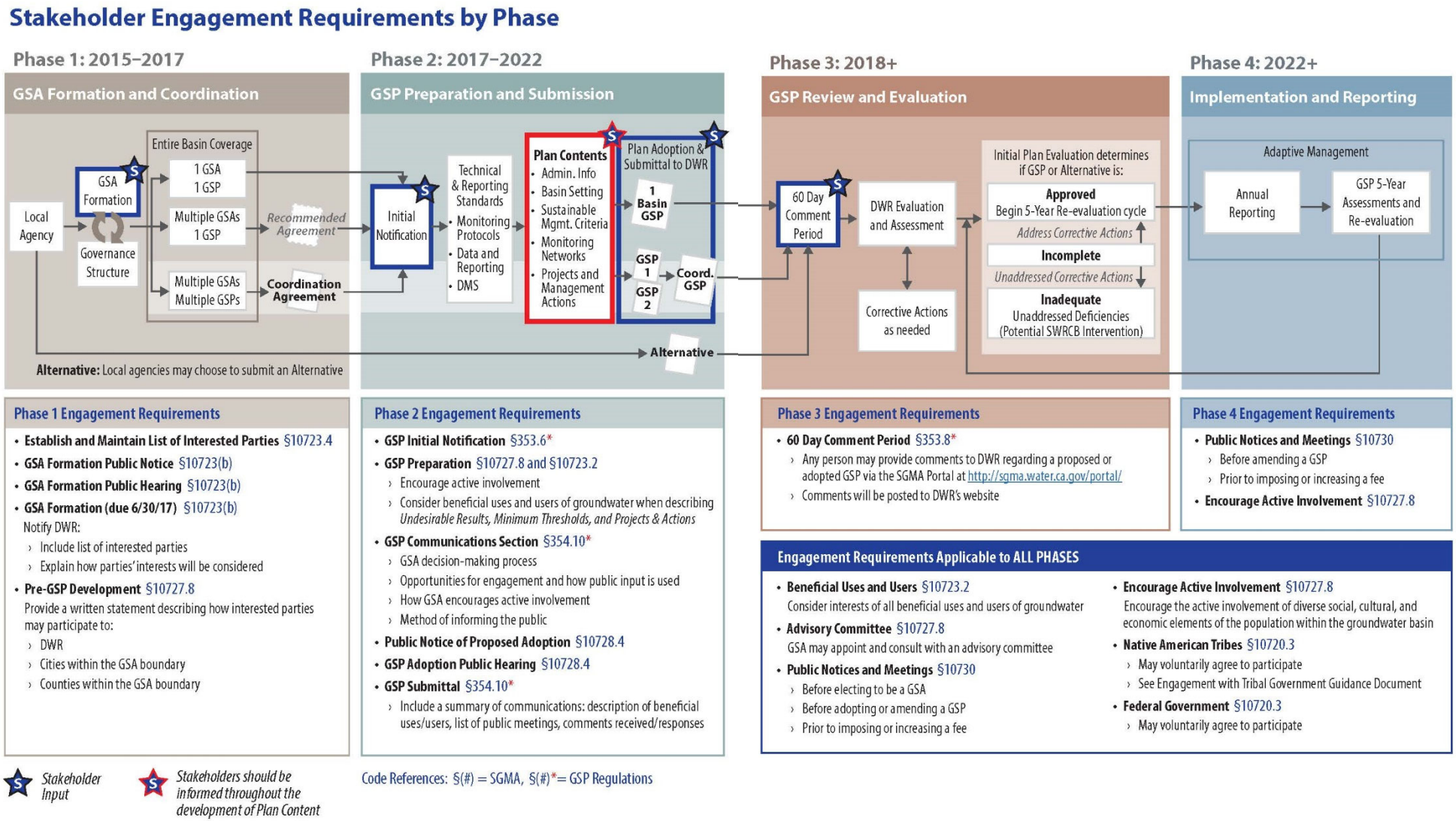
(2) Identification of opportunities for public engagement and a discussion of how public input and response will be used.

(3) A description of how the Agency encourages the active involvement of diverse social, cultural and economic elements of the population within the basin.

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

A full list of codes and requirements is also provided in **Appendix B**.

Figure 2. Stakeholder Engagement Requirements by SGMA Phase



2.1.1 Beneficial Users

Pursuant to Section 10723.2 of the California Water Code, each GSA must consider the interests of all beneficial users and users of groundwater within the Subbasin, as well as those responsible for implementing GSPs. Following are the Required Interested Parties for the purpose of mandated outreach:

- Holders of overlying groundwater rights, including:
- Agricultural users.
- Domestic well owners.
- Municipal well operators.
- Public water systems.
- Local land use planning agencies.
- Environmental users of groundwater.
- Surface water users, if there is a hydrologic connection between surface and groundwater bodies.
- The federal government, including, but not limited to, the military and managers of federal lands.
- California Native American tribes.
- Disadvantaged communities, including, but not limited to, those served by private domestic wells or small community water systems.
- Entities listed in Section 10927[2] that are monitoring and reporting groundwater elevations in all or a part of a groundwater basin managed by the groundwater sustainability agency.

[2] **CA Water Code § 10927 (2017)**
Any of the following entities may assume responsibility for monitoring and reporting groundwater elevations in all or a part of a basin or subbasin in accordance with this part:
(a) A watermaster or water management engineer appointed by a court or pursuant to statute to administer a final judgment determining rights to groundwater.
(b) (1) A groundwater management agency with statutory authority to manage groundwater pursuant to its principal act that is monitoring groundwater elevations in all or a part of a groundwater basin or subbasin on or before January 1, 2010.
(2) A water replenishment district established pursuant to Division 18 (commencing with Section 60000). This part does not expand or otherwise affect the authority of a water replenishment district relating to monitoring groundwater elevations.
(3) A groundwater sustainability agency with statutory authority to manage groundwater pursuant to Part 2.74 (commencing with Section 10720).
(c) A local agency that is managing all or part of a groundwater basin or subbasin pursuant to Part 2.75 (commencing with Section 10750) and that was monitoring groundwater elevations in all or a part of a groundwater basin or subbasin on or before January 1, 2010, or a local agency or county that is managing all or part of a groundwater basin or subbasin pursuant to any other legally enforceable groundwater

2.1.2 Mandated Outreach Activities

Table 1 provides a list of the mandated outreach and the timeframe in which is required.

Table 1. Mandated SGMA Outreach Activities

Timeframe	Item
Prior to initiating plan development	• Statement of how interested parties may contact the Agency and participate in development and implementation of the plan submitted to DWR. • Web posting of same information.
Prior to plan development	• Must establish and maintain an interested persons list. • Must prepare a written statement describing the manner in which interested parties may participate in GSP development and implementation. Statement must be provided to: • Legislative body of any city and/or county within the geographic area of the plan • Public Utilities Commission if the geographic area includes a regulated public water system regulated by that Commission • DWR • Interested parties (see Section 10927) • The public
Prior to and with GSP submission	• Statements of issues and interests of beneficial users of basin groundwater, including types of parties representing the interests and consultation process • Lists of public meetings • Inventory of comments and summary of responses • Communication section in plan that includes: – Agency decision making process – Identification of public engagement opportunities and response process – Description of process for inclusion

management plan with provisions that are substantively similar to those described in that part and that was monitoring groundwater elevations in all or a part of a groundwater basin or subbasin on or before January 1, 2010.

(d) A local agency that is managing all or part of a groundwater basin or subbasin pursuant to an integrated regional water management plan prepared pursuant to Part 2.2 (commencing with Section 10530) that includes a groundwater management component that complies with the requirements of Section 10753.7.

(e) A local agency that has been collecting and reporting groundwater elevations and that does not have an adopted groundwater management plan, if the local agency adopts a groundwater management plan in accordance with Part 2.75 (commencing with Section 10750) by January 1, 2014. The department may authorize the local agency to conduct the monitoring and reporting of groundwater elevations pursuant to this part on an interim basis, until the local agency adopts a groundwater management plan in accordance with Part 2.75 (commencing with Section 10750) or until January 1, 2014, whichever occurs first.

(f) A county that is not managing all or a part of a groundwater basin or subbasin pursuant to a legally enforceable groundwater management plan with provisions that are substantively similar to those described in Part 2.75 (commencing with Section 10750).

(g) A voluntary cooperative groundwater monitoring association formed pursuant to Section 10935.

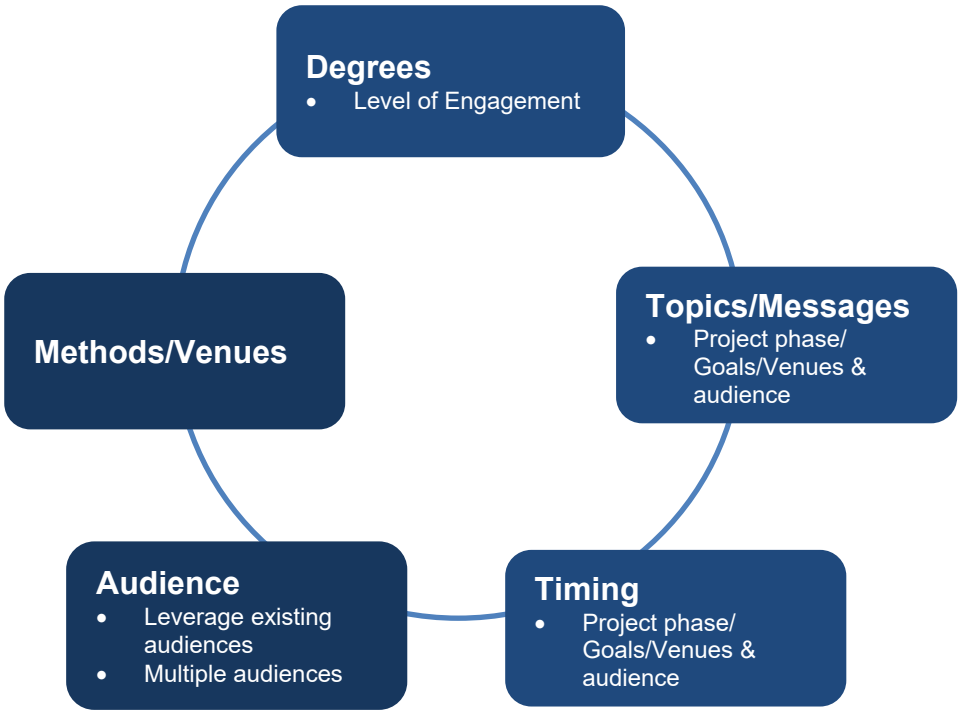
(Amended by Stats. 2014, Ch. 346, Sec. 5. (SB 1168) Effective January 1, 2015.)

Timeframe	Item
	• Method for public information related to progress in implementing the plan (status, projects, actions)
90 days prior to GSP Adoption Hearing	Prior to Public Hearing for adoption or amendment of the GSP, the GSP entities must notify cities and/or counties of geographic area 90 days in advance.
90 days or less prior to GSP Adoption Hearing	• Prior to Public Hearing for adoption or amendment of the GSP, the GSP entities must: – Consider and review comments – Conduct consultation within 30 days of receipt with cities or counties so requesting
GSP Adoption or Amendment	GSP must be adopted or amended after a Public Hearing.
60 days after plan submission	60-day comment period for plans under submission to DWR. Comments will be used to evaluate the submission.
Prior to adoption of fees	• Public meeting required prior to adoption of, or increase to fees. Oral or written presentations may be made as part of the meeting. • Public notice shall include: – Time and place of meeting – General explanation of matter to be considered – Statement of availability for data required to initiate or amend such fees – Public posting on Agency Website and provision by mail to interested parties of supporting data (at least 20 days in advance) – Mailing lists for interested parties are valid for 1 year from date of request and may be renewed by written request of the parties on or before April 1 of each year. – Includes procedural requirements per Government Code, Section 6066.
Prior to conducting a fee adoption hearing.	Must publish notices in a newspaper of general circulation as prescribed. Publication shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. The period of notice begins the first day of publication and terminates at the end of the fourteenth day, (which includes the first day.)

3.0 COMMUNICATIONS PLAN OVERVIEW

Communication is the process of transmitting ideas and information. According to the Project Management Institute, 75%-90% of a project manager's time is spent communicating. A Communications Plan provides the purpose, method, messages, timing, intensity, and audience of the communication, then describes who will do the communicating, and the frequency of the communication (see **Figure 3**.)

Figure 3. Overview of the Communications Plan Elements



3.1 PURPOSE

The purpose of this Communications Plan is to outline the information and communications needs of stakeholders within the Subbasin and provide a roadmap to meet them. This Communications Plan then identifies how communications activities, processes, and procedures will be managed throughout the project life cycle.

3.2 IMPORTANCE

While communications are important in every project, a well-executed communications strategy will be essential to the success of the GSP development and adoption process. The financial and regulatory stakes are high and communication missteps can create project risks. Further, development of a viable GSP will require an on-going collaboration among all the stakeholders,

both organizational and external. The plan will be comprehensive and consider multiple variables, a range of system elements and project costs and benefits. Stakeholder input will be needed to refine GSP requirements and fully define the water management system, and potential impacts, costs and benefits that may result in managing for sustainability.

3.2.1 Communication Phases

Communications are unique for each GSP development phase. Following are Phases where communication messages will be needed.

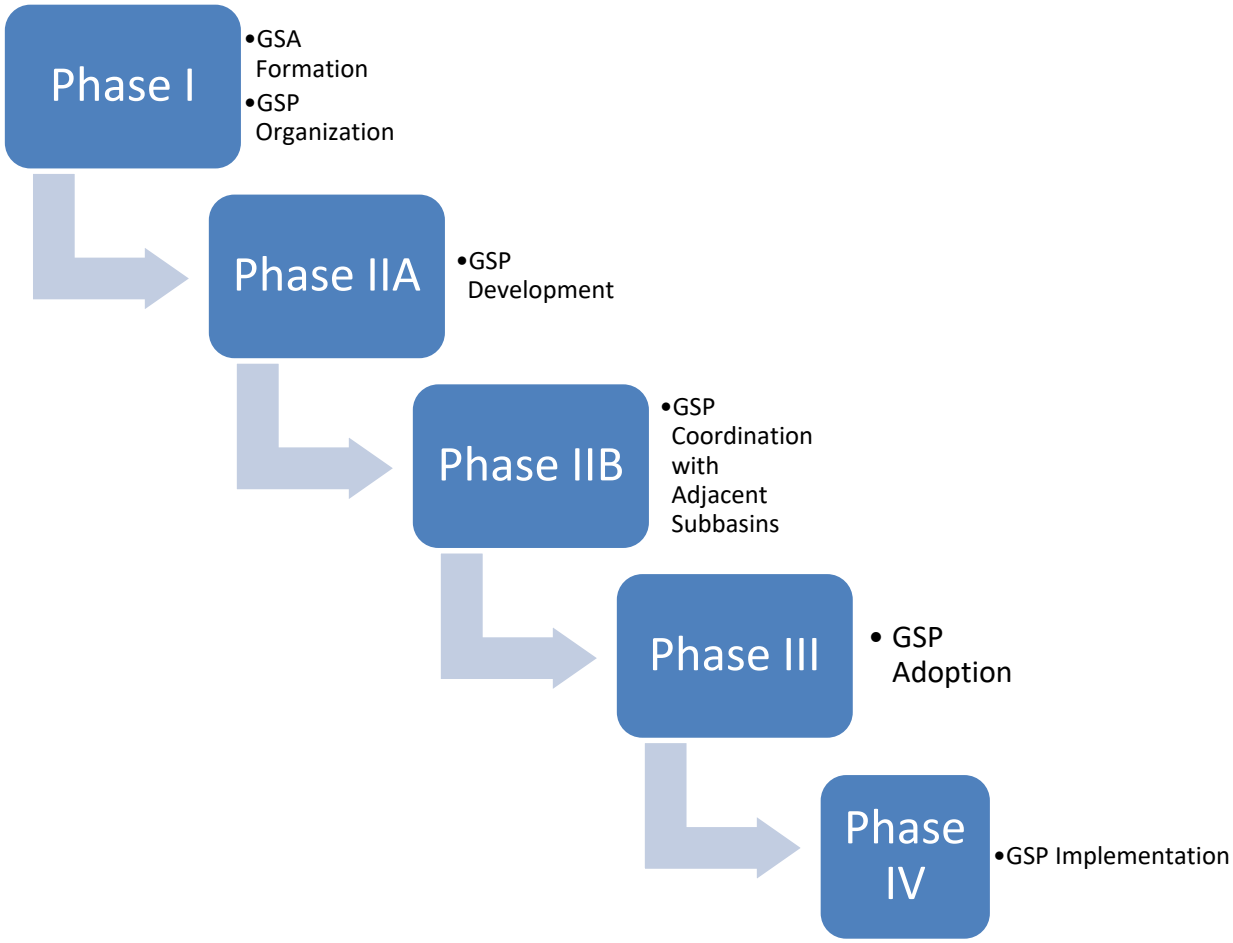


Figure 4. Communication Phases

For each Communications Phase, the GSAs also need to determine:

1. Level of Engagement (Degrees) – How much outreach is needed?
2. Topics, Messages – What do people need to know?
3. Timing – When should this occur?

4. Audience – Who are the right people to talk with?
5. Methods/Venues – What is the best method to reach them?

3.3 SCOPE

This Communications Plan focuses on formal communication elements. Other communication channels exist on informal levels and enhance those discussed within this plan. This plan is not intended to limit, but to enhance communication practices. Open, ongoing communication between stakeholders is critical to the success of the project.

3.4 COMMUNICATIONS GOALS

Development, adoption and implementation of the GSP will require basin external stakeholders, other agencies, staff, managers, and the multiple GSA Boards to evaluate choices, make decisions, and commit resources.

The core communications goal is to plan for and efficiently deliver clear and succinct information: (1) at the right time, (2) to the right people, (3) with a resonating message. This is done to facilitate quality decision making and build accompanying public support

3.5 COMMUNICATIONS OBJECTIVES

The objectives of this Communications Plan are to present strategies and actions that are:

- Realistic and action-oriented
- Specific and measurable
- Minimal in number (a few well delivered are better than many mediocre efforts)
- Audience relevant

3.6 STRATEGIC APPROACH

Three primary communications strategies have been identified for the GSP development.

6. Fully leverage the activities of existing groups. This practical approach is cost effective and respectful of the limited time that stakeholders have to participate in collaborative processes.
7. Provide targeted, communications and outreach to opinion leaders in key stakeholder segments.
8. Provide user friendly information and intermittent opportunities through existing communication channels, surveys, and open houses or workshops to allow interested stakeholders (internal and external) to engage commensurate with their degree of interest.

3.7 CONSTRAINTS

All projects are subject to limitations and constraints as they must be within scope and adhere to budget, scheduling, and resource requirements. These constraints can be even more challenging in projects with multiple agencies as will be the case with the coordination of

multiple GSAs. There are also legislative, regulatory, technology, and other organizational policy requirements which must be followed as part of communications management. These limitations must be clearly understood and communicated where appropriate. While communications management is arguably one of the most important aspects of project management, it must be done in an effective and strategic manner recognizing and balancing the multiple constraints.

All project communication activities should occur within the project's approved budget, schedule, and resource allocations. The GSP project managers and the leadership of the participating GSAs should have identified roles in ensuring that communication activities are performed. To the extent possible, to support collaboration and reduce costs, GSA partners should utilize standardized formats and templates as well as project file management and collaboration tools.

4.0 INITIAL OUTREACH OPPORTUNITIES

As part of development of this Communications Plan, a neutral, 3rd party facilitator conducted a survey with GSA representatives to collect information on outreach opportunities in the Subbasin. In addition, the facilitator conducted a series of discussions with GSA representatives at GSP Coordination Group meetings. The purpose of these activities was to inform development of this Communications Plan, as well as develop an initial list of outreach opportunities in the Subbasin.

The outreach opportunities survey asked GSA representatives to identify potential outreach venues within the Subbasin. The survey was provided in an electronic format to GSA representatives in the Subbasin. Seven GSAs completed the survey. The results of the survey and other discussions with GSA representatives are summarized below.

4.1 OUTREACH VENUES

GSA representatives have identified a list of potential outreach venues in the Subbasin, shown in **Table 2** below. Note that this is only an initial list of outreach venues. The GSAs will continue to expand this list and develop a full Outreach Venues Database, described in Subsection 7.2.7.

Table 2. Potential Outreach Venues in the East Contra Costa Subbasin

Organization/Event Name	Type of Organization/Event	Location
Contra Costa County Farm Bureau	Agricultural	Contra Costa County
Brentwood Lions Club	Civic/Community	Brentwood
Discovery Bay Chamber of Commerce	Commercial	Discovery Bay
Oakley Chamber of Commerce	Commercial	Oakley
Discovery Bay Lions Club	Civic/Community	Discovery Bay
Earth Day	Event	Multiple locations throughout Subbasin
Brentwood City Council	Government/Municipal	Brentwood
Brentwood Planning Commission	Government/Municipal	Brentwood
Contra Costa County Board of Supervisors	Government/Municipal	Contra Costa County
Contra Costa County Municipal Advisory Council – Byron and Bethel Island	Government/Municipal	Contra Costa County
Contra Costa County Municipal Advisory Council - Knightsen	Government/Municipal	Contra Costa County
Contra Costa County Transportation, Water, Infrastructure Committee	Government/Municipal	Contra Costa County
Oakley City Council	Government/Municipal	Oakley

Building Industrial Association - East Bay Chapter	Industrial	Contra Costa County
Industrial Association of Contra Costa County	Industrial	Contra Costa County
Farmers Market	Other	Brentwood
East County Water Management Association Board Meeting	Other	Contra Costa County
Realtor groups	Other	Multiple locations throughout Subbasin

5.0 AUDIENCE AND MESSAGES

5.1 AUDIENCES

This Communications Plan anticipates two core audience segments. First is the East Contra Costa Subbasin GSA Boards and the communications among and between themselves. This audience segment is large given that seven GSAs will be working to develop a GSP and each GSA has its own Board and audiences. The second audience is the Subbasin stakeholders, as identified in SGMA. This audience is also large. Many of the stakeholders are shared by the GSA Boards and some of the larger stakeholder segments are also represented on the GSA Boards (see **Figure 4**). Nearly all of the communications tactics identified in this Communications Plan apply to both segments; however, some strategies apply to one or the other specifically and are so identified.

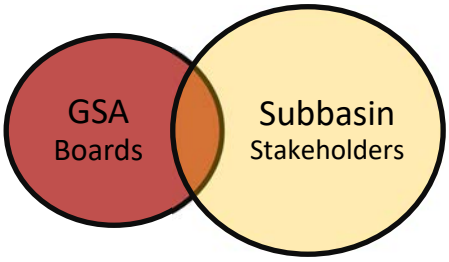


Figure 5. Core Audience Segments

5.1.1 Subbasin Stakeholders

Pursuant to Section 10723.2 of the California Water Code, each GSA must consider the interests of all beneficial users and users of groundwater within the Subbasin, as well as those responsible for implementing GSPs. These interests include the following:

- Agricultural users, including farmers, ranchers, and dairy professionals.
- Domestic well owners.
- Municipal well operators.
- Public water systems.
- Local land use planning agencies.
- Environmental users of groundwater.
- Surface water users, if there is a hydrologic connection between surface and groundwater bodies.
- The federal government, including, but not limited to, the military and managers of federal lands.
- California Native American tribes.
- Disadvantaged communities, including, but not limited to, those served by private domestic wells or small community water systems.
- Entities monitoring or reporting groundwater elevations in the subbasin

As part of the GSA formation process, each GSA was required to provide a list of interested parties developed pursuant to California Water Code Section 10723.2, and explain how these interested parties would be considered in the development and operation of the GSA and development and implementation of the GSP. This list has been augmented by the facilitation and technical teams with input from the GSAs. GSAs should periodically assess their list of beneficial users and develop tactics or activities to refine the list, identify and fill any gaps.

The County of Contra Costa, supported by the Diablo Water District, has established and maintained a mailing list and Interested Parties Database (**Appendix B or 2**?).

5.1.2 Messages Tied to Decision-Making

Communications will be linked to decision making. For each anticipated decision, GSAs should answer the following questions:

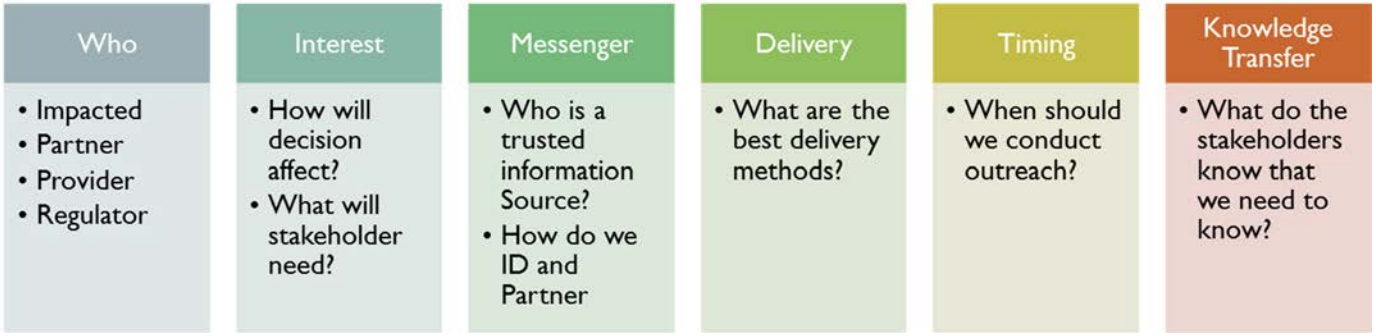
1. Who is the stakeholder?

    a) An impacted party?
    b) A potential planning partner?
    c) A potential provider of services or resources?
    d) A regulator of the activity?

    (Note: Some stakeholders may be in more than one category.)
2. What is the interest of the stakeholder? How will the stakeholder be affected? What are the stakeholders' needs?
3. Who is the right messenger for the information?
4. How should the information be delivered? What are the best methods?
5. What is the appropriate timing for the messages?
6. How do we create two-way communication?

Figure 6 illustrates some of these ideas.

Figure 6. Communications Planning Questions



5.2 TAILORING MESSAGES TO AUDIENCES

There are several core stakeholder groups that will require ongoing communications and tailored messaging throughout the planning process. They are:

- GSA Boards
- Agriculture
- Disadvantaged Communities
- Municipalities

Other stakeholders requiring special consideration include:

- Industrial Users/ Business
- Regulators (State and Federal)
- Potential Partners
- Environmental Organizations
- Federal Agencies

While all of the stakeholder types are important to engage for development of a GSP, the core stakeholder groups will be most affected by any changes that might be proposed as a result of the GSP(s).

5.2.1 GSA Boards

Due to the multiple GSAs in the Subbasin, specific focus is needed on communications to keep them informed, provide consistent updates and information that the Boards can use in their own outreach, and support their decision making. Primary objectives for communications with the GSA Boards are to ensure:

- Consistent understanding of the requirements for a GSP and/or GSP coordination
- On-going access to current information
- Timely notice of any significant developments or decision points that may require changes to policies and/or require some other board action
- Confidence that the GSP will be accepted by the GSA's stakeholders

Key communications activities involving the Board include:

1. Providing short and digestible pieces of information to ensure each Board member can quickly articulate to his/her constituents on key matters and remain sufficiently informed so that no decision points are surprises.

2. Provide user-friendly informational materials to be used with public audiences, and will support the Board with their own constituent outreach.

3. Utilize regular Board communications for routine updates and reserve specific Board agenda items for highly significant discussion items.

The GSAs have agreed to:

1. Share standardized information that can be used by managers and executives with all of their Boards.

2. Utilize Managers Reports and standing items in Board agendas.

5.2.2 Primary Audiences

The following provides an outline of key messages and activities in support of each of the audience types.

5.2.2.1 Agricultural

The East Contra Costa Subbasin includes a significant portion of the County's agriculture footprint. A 2013 report on the Economic Contributions of Contra Costa County Agriculture indicates county-wide agriculture contributes a total of $225.0 million to the local economy, and provides 2,277 jobs in Contra Costa County economy. It was found to have exceptional diversity that provides critical economic stability within agriculture and the broader economy.

Humberto Izquierdo, the Contra Costa Agricultural Commissioner, in the annual crop report reported the total **gross value** of County agricultural crops in 2017 was $120,441,000 which was a decrease of $7,615,000 or 6% from 2016. The report indicates that "in general, demand and prices have remained strong for agricultural crops in Contra Costa County. Crop values vary from year to year due to factors such as production, weather, and market conditions. Some notable changes include an 31% increase in nursery product value and a significant decrease of 43% of field crop values. Approximately 2.5% or 4,861 acres of the total cultivated acreage was farmed organically on 15 farms. Several crop categories exceeded one million dollars in value. These categories in decreasing order include cattle and calves, tomatoes, sweet corn, grapes, miscellaneous vegetables, cherries, rangeland, walnuts, irrigated pasture, field corn, peaches and alfalfa hay. The economic benefit of agricultural production is generally thought to be about three times the gross production value."

GSAs should monitor any agricultural trends within their jurisdiction and make adjustments to tailor messages appropriate to the audience. Messages about the GSP development should feature the overall desirability of a sustainable management approach and describe how the plan will contribute to management certainty and protect against regulatory oversight. In thinking about irrigation users it is also important to remember that one size does not fit all. Where possible, GSAs should leverage existing outreach channels for reaching agricultural stakeholders, such as local Farm Bureaus and the County Agricultural Commissioner. This will be all the more important given the diversity of crop types.

5.2.2.2 Disadvantaged Communities

Messages developed for this sector should be tailored and specific to the community. This type of outreach is often best served by use of surrogates and trusted messengers. These messages should be aligned with activities of the Integrated Regional Water Management (IRWM) Plan. Messages about ways to access the increased availability of resources due to grant incentives should also be considered. ECC Subbasin Disadvantaged Communities and Economically Disadvantaged Areas are illustrated in **Figure 7**.

Figure 7. Disadvantaged Communities and Economically Disadvantaged Area, ECC Subbasin.

5.2.2.3 Municipalities

Some care will be needed to address any tensions that may arise as GSP implementation actions are developed. Concerns may relate to the relative percentages of use by municipal agencies and the determination of what constitutes the highest and best beneficial uses within the region. A promising interaction with this community would involve collaboration on messaging with the IRWM planning process to achieve mutually beneficial goals.

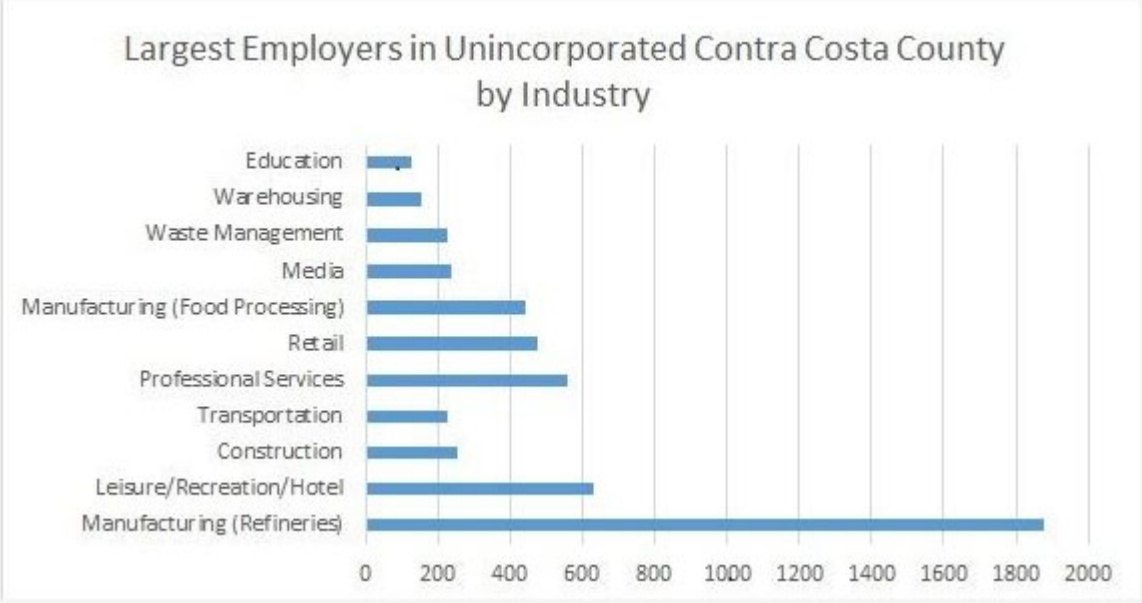
Municipal agencies have been providing in-kind support to the GSP development process through support for project websites and mailing lists, production of meeting notices, assistance to the planning process from in-house public information professionals, and offering access to physical meeting spaces.

Municipalities not already engaged may need assistance in making the case for the need to think at a basin or subbasin scale rather than more local terms.

5.2.2.4 Business and Industry Interests

Business and industry interests seek assurances about the availability of water for operations. Following (**Table 3**) are the top employers in unincorporated Contra Costa County, unlike agriculture, many of the larger employers are outside of the East Contra Costa Subbasin but the employees may live in the subbasin.

Table 3. Employers*



*Source: America's Labor Market Information System Database, downloaded via State of California Employment Development Department, March 1, 2018 & County of Contra Costa.

Rather than the listed major employers, the primary business interests for this GSP is likely to be the realtor and building industries. Outreach should focus on professional associations.

Messages for these audiences should focus on how the GSP development will contribute to sustainability and how these audiences can participate in discussions specific to their interests.

5.2.2.5 Regional/Statewide Interests and Regulators

Some degree of uncertainty remains in the overall legal, legislative and regulatory environment as it relates to SGMA implementation. It is in the interest of the Subbasin stakeholders to engage state and federal agencies and regulators throughout the process. These parties may

have resources to assist the subbasin and a cooperative attitude will build good will in the event that adjustments are needed to achieve SGMA compliance.

5.2.2.6 Potential Agency Partners

A variety of collaborations to achieve GSP development goals may be possible. The GSAs should consider the potential for collaboration with non-GSA members and inter/intra-basin (adjacent subbasin(s)) partners, as part of plan deliberations.

5.2.2.7 Environmental Community

The focus of messaging for this group being on how the GSP development will contribute to a sustainable regional water portfolio which includes surface water sustainability. Special effort should be made to identify specific topics of interest. For example, as part of GSP development, a list of groundwater dependent species may be created, or impacts to wetlands may be identified. These types of lists would highlight where input from the environmental community might be needed.

5.2.2.8 Federal Government

Federal representatives interviewed for the assessment asked to be kept informed of subbasin SGMA activities. These agencies have a direct interest in surface water integration as well as SGMA activities that could impact wetlands restoration efforts or groundwater dependent ecosystems and species.

5.3 COMMUNICATIONS AND CHANGE MANAGEMENT

The process of adopting and implementing a GSP will require significant change management. Communications planning should encompass basic change management approaches. Messages should also evolve over time and be tied to the planning process and key decision points. Then, for each audience and each major planning step, communications must do the following:

3. Describe what the actual proposed plan (change) is.
4. Articulate how the change will directly impact the category of stakeholder involved.
5. Outline the methods that will be used to implement the plan (change).
6. Define the costs and benefits of changing and not changing, and what future conditions will be if change does not occur.
7. Consider unintended consequences and others that may also be impacted by the same change then develop a strategy to engage them.
8. Offer o$_P$portunities for input and for stakeholders and others to improve the approach.

The communications requirements for large changes are often underestimated. Some experts indicate that messages may need to be delivered up to 8 different times to be fully absorbed. Communications needs will also evolve as the GSP planning progresses. **Table 4** on the following page provides a sample of early communications that focus on SGMA and groundwater basics.

As part of the GSP planning process, the next phase of communications will also need to communicate the requirements for sustainability and how they are achieved in the context of the Subbasin.

Once the GSP begins to be formulated and again as projects are proposed, a message tables, similar to **Table 4** and should be developed for each major project phase (see Chapter 3). For the purposes of the GSP required Communication plan these primary messages should be documented and shared with the GSAs for use in developing GSA communications.

Table 4. Early Phase Message Elements for Subbasin Stakeholders

Element	What the Change Is	How it will affect the Stakeholder	How the change will be Implemented	Why it is a good idea
Early Phase GSP Development	Locally governed GSAs will work together to sustainably manage ground water. The Subbasin /Basin is required to ensure Sustainable Groundwater Management by submitting a sustainability plan by 2022 The plan must be implemented and found to result in sustainable management by 2042.	(Unique to audience type) Changes in the current methods of acquiring and utilizing groundwater may occur. May affect future decisions related to crop types and decisions related to conjunctively using surface water. May provide additional project resources to the DAC communities.	A collaborative approach is being undertaken to prepare the plan with multiple GSAs coordinating with the _____ (NAME) as the planning organizer.	Sustainable and wise use of groundwater allows for the success of future generations and creates greater certainty for today's beneficial users. Failure to act may result in negative regulatory consequences.

6.0 RISK MANAGEMENT

Risk management is the identification, assessment, and prioritization of risks (defined as *the effect of uncertainty on achieving objectives*) followed by coordinated, efficient and economical strategies and actions to minimize, monitor, and control the probability and/or impact of negative events. Strategies and actions may also be used to avert risk by leveraging strengths and opportunities.

Risks can come from uncertainty in economic factors, threats from project failures (at any phase), regulatory and legal uncertainties, natural causes and disasters (drought, flood, etc.), as well as dissention from adversaries, or events of uncertain or unpredictable circumstances. Several risk management standards have been developed. This analysis utilizes those from the Project Management Institute.

Table 5 outlines standardized risk categories and translates them to outreach risks.

Table 5. Risk Factors

Risk Category	Outreach Risk Factors
Technical, quality, or performance	• Realistic performance goals, scope and objectives
Project management	• Quality of outreach design • Outreach deployment and change management • Appropriate allocation of time and resources • Adequate support for outreach in project management plans
Organizational / Internal	• Executive Sponsorship • Proper prioritization of efforts • Conflicts with other functions • Distribution of workload between organizational and consultant teams
External	• Legal and regulatory environment • Changing priorities • Risks related to political dynamics
Historical	• Past experiences with similar projects • Organizational relations with stakeholders • Policy and data adequacy • Media and stakeholder fatigue

6.1 TECHNICAL, QUALITY, OR PERFORMANCE

GSAs in the Subbasin are expected to meet the SGMA requirements related to GSP development. However, a potential concern in this category is fulfilling SGMA requirements for stakeholder outreach and engagement. GSA representatives have previously expressed concern about the degree of engagement that may be expected from their boards. In addition, some GSA representatives may be unfamiliar or inexperienced with conducting outreach, especially on a subbasin-wide scale.

Outreach requirements should be an ongoing consideration and currently appears to be underestimated in emphasis at both the Subbasin- and GSA-level. Additional organizational capacity and resources may be required to ensure that stakeholders within the Subbasin are kept informed of GSP development activities and are provided meaningful opportunities to engage in the GSP development process. GSAs should collaborate and work closely with their consultants to identify stakeholders, refine their Interested Parties Databases, conduct a variety of outreach tactics, and maintain documentation of all outreach activities.

6.2 PROJECT MANAGEMENT

Project management is currently being delegated to a technical consultant, with oversight from the GSP Coordination Group. The primary concern in this category relates to ensuring that the consultant's scope and budget meets all the necessary requirements to achieve both technical and outreach goals. The GSP Coordination Group should make sure that adequate resources are being allocated to outreach activities. This includes both the consultant's time and support, as well as GSA staff time and resources to guide the consultant team. GSAs should evaluate the current resources available for GSP development and outreach activities and consider if additional support is required. Some outreach tools and tactics also require a high level of participation from GSA staff. GSAs should identify where GSA-level resources are most required and plan accordingly.

6.3 ORGANIZATIONAL / INTERNAL

One concern in this category is potential competition for resources with other programs or projects. GSA representatives often work on multiple projects or serve other roles within their agency. Staff time or resources may be re-allocated to other projects or programs. Small agencies or water districts also contend with existing constraints on resources. GSA representatives should ensure that organizational resources for SGMA are balanced with other programs. GSAs should also take advantage of funding and technical support services offered through DWR and other state agencies to augment local resources.

Another concern in this category is the distribution of workload between the GSA and consultant teams. Clear roles and responsibilities must be defined and continuous interactions in place to ensure successful execution. High-level spokespersons or champions within the GSAs should be identified during the GSP development process. These individuals should be able to discuss Subbasin planning with the media, regulators, or stakeholders, with support from the technical consultant.

6.4 EXTERNAL

The legal and regulatory environment of the GSP development process is complex and evolving. Ongoing issues with surface water deliveries and changing market conditions are outside of the control of the parties. It will be important for mechanisms to be in place that allow for relatively rapid responses to changing conditions.

6.5 HISTORICAL

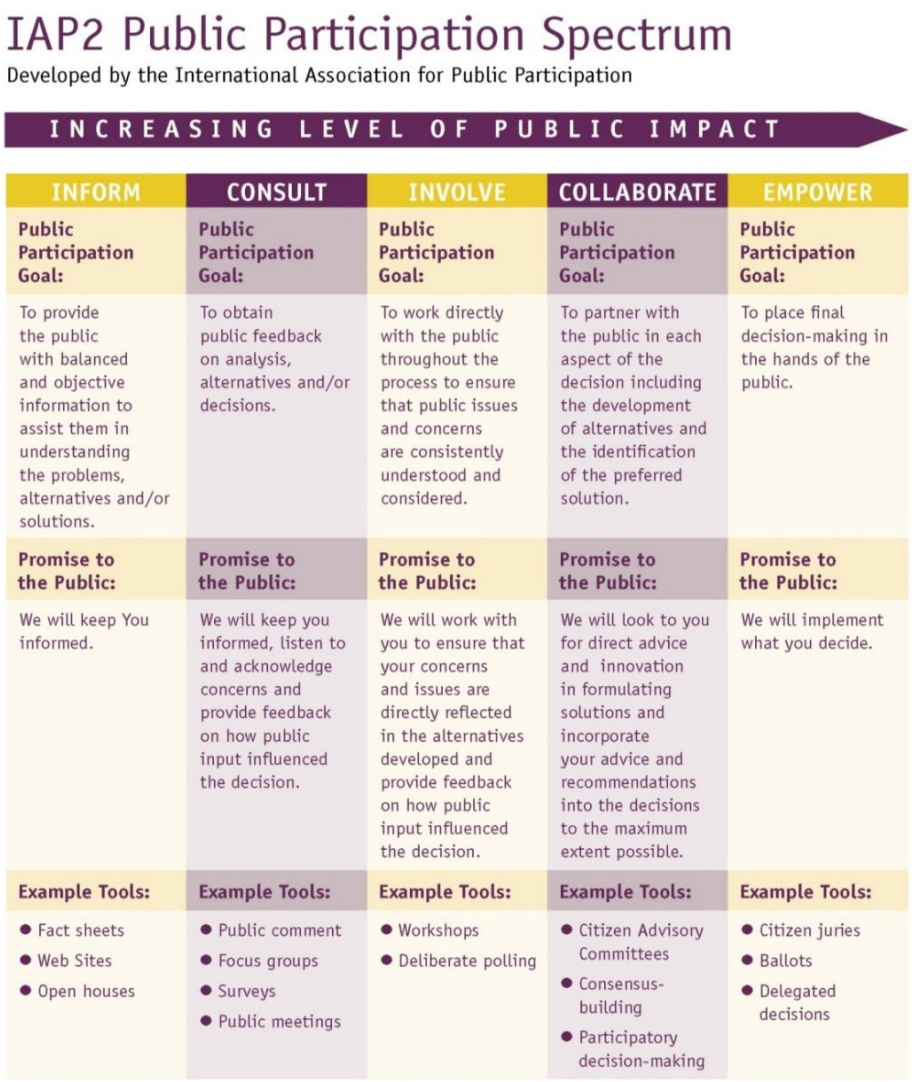
Agencies in the Subbasin have a long and successful history working together to manage water, especially regarding issues related to the Integrated Regional Water Management. Therefore, historical risk factors are considered to be low.

One concern in this category may be stakeholder fatigue. Where possible, GSAs should try to leverage existing outreach efforts and communications channels. For example, GSA should attempt to leverage disadvantaged communities outreach activities being conducted as part of the Integrated Regional Water Management program.

7.0 TACTICAL APPROACHES

This section describes specific tactical tools and approaches to deliver the activities, messages, and recommendations of the previous chapters. These approaches are based on best communication practices and grounded in the public participation philosophy of the International Association for Public Participation, Public Participation Spectrum as illustrated in **Figure 8**. The Spectrum represents a philosophy that outreach should match the desired level of input from both the stakeholder and the organizational entity.

Figure 8. IAP2 Public Participation Spectrum



The level of engagement should be adapted to the type and needs of the stakeholder, as well as the stakeholder's interest in and nexus to SGMA. Many stakeholders simply seek to be informed, unless there is a potential for significant changes that may include them. Tactics and tools for this group may include fact sheets, website, open houses, briefings to community

groups such as the Chamber of Commerce or Rotary, and informational items placed in publications they already read.

Other stakeholders, such as groundwater pumpers or disadvantaged communities, may seek to be consulted. This group should have access to all the outreach materials, as well be invited to provide comments or written materials and planning concepts. These stakeholders may also participate in focused workshops and/or briefings and should be invited to attend larger public meetings.

The development of some GSP features may also require a higher degree of involvement. This would focus on engagement of a subset of stakeholders that may experience significant impacts associated with SGMA.

Collaboration opportunities are of a different character than defined in the Spectrum. Collaboration in this GSP development process will focus on working with partners that have mutual goals to achieve those goals together. This will more resemble a partnership than a public engagement activity.

7.1 COMMUNICATIONS COORDINATION

Each GSA is required to perform legally mandated outreach activities and the GSP submission guidelines require a minimum level of engagement. The GSAs in the Subbasin should coordinate outreach activities. In addition to efficiency and cost savings (the GSAs can share resources), coordinated communications will allow for consistency in messaging and reduce confusion for stakeholders that may not know what GSA jurisdiction they are in, and/or are in multiple GSA jurisdictions. The following are suggested tools and tactics for communications coordination:

- Website
- Meeting calendar
- Branded informational Flyers, Templates, PowerPoint Presentations, etc.
- Periodic newsletter
- GSP related mailing lists
- Descriptions of interested parties
- Issues and interest statements for legally mandatory interested parties
- Public workshops
- Press releases and guest editorials
- Speakers Bureau
- Existing group venues
- Outreach documentation
- Some of these tools and tactics are further described in Sections 7.2 and 7.3.

7.2 OUTREACH TOOLS

Outreach tools are used to identify, track engagement with, and disseminate information to stakeholders. This section describes a suite of tools that could be utilized by GSAs in the Subbasin to conduct SGMA outreach activities. GSAs should provide materials in multiple languages. A minimum, outreach materials should be available in Spanish. In 2015, the most

common non-English language spoken in Contra Costa County, CA was Spanish. 16% of the overall population of Contra Costa County, CA are native Spanish speakers while 2.88% speak Chinese and 2.84% speak Tagalog, the next two most common languages.

A common visual identity or branding should be implemented for all printed and electronic informational materials intended for public and stakeholder audiences.

7.2.1 Website

An internet website(s) has been established and is utilized to provide background information and context; promote public engagement activities; and develop an Interested Parties Database. In addition, Section 10725.2(b) of the California Water Code states that each GSA must "provide notice of the proposed adoption of the groundwater sustainability plan on its Internet Web site and provide for electronic notice to any person who requests electronic notification."

A website for the ECC Subbasin has been developed by Contra Costa Water District (https://www.eccc-irwm.org/sgma/sgma-news-meetings/). This website will serve as the centralized location for SGMA information within the Subbasin. The GSAs should develop a procedure for maintaining, updating, and sharing the costs associated with the centralized websites. Central points of contact for information about the individual GSAs and the GSP process should be identified on the website. Related to the GSP process the group could designate on knowledgeable individual that could route any requests for information as appropriate.

Those GSAs with their own SGMA webpages link to and from the centralized SGMA websites and some provide their own customized information. For those GSAs without their own website, courtesy pages will be provided as an added feature of the central sites. The courtesy pages will all use a single template with the same information to facilitate easy management and updates. Individual GSAs choosing to take advantage of the courtesy pages will be responsible for ensuring that information is current. The page should include a "Last Updated" box to indicate the timeliness of the information.

Basic features of the website should include the following:

- Background information, including map of the Subbasin
- Information on how stakeholders or interested members of the public can get involved
- Method to enroll on the Interested Parties Database
- Public meeting notices and summaries
- Informational materials, including a separate link for Spanish (or other secondary language) materials
- Frequently asked questions
- Links to GSA webpages
- Contact information (name, email, phone) for each GSA point of contact

Should a GSA decide to not participate in the central website, a similar website structure could be utilized for the individual GSA.

7.2.2 Meeting Calendar

A shared meeting calendar on the GSP website will provide a one-stop shop for stakeholders and assist in preventing meeting conflicts while creating more potential for shared activities. This calendar should include current and scheduled meetings and workshops, as well as serve as the repository for agendas and meeting summaries, along with copies of meeting materials and presentation slides. An integrated project calendar should also be developed that links planning project milestones with communications milestones. The meeting calendar should be incorporated as part of the centralized GSA websites.

7.2.3 Outreach Materials

The GSAs should collaboratively develop a suite of Subbasin-level outreach materials. These outreach materials should have a single look and feel to create ongoing consistency and visual recognition by stakeholders. Template materials may be refined or modified by individual GSAs to be fit-for-purpose or incorporate specific GSA-level information, while maintaining the key messages. The use of templates, shared presentations, and flyers will create efficiencies and reinforce messaging across the Subbasin. Outreach materials should evolve over time as the GSP is completed, adopted, and implemented. Potential outreach materials are futher described below.

7.2.3.1 Brochures and Fact Sheets

The purpose of these types of documents is to inform the public and stakeholders about a specific issue. Information in these materials should be kept at a high-level and avoid technical jargon, unless defined in the material itself. The materials should also include the address for the Subbasin website(s) and GSA or GSP contact information. The materials can be formatted or printed by each GSA, as needed. Template brochures or fact sheets may be developed to address Subbasin-level issues and incorporate key messages.

7.2.3.2 Presentation Slides

Template presentation slides provide visual and text content to verbal presentations. The presentation slides should utilize the key messages and answer basic questions about SGMA and the Subbasin, including:

- What is SGMA?
- What and when are the major SGMA milestones?
- What is a GSA?
- Who/where are the GSAs in the Subbasin?
- What is a GSP?
- What is timeline for developing the East Contra Costa Subbasin GSP?
- How can stakeholders and interested members of the public stay involved?
- Template presentation slides should be primarily visual with accompanying talking points or notes and avoid technical jargon, unless defined in the presentation. Presentation slides may be posted on the centralized or individual GSA websites to inform stakeholders unable to attend public meetings or workshops.

7.2.3.3 Utility Bill Inserts

Many GSA members are or serve as utilities that deliver monthly billing statements to customers. These monthly mailings often have space available to insert additional documents at little or no cost to the GSA (if the utility bill's total weight does not exceed the base rate for first class U.S. Mail). Utility bill inserts are often a single-sheet of paper cut to fit a standard #10 envelope without folding. GSAs in the Subbasin may utilize inserts as needed to inform their customers about upcoming public meetings and workshops, GSP public comment and adoption proceedings, and other SGMA activities.

7.2.3.4 Other Outreach Materials

Other SGMA outreach materials may include, but are not limited to, the following:

- Fliers
- Letterhead
- Comment Cards
- Sign-in Sheets

7.2.4 Interested Parties Database

SGMA requires each GSA to establish and maintain an Interested Party Database. Section 10723.4 of the California Water Code states that any person may request, in writing, to be placed on a list to receive notices regarding GSP preparation, meeting announcements, and availability of draft plans, maps, and other relevant documents. In addition, each GSP must include a description of interested parties within the Subbasin.

The GSP has established an Interested Parties Database (**Appendix C**) for use by all the GSAs. This shared approach provides efficiencies given the number of shared stakeholders and need for consistent communications within the subbasin. GSAs should also develop a process for new stakeholders to add themselves to the database. A separate procedure has also been added to tailor the list specific to a particular GSA if an issue or topic only affects a subset of the subbasin. Interested Parties may self-select to be added to the database through an electronic form located on the GSA or Subbasin SGMA website, or enroll through written request to their GSA. The Interested Parties Database should seek to fully include beneficial users, consistent with California Water Code Section 10723.2 (see Subsection 2.1.1). Interested Parties Databases should be continually updated throughout GSP development and implementation.

GSAs within the Subbasin should utilize their own standard mailing lists for publicly noticed meetings and use the Interested Parties Database as the email and mailing list for sending out notices regarding GSA and GSP related meetings, workshops, and other activities. In addition, newsletters or other information regarding GSP milestones should be distributed using the Database. Contra Costa County has developed a centralized email address [groundwaterinfo@dcd.cccounty.us] that will be used for distributing information and receiving comments.

7.2.5 Outreach Venues Database

In addition to conducting targeted outreach to beneficial users, GSA should seek to leverage the activities of existing community groups to conduct broader outreach related to SGMA and GSP development. An initial list of outreach venues has been identified by the GSAs and is provided in Section 4.1. GSAs should expand upon this list and maintain a database of existing civic, non-profit, and other community organizations in the Subbasin. This may include:

- Local chambers of commerce
- Service clubs (e.g. Rotary Club, Lions Club)
- Industry associations (e.g. Industrial Association of Contra Costa County, Local Building Industry Association chapters)
- Community fairs or farmers markets
- Gatherings of elected officials

This Outreach Venues Database should identify the organization name, organization type, typical meeting schedule, and contact information of each potential venue. Each group or organization will require a different level of involvement, depending on the group's interest in and nexus to groundwater management. The Outreach Venues Database may be used to inform stakeholders, receive feedback on GSP development and implementation, or seek collaboration on addressing existing or emerging issues.

7.2.6 Outreach Documentation

Pursuant to Section 354.10 of the California Water Code, the GSP must include a list of public meetings public meetings at which the GSP was discussed or considered by the GSA. In addition, the GSP must describes the GSA(s)' processes for encouraging the involvement of a diverse elements within the subbasin; and identify opportunities for public engagement in the GSA formation, GSP development, and GSP implementation processes.

GSAs should maintain a record of all outreach activities related to SGMA. For this GSP, GSAs will provide documentation on a quarterly basis to the technical consultants for incorporation into a master file. This topic should be included as a standing agenda item on the regularly scheduled meetings of the GSP coordination group. The record should document all outreach activities conducted to all stakeholder audiences including, but not limited to:

- Presentations to GSA Boards, city councils, boards of supervisors, or other elected bodies
- Presentations to stakeholder or community groups or associations
- Presentations at any meeting open to members of the public
- Public workshops
- Newsletters or other regular methods of communications
- Distribution of informational materials, including bill inserts
- Media alerts, op-eds, or newspaper postings

The information in the outreach record should be used to conduct follow-up with stakeholders and as documentation as part of the GSP. The record should include the date, time, audience, and attendance of each activity. The record may also include a list of upcoming outreach and

local and regional media contacts. GSAs should develop a process for updating the record and consolidating the outreach records for inclusion in the GSP.

7.3 OUTREACH TACTICS

GSAs in the Subbasin should conduct a variety of public outreach activities to inform, engage, and respond to stakeholders and other interested parties during GSP development, adoption, and implementation. These activities function to inform stakeholders about SGMA and the GSP, collect information important to groundwater sustainability planning, and receive feedback on the GSP or other public documents.

Regular communication with stakeholders and the public will be a key component to the successful adoption and implementation of the GSP. Some outreach activities identified in this section should be timed with GSP development milestones, while others should be conducted on regular or semi-regular basis. GSAs in the Subbasin should collaboratively develop a stakeholder communications and outreach calendar in association with the overall planning schedule.

Outreach tools identified in Section 6.2 should be used promote, conduct, and track implementation of the tactics identified in this section. As described in Subsection 7.2.8, all outreach activities described in this section should be documented.

7.3.1 Communications Workbook

A separate East Contra Costa Subbasin Communications Workbook (**Appendix D**) provides lists of required activities for each GSA. The workbook will also assist in document outreach activities.

7.3.2 Outreach Survey

A survey to all interested parties was distributed in November-December 2018. The purpose of the survey was two-fold, first to provide some basic GSP education and second to receive input from the interested parties on any topics or concerns for inclusion in the GSP deliberations. The questions were framed to facilitate input on GSP topics. While limited, input provided during the survey was useful.

7.3.3 GSA Board Meetings and Workshops

GSA board meetings are the forum where key GSA decisions are presented, discussed, and decided. Presentations at GSA Board meetings also provide an opportunity to engage with the public and stakeholders in the decision-making process for development of the GSP. GSA representatives should verify with their legal counsel whether their GSA board's meetings are subject to the Brown Act and may be conducted with existing meetings for that agency's board or elected body (e.g. city council, board of supervisors, board of directors). The GSP Coordination Group members should provide regular updates to their GSA boards regarding the status of GSP development and public outreach activities. These representatives should assess

their Board's level of knowledge regarding groundwater topics early in GSP development process and assess the need for a "groundwater 101" type workshop.

7.3.4 Public and Stakeholder Workshops

In support of GSP development, GSAs may host workshops to present technical findings, exchange information with stakeholders, and solicit public and stakeholder feedback on the public draft GSP or other public documents. Workshops may be planned and implemented by individuals GSAs or coordinated as a Subbasin-wide activity. Coordinated workshops will be planned at GSP Coordination Group meetings.

At this time, it anticipated that individual Boards will have publicly noticed workshop items as part of their regular Board meeting agendas. The workshops will be primarily informational, with the purpose of informing stakeholder and members of public about the basics of SGMA and the GSP development process. Further opportunities for stakeholders to get involved should be identified at that time.

The GSAs should hold additional workshops throughout the GSP planning process to inform stakeholders about and receive feedback on key GSP topics. The timing of these workshops should be aligned with key milestones as identified in the project schedule.

7.3.5 Speaking Engagements

Efforts should be made to conduct outreach at events or meetings that already occur (e.g. Farm Bureau meetings, Rotary Club, etc.). The purpose of these presentations is to build and maintain awareness about SGMA and the GSP, encourage participation at public GSP development workshops, and encourage enrollment in the Interested Parties Databases.

The GSAs should develop a list of knowledgeable presenters in the event that an organization or other entity would like a presentation. Branded outreach materials, such as template presentation slides and handouts, should be readily available for these presenters. The initial round of presentations should focus on increasing awareness of SGMA and expanding the Interested Parties Database.

Speaker engagements should be recorded in the overall outreach record and reported at Coordination Group meetings.

7.3.6 Existing Outreach Venues

GSAs should fully leverage the activities of existing groups. A list of potential presentation venues is provided in Section 4.1. This list should be developed into a full Outreach Venues Database, described in Subsection 7.2.7. This database should be referenced when there is a need to deploy information. GSAs may conduct informal outreach with the leaders of such groups to determine the best way to interact. GSAs should also determine what communications channels these groups are using and equally leverage these. For example, GSAs may place articles or event postings in group newsletters at little or no charge.

7.3.7 Press Releases and Guest Editorials

At some point in the GSP development and implementation process, it is likely that stakeholders will be asked to make changes and/or financially support a sustainability effort. It will be more productive for the GSAs and their GSP collaboration partners to frame discussions about these changes than to have others, perhaps with less knowledge, do so on their behalf. For that reason, there is a need for press releases and/or guest editorials to offer the media and stakeholders accurate information offered in the context of SGMA. This type of outreach should be closely coordinated as consistency in messages is critical to stakeholder acceptance.

GSAs may also use press releases, guest editorials, or media alerts to draw media attention to a significant events or GSP milestones. For example, GSAs may use this tactic to promote a public meeting or workshop or alert stakeholders about release of the public draft GSP.

7.4 ITEMS FOR FUTURE CONSIDERATION

This Communications Plan outlines an outreach effort based on project and stakeholder needs and preferences. This document has been prepared as a working draft, living document and should be updated as new information and the GSP development process needs are developed..

8.0 GSP ADOPTION

Adoption of a GSA is governed by California Water Code Section 10728.4 and provides the following requirements:

A groundwater sustainability agency may adopt or amend a groundwater sustainability plan after a public hearing, held at least 90 days after providing notice to a city or county within the area of the proposed plan or amendment. The groundwater sustainability agency shall review and consider comments from any city or county that receives notice pursuant to this section and shall consult with a city or county that requests consultation within 30 days of receipt of the notice. Nothing in this section is intended to preclude an agency and a city or county from otherwise consulting or commenting regarding the adoption or amendment of a plan.

Potential outreach tactics and key milestones during the GSP adoption phase are described below. These tactics and milestones should be identified early in the GSP development process and included as part of the GSP planning schedule.

8.1 GSP ADOPTION PROCEEDINGS

8.1.1 Media Relations, Email, and Social Media

The GSAs should notify the public and stakeholders of availability of the Public Draft GSP via email or print notices, (if already used by a GSA) social media posts, and other communication channels established during the GSP development process. At a minimum, beneficial users and individuals on the Interested Parties Database should be notified.

The GSAs may also issue a news release or media advisory in advance of and during the public comment period to alert the public and stakeholders to the availability of the Public Draft GSP.

8.1.2 Public Comment Process

Pursuant to California Code of Regulations Section 354.10, the GSP must include a summary of comments regarding the GSP, as well as a summary of any responses to those comments by the GSA. The GSAs in the Subbasin should establish a procedure for receiving and responding to comments on the GSP. This may include a public hearing and/or a formal or informal public comment and response period. Public comments and responses to comments on the GSP should be documented and included either directly in or as an attachment or appendix to the plan. The format for the public comment and response process should be adapted to the type and needs of the stakeholders and best use of available GSA resources.

Following the public comment process, the GSAs may hold a series of briefings with GSA boards to present the proposed GSP, describe the development and stakeholder engagement process, and provide an overview of public comments. The GSAs should also establish a collaborative process for addressing stakeholder comments on the GSP.

8.1.3 Newspaper Advertisements

Pursuant to Government Code Section 6066, the GSAs must publish two newspaper advertisements at least five days apart, 14 days prior to a public hearing to adopt the GSP.

8.1.4 Public Hearing to Adopt

Pursuant to California Water Code Section 10728.4, adoption of the final GSP must occur after a public hearing. This hearing must be preceded by newspaper advertisements pursuant to Government Code Section 6066 and, if required, notification to the California Public Utilities Commission pursuant to California Water Code Section 10727.8(a).

8.2 POST ADOPTION PROCEEDINGS

Following submission of the GSP to State, DWR will hold a 60-day public comment period (California Water Code Section 10733.4(c)) for the public, stakeholders and other interested parties on submitted plans. Comments submitted to the State assist in the DWR evaluation of the submitted GSPs and are relayed to the submitting agency for their reference.

9.0 MEASUREMENTS & EVALUATIONS

A guiding principle for evaluation and measurement of the Communications Plan's success is to provide regular, unbiased reporting of progress toward achieving goals. Success may be evaluated in several ways, including process measures, outcome measures, and an annual evaluation of accomplishments. Optional evaluation measures are described below.

9.1 PROCESS MEASURES

Process measures track progress toward meeting the goals of the Communications Plan. These include:

- Level of attendance/ participation in outreach activities
- Shared understanding of the overarching aims, activities, and opportunities presented by different planning approaches and project activities
- Productive dialogue among participants at meetings and events
- Sense of authentic engagement; people understand why they have been asked to participate, and feel that they can contribute meaningfully
- Timely and accurate public reporting of planning milestones
- Feedback from Coordinating Body and GSA members, regulators, stakeholders, and interested parties about the quality and availability of information materials
- Level of stakeholder interest in the GSP development process information

9.2 OUTCOME MEASURES

Outcome measures track the level of success of the Communications Plan in meeting its overall goals. Some outcome measures considered for the GSP development process include the following:

- Consistent participation by key stakeholders and interested parties in essential activities
- Participants have no difficulty locating the meetings, and are informed as to when and where they will be held
- Responses from meeting participants that the engagement methods provided for a fair and balanced exchange of information
- Feedback from interested parties that they understand how their input is used, where to track data, and what results to expect
- The project receives quality media coverage that is accurate, complete and fair

10.0 COMMUNICATION GOVERNANCE

Given the relatively large number of stakeholders and the legal requirements for outreach, some form of coordination and communications governance is recommended.

Execution of communications activities can be accomplished by an individual or multiple individuals, and/or include or be solely managed by project consultants. The actual form of the governance is less important than a clear understanding of the roles and responsibilities of those responsible for ensuring required communication. Also essential is a clear chain of command that ensures the elected representatives of GSAs are able to retain communications leadership and guidance.

A driving consideration for establishing a communications governance structure is the level of effort associated with required activities and the fact that communications are highly time dependent. That means that communications activities should be occurring that may happen outside of regularly scheduled GSA meetings. In this case delegation with guidance to a communications team is efficient and effective.

10.1 ROLES AND RESPONSIBILITIES

This GSP development Communications Plan outlines numerous strategies, activities and tactics. While none are highly complex, there is a requirement for coordination and clarity regarding who will be responsible for executing the tasks.

A description of the initial key roles and responsibilities is provided below:

Responsible

Those who do the work to achieve the task. There is at least one person with a role of *responsible*, although others can be delegated to assist in the work required.

Accountable (also approver or final approving authority)

This is the person ultimately answerable for the correct and thorough completion of the deliverable or task, and the one who delegates the work to those responsible. There *may only* be only one *accountable* specified for each task or deliverable.

Consulted

Those whose opinions are sought, typically subject matter experts were people that are impacted by the activity; and with whom there is two-way communication.

Informed

Those who are kept up-to-date on progress, typically on the launch and completion of the task or deliverable. This is one-way communication.

Role Distinction

There is a distinction between a role and the individual assigned the task. Role is a descriptor of an associated set of tasks that could be performed by just one or many people. In the case of the RACI Chart, the team may list as many people as is logical except for the Accountable role.

10.1.1 Initial Roles

Initial communication roles (**Table 6**) have been identified as follows.

Table 6. Initial Communication Roles

Task	Roles & Responsibilities	Timeframe
GSP Fiscal Agent and Manager	Accountable - City of Brentwood. GSAs responsible for providing necessary materials & input	All Project Phases
Preparation of Information sheets, flyers and other project related Information	Consultant team responsible for preparation with review and approval by GSA representatives	All Project Phases
Website	Site maintained by Contra Costa Water District. GSAs and consultants provide approved content to the site.	All Project Phases
Maintenance of Interested Parties List	Consultant maintains list. GSAs and consultants provide approved additions for the list.	All Project Phases
Planning Outreach meetings to discuss SGMA and expand Interested Parties list	Who?) organizes outreach meetings calendar with leaders of existing groups. Notification is sent by via email (CCC) and if no email DWD sends cards. Consultant provides technical support. GSAs provide assistance with list. Meeting documentation sent back to consultant to record.	All Project Phases
List of presenters	Who? to prepare and organize presenters if an	All Project Phases

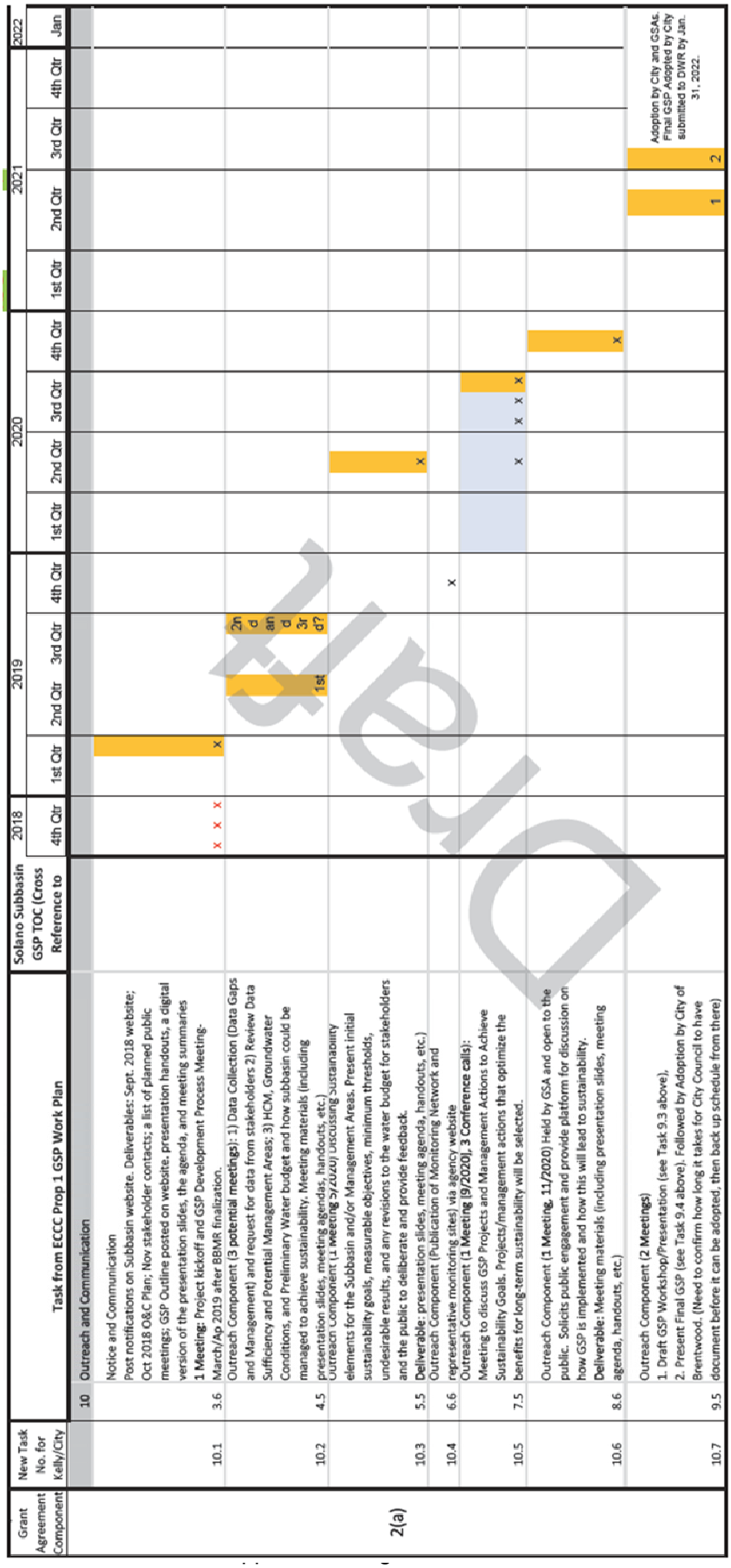
Task	Roles & Responsibilities	Timeframe
	entity would like a presentation	
Social Media??	Any GSA with Social Media presence will post GSP notices.	
DAC and EDA outreach		
Public workshops		
Press releases and guest editorials		
Utility bill insert timing and content		

11.0 LIST OF APPENDICES

Appendix A. – Project Schedule
Appendix B. Public Outreach Requirements under SGMA
Appendix C. – Interested Parties List

Appendix A. PROJECT SCHEDULE

Project Plans Incorporate outreach based on Legal meeting requirements and mindful of key decision points that require stakeholder input.



Appendix B. Public Outreach Requirements under SGMA

GSP Regulations

California Code of Regulations Section	Public Outreach Requirement
§ 353.6. Initial Notification (a) Each Agency shall notify the Department, in writing, prior to initiating development of a Plan. The notification shall provide general information about the Agency's process for developing the Plan, including the manner in which interested parties may contact the Agency and participate in the development and implementation of the Plan. The Agency shall make the information publicly available by posting relevant information on the Agency's website.	1. Statement of how interested parties may contact the Agency and participate in development and implementation of the plan submitted to DWR. 2. Web posting of same information. **Timing**: *Prior to initiating development of a plan.*
§ 353.8. Comments (a) Any person may provide comments to the Department regarding a proposed or adopted Plan. (b) Pursuant to Water Code Section 10733.4, the Department shall establish a comment period of no less than 60 days for an adopted Plan that has been accepted by the Department for evaluation pursuant to Section 355.2. (c) In addition to the comment period required by Water Code Section 10733.4, the Department shall accept comments on an Agency's decision to develop a Plan as described in Section 353.6, including comments on elements of a proposed Plan under consideration by the Agency.	1. 60-day comment period for plans under submission to DWR. Comments will be used to evaluate the submission. 2. Parties may also comment on a GSA's (or GSAs') statements submitted under section 353.6 **Timing**: For GSP Submittal - *60 days after submission to DWR*
§ 354.10. Notice and Communication Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following: (a) A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties. (b) A list of public meetings at which the Plan was discussed or considered by the Agency. (c) Comments regarding the Plan received by the Agency and a summary of any responses by the Agency. (d) A communication section of the Plan that includes the following:	1. Statements of issues and interests of beneficial users of basin groundwater, including types of parties representing the interests and consultation process 2. Lists of public meetings 3. Inventory of comments and summary of responses 4. Communication section in plan that includes: • Agency decision making process • ID of public engagement opportunities and response process • Description of process for inclusion • Method for public information related to progress in implementing the plan (status, projects, actions) **Timing**: For GSP Submittal – *with plan* For GSP Development – *continuous. [Note: activities should be included in the project schedule and information posted on web.]*

California Code of Regulations Section	Public Outreach Requirement
(1) An explanation of the Agency's decision-making process. (2) Identification of opportunities for public engagement and a discussion of how public input and response will be used. (3) A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin. (4) The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions.	
§ 355.2. (c) Department Review of Adopted Plan (c) The Department (DWR) shall establish a period of no less than 60 days to receive public comments on the adopted Plan, as described in Section 353.8.	1. 60-day public review period for public comment on submitted plan. **Timing**: After GSP Submittal to DWR – *60 days*
§ 355.4. & 355.10 Criteria for Plan Evaluation The basin shall be sustainably managed within 20 years of the applicable statutory deadline consistent with the objectives of the Act. The Department shall evaluate an adopted Plan for compliance with this requirement as follows: (b) (4) Whether the interests of the beneficial uses and users of groundwater in the basin, and the land uses and property interests potentially affected by the use of groundwater in the basin, have been considered. … (10) Whether the Agency has adequately responded to comments that raise credible technical or policy issues with the Plan.	1. Required public outreach and stakeholder information is submitted, including statement of issues and interests of beneficial users. 2. Public and stakeholder comments and questions adequately addressed during planning process. **Timing**: For GSP Submittal – *with plan* For resubmittal related to corrective action – *with submittal*

California Water Code

California Water Code Section	Public Outreach Requirement
10720. This part shall be known, and may be cited, as the "Sustainable Groundwater Management Act." **10720.3** (a) This part applies to all groundwater basins in the state. … (c) The federal government or any federally recognized Indian tribe, appreciating the shared interest in assuring the sustainability of groundwater resources, may voluntarily agree to participate in the preparation or administration of a groundwater sustainability plan or groundwater management plan under this part through a joint powers authority or other agreement with local agencies in the basin. A participating tribe shall be eligible to participate fully in planning, financing, and management under this part, including eligibility for grants and technical assistance, if any exercise of regulatory authority, enforcement, or imposition and collection of fees is pursuant to the tribe's independent authority and not pursuant to authority granted to a groundwater sustainability agency under this part.	1. Tribes and the federal government may voluntarily participate in GSA governance and GSP development. **Timing**: *Prior to initiating development of a plan.*
CHAPTER 4. Establishing Groundwater Sustainability Agencies [10723 - 10724]	
10723. a) Except as provided in subdivision (c), any local agency or combination of local agencies overlying a groundwater basin may decide to become a groundwater sustainability agency for that basin. (b) Before deciding to become a groundwater sustainability agency, and after publication of notice pursuant to Section 6066 of the Government Code, the local agency or agencies shall hold a public hearing in the county or counties overlying the basin.	1. Must hold public hearing in the county or counties overlying the basin, prior to becoming a GSA **Timing**: *Prior to becoming a GSA.*
10723.2 The groundwater sustainability agency shall consider the interests of all beneficial uses and users of groundwater, as well as those responsible for implementing groundwater sustainability plans. These interests include, but are not limited to, all of the following: (a) Holders of overlying groundwater rights, including: (1) Agricultural users. (2) Domestic well owners. (b) Municipal well operators. (c) Public water systems. (d) Local land use planning agencies.	1. Must consider interest of all beneficial uses and users of groundwater. 2. Includes specific stakeholders as listed. **Timing**: *During development of a GSP.*

California Water Code Section	Public Outreach Requirement
(e) Environmental users of groundwater. (f) Surface water users, if there is a hydrologic connection between surface and groundwater bodies. (g) The federal government, including, but not limited to, the military and managers of federal lands. (h) California Native American tribes. (i) Disadvantaged communities, including, but not limited to, those served by private domestic wells or small community water systems. (j) Entities listed in Section 10927 that are monitoring and reporting groundwater elevations in all or a part of a groundwater basin managed by the groundwater sustainability agency.	
10723.4. The groundwater sustainability agency shall establish and maintain a list of persons interested in receiving notices regarding plan preparation, meeting announcements, and availability of draft plans, maps, and other relevant documents. Any person may request, in writing, to be placed on the list of interested persons.	1. Must establish and maintain an interested persons list. 2. Any person may ask to be added to the list **Timing**: *On forming a GSA.*
10723.8. (a) Within 30 days of deciding to become or form a groundwater sustainability agency, the local agency or combination of local agencies shall inform the department of its decision and its intent to undertake sustainable groundwater management. The notification shall include the following information, as applicable: … (4) A list of interested parties developed pursuant to Section 10723.2 and an explanation of how their interests will be considered in the development and operation of the groundwater sustainability agency and the development and implementation of the agency's sustainability plan.	1. Creates notification requirements that include: a. A list of interested parties b. An explanation of how interests will be considered **Timing**: *On forming a GSA & with submittal of GSP*
10727.8 (a) Prior to initiating the development of a groundwater sustainability plan, the groundwater sustainability agency shall make available to the public and the department a written statement describing the manner in which interested parties may participate in the development and implementation of the groundwater sustainability plan. The groundwater sustainability agency shall provide the written statement to the legislative body of any city, county, or city and county located	1. Agencies preparing a GSP must prepare a written statement describing the manner in which interested parties may participate in its development and implementation. 2. Statement must be provided to: a. Legislative body of any city and/or county within the geographic area of the plan b. Public Utilities Commission if the geographic area includes a regulated public water system regulated by that Commission c. DWR d. Interested parties (see Section 10927)

California Water Code Section	Public Outreach Requirement
within the geographic area to be covered by the plan. The groundwater sustainability agency may appoint and consult with an advisory committee consisting of interested parties for the purposes of developing and implementing a groundwater sustainability plan. The groundwater sustainability agency shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the groundwater basin prior to and during the development and implementation of the groundwater sustainability plan. If the geographic area to be covered by the plan includes a public water system regulated by the Public Utilities Commission, the groundwater sustainability agency shall provide the written statement to the commission. (b) For purposes of this section, interested parties include entities listed in Section 10927 that are monitoring and reporting groundwater elevations in all or a part of a groundwater basin managed by the groundwater sustainability agency.	e. The public 3. GSP entities may form an advisory committee for the GSP preparation and implementation. 4. The GSP entities are to encourage active involvement of diverse social, cultural and economic elements of the affected populations. **Timing**: *On initiating GSP*
10728.4 Public Notice of Proposed Adoption, GSP Adoption Pubic Hearing A groundwater sustainability agency may adopt or amend a groundwater sustainability plan after a public hearing, held at least 90 days after providing notice to a city or county within the area of the proposed plan or amendment. The groundwater sustainability agency shall review and consider comments from any city or county that receives notice pursuant to this section and shall consult with a city or county that requests consultation within 30 days of receipt of the notice. Nothing in this section is intended to preclude an agency and a city or county from otherwise consulting or commenting regarding the adoption or amendment of a plan.	1. GSP must be adopted or amended at Public Hearing. 2. Prior to Public Hearing for adoption or amendment of the GSP, the GSP entities must: a. Notify cities and/or counties of geographic area 90 days in advance. b. Consider and review comments c. Conduct consultation within 30 days of receipt with cities or counties so requesting
10730 Fees. (a) A groundwater sustainability agency may impose fees, including, but not limited to, permit fees and fees on groundwater extraction or other regulated activity, to fund the costs of a groundwater sustainability program, including, but not limited to, preparation, adoption, and amendment of a groundwater sustainability plan, and investigations, inspections, compliance assistance, enforcement, and program administration, including a prudent reserve. A groundwater sustainability agency shall not impose a fee pursuant to this subdivision on a de minimis extractor unless	Related to GSAs 1. Public meeting required prior to adoption of, or increase to fees. Oral or written presentations may be made as part of the meeting. 2. Public notice shall include: a. Time and place of meeting b. General explanation of matter to be considered c. Statement of availability for data required to initiate or amend such fees d. Public posting on Agency Website and provision by mail to interested parties of supporting data (at least 20 days in advance)

California Water Code Section	Public Outreach Requirement
the agency has regulated the users pursuant to this part. (b) (1) Prior to imposing or increasing a fee, a groundwater sustainability agency shall hold at least one public meeting, at which oral or written presentations may be made as part of the meeting. (2) Notice of the time and place of the meeting shall include a general explanation of the matter to be considered and a statement that the data required by this section is available. The notice shall be provided by publication pursuant to Section 6066 of the Government Code, by posting notice on the Internet Web site of the groundwater sustainability agency, and by mail to any interested party who files a written request with the agency for mailed notice of the meeting on new or increased fees. A written request for mailed notices shall be valid for one year from the date that the request is made and may be renewed by making a written request on or before April 1 of each year. (3) At least 20 days prior to the meeting, the groundwater sustainability agency shall make available to the public data upon which the proposed fee is based. (c) Any action by a groundwater sustainability agency to impose or increase a fee shall be taken only by ordinance or resolution. (d) (1) As an alternative method for the collection of fees imposed pursuant to this section, a groundwater sustainability agency may adopt a resolution requesting collection of the fees in the same manner as ordinary municipal ad valorem taxes. (2) A resolution described in paragraph (1) shall be adopted and furnished to the county auditor-controller and board of supervisors on or before August 1 of each year that the alternative collection of the fees is being requested. The resolution shall include a list of parcels and the amount to be collected for each parcel. (e) The power granted by this section is in addition to any powers a groundwater sustainability agency has under any other law.	3. Mailing lists for interested parties are valid for 1 year from date of request and may be renewed by written request of the parties on or before April 1 of each year. 4. Includes procedural requirements per Government Code, Section 6066. **Timing**: *Prior to adopting fees.*

California Government Code

CODE	PUBLIC OUTREACH REQUIREMENT
6060 Whenever any law provides that publication of notice shall be made pursuant to a designated section of this article, such notice shall be published in a newspaper of general circulation for the period prescribed, the number of times, and in the manner provided in that section. As used in this article, "notice" includes official advertising, resolutions, orders, or other matter of any nature whatsoever that are required by law to be published in a newspaper of general circulation. **6066** Publication of notice pursuant to this section shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. The period of notice commences upon the first day of publication and terminates at the end of the fourteenth day, including therein the first day.	1. Must publish notices in a newspaper of general circulation as prescribed. 2. Publication shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. 3. The period of notice begins the first day of publication and terminates at the end of the fourteenth day, (which includes the first day.) **Timing**: *Prior to adopting fees*

Appendix C. Interested Parties

HOLDERS OF OVERLYING GROUNDWATER RIGHTS

(1) Agricultural Users

- Contra Costa County Farm Bureau
- East Contra Costa Irrigation District
- Contra Costa County Agricultural Commissioner
- Ron Nunn Farms
- RRS Farms
- Dwelley Farms
- Mr. Stuart
- Ron Nunn
- Eugene Mangini,
- Marian & Louis Mangini,
- Louis Volpone,
- David Roche,
- Pierina Maggiora,
- Reclamation Districts (RD)
  - RD 799 (Hotchkiss Tract)
  - RD 800 (Byron Tract)
  - RD 830 (Jersey Island)
  - RD 2024 (Orwood and Palm Tracts)
  - RD 2025 (Holland Tract)
  - RD 2026 (Webb Tract)
  - RD 2059 (Bradford Island)
  - RD 2065 (Veale Tract)
  - RD 2090 (Quimby Island)
  - RD 2117 (Coney Island)
  - RD 2121 (Bixler Tract)
  - RD 2137

(2) Domestic Well Owners

- Mr. Shatting
- Mr. Critchfield
- Mr. Rozenski
- Mr. Larson
- Mr. & Mrs. Driscoll
- MS. Lomax
- Mr. & Mrs. Boro
- Mr. & Mrs. Gil
- Gang Sun
- Ernest Rodriguez
- Ernest Dominguez
- Ronald Stinnette
- Frank Williams
- Luis Colmenares
- Walter Li
- Anna Rivera
- Elia Garcia
- Jose L. Cabada
- Thomas Trimble
- Sengchanh Panyachith
- Suzan M Ferrer
- Ron & Jean Tennison
- Arturo Martinez
- Susan Corrie
- Esthela Rodriguez
- L L G Group
- Josefina Torres
- Juan Rivera
- Agripina Valle
- Jennifer Vallis
- Jim & Cheryl Hammers
- Oscar Hernandez
- Jesus Campos
- Louden LLC
- Brian Stewart
- Tammi Van Alstyne
- Lela Peterson
- Harvest Time Assembly
- Lee Munoz
- Arcangel Camacho
- Profirio Medina
- Baymark Financial Inc
- Pat Vanden Broek
- Margarito Meza
- Eric Avalos
- Alicia Cruz
- Mario Sanchez Gonzale
- Esperanza Lopez
- Cinda Nagel
- Victor Chavez
- Tiana Flores
- Francisco Sanchez
- Mario Cabada
- Lone Tree Drive Inn
- Irma Gamez
- Wes Tilton
- Claire Keith

- Pedro Guitron
- Maria Aguayo
- Michael Mcpoland
- Randy Peterson
- Ian Robertson
- Kim Silva
- Delta Fence C/O Martin II
- Rodney L Kraber
- Francisca Sandoval
- Daniel Mendoza
- Salome Quintanilla
- Esperanza Magana
- Alice Bloodworth
- Michael W Driskill
- Christine Curiel
- Jim Price Heidolf Property
- Tim Bigelow
- Kristin Pipkins
- Darlene Gonzalez
- Marcial Cruz
- Gloria Mcgarath
- Annette Beckstrand
- Josefina Zesati

(3) Municipal Well operators or Systems

- City of Brentwood
- City of Oakley
- Discovery Bay Community Services District

(4) Public Water Systems.

- Aloha Club
- Anchor Marina SWS
- Angler's Ranch #3 - SWS
- Angler's Subdivision #4
- Bay Standard Water System
- Beacon West Water System
- Bethel Baptist Church -SWS
- Bethel Harbor
- Bethel Island Golf Course
- Bethel Island Mutual Water Co
- Bethel Market
- Bethel Missionary Baptist
- Big Oak Mobile Home Park Water
- Brentwood Creek Farm - Farm Land LP
- Bridgehead Cafe
- Byron Airport Water System
- Byron Corners Inc SWS
- Byron Inn Cafe Water System
- Byron United Methodist Church
- Camino Mobile Home Park
- Cecchini Water Service - Farm Land LP Delete
- Colonia Santa Maria
- Country Junction Deli
- Cruiser Haven Marina - SWS
- Delta Bar & Grill
- Delta Mutual Water Company
- Delta Sportsman
- Doc's Marina
- Dutch Slough Water Works
- EBRPD Round Valley Water Sys
- Excelsior Middle School
- Farrar Park Water System
- Flamingo Mobile Manor SWS
- Frank's Marina
- Gas N Save
- Holland Riverside Marina Water
- Knightsen Community Water Sys
- Knightsen Elementary School
- Lazy M Marina
- Lindquist Landing Marina SWS
- Lone Tree Medical & Dental SWS
- Mac's Old House
- Marin Food Specialties SWS
- Marina Mobile Manor SWS
- Neighborhood Church SWS
- New Life Marina
- Oakley Mutual Water Company
- Orin Allen Youth Rehab Facility
- Orwood Resort
- Pleasantimes Mutual Water Co
- Riverview Water Association
- Russo's Mobile Park
- Sandmound Mutual
- Sandy Point Mobile Home Park
- Sugar Barge Water System
- Sunset Harbor
- Tess' Farm Market
- Tugs Boat House Lounge
- Wahl Family Water System
- Willow Mobile Home Park - SWS
- Willow Park Marina - SWS
- Willowest Marina WS
- City Of Antioch
- City Of Brentwood

- Town of Discovery Bay
- Santiago Island Village
- Contra Costa Water District
- Diablo Water District

(5) Local Land Use Planning Agencies.

- Contra Costa County
- City of Oakley
- City of Antioch
- City of Brentwood

(6) Environmental Users of Groundwater

- East Bay Regional Park District, Big Break
- Dutch Slough Restoration Project
- Contra Costa Watershed Forum
- Contra Costa County Watershed Program (CWP)
- East Contra Costa Habitat Conservancy

(7) Surface Water Users (if there is a hydrologic connection between surface and groundwater bodies)

- City of Antioch
- Contra Costa Water District
- East Contra Costa Irrigation District
- Byron Bethany Irrigation District

(8) The Federal Government (including, but not limited to, the military and managers of federal lands)

- U.S. Bureau of Reclamation
- US Fish & Wildlife

(9) California Native American Tribes

- Wilton Rancheria Tribe
- Bay Miwok Tribe

(10) Disadvantaged Communities

All residents on Bethel Island*

(11) Entities listed in Section 10927 (monitoring and reporting groundwater elevations in all or a part of a groundwater basin managed by the groundwater sustainability agency).

- Statewide Groundwater Elevation Monitoring (CASGEM) data with DWR for Eastern Contra Costa County.

(12) Other:

- Delta Diablo Sanitary District
- Iron House Sanitary District
- Knightsen Town Advisory Council

Appendix D. East Contra Costa Subbasin Communication Plan Workbook

East Contra Costa Subbasin Communication Plan Workbook

Contents

1. Mandated SGMA Outreach Activities

Timeframe	Item
Prior to initiating plan development	Statement of how interested parties may contact the Agency and participate in development and implementation of the plan submitted to DWR. Web posting of same information.
Prior to plan development	Must establish and maintain an interested persons list. Must prepare a written statement describing the manner in which interested parties may participate in GSP development and implementation. <u>Statement must be provided to:</u> Legislative body of any city and/or county within the geographic area of the plan Public Utilities Commission if the geographic area includes a regulated public water system regulated by that Commission DWR Interested parties (see Section 10927) The public
Prior to and with GSP submission	Statements of issues and interests of beneficial users of basin groundwater, including types of parties representing the interests and consultation process Lists of public meetings Inventory of comments and summary of responses Communication section in plan that includes: Agency decision making process Identification of public engagement opportunities and response process Description of process for inclusion Method for public information related to progress in implementing the plan (status, projects, actions)
90 days prior to GSP Adoption Hearing	Prior to Public Hearing for adoption or amendment of the GSP, the GSP entities must notify cities and/or counties of geographic area 90 days in advance.
90 days or less prior to GSP Adoption Hearing	Prior to Public Hearing for adoption or amendment of the GSP, the GSP entities must: – Consider and review comments – Conduct consultation within 30 days of receipt with cities or counties so requesting
GSP Adoption or Amendment	GSP must be adopted or amended at Public Hearing.
60 days after plan submission	60-day comment period for plans under submission to DWR. Comments will be used to evaluate the submission.
Prior to adoption of fees	Public meeting required prior to adoption of, or increase to fees. Oral or written presentations may be made as part of the meeting. Public notice shall include: Time and place of meeting General explanation of matter to be considered Statement of availability for data required to initiate or amend such fees Public posting on Agency Website and provision by mail to interested parties of supporting data (at least 20 days in advance) Mailing lists for interested parties are valid for 1 year from date of request and may be renewed by written request of the parties on or before April 1 of each year. Includes procedural requirements per Government Code, Section 6066.
Prior to conducting a fee adoption hearing.	Must publish notices in a newspaper of general circulation as prescribed. Publication shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. The period of notice begins the first day of publication and terminates at the end of the fourteenth day, (which includes the first day.)

GSP COMMUNICATIONS WORKBOOK

California Code of Regulations Section 354.10 states that each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties.

GSP Submittal Requirements

Table 6. GSP Submittal Requirements3

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

2. Beneficial Use

Description of the beneficial use(s)	
Users of groundwater (as related to the beneficial activity)	

3. Land Use and Property Interests

Land uses and property interests potentially affected by the use of groundwater in the basin	
Types of parties representing those interests	
Nature of consultation with those parties.	

4. Meeting Records

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

List of public meetings at which the Plan was discussed or considered by the Agency.

DATE	LOCATION	CONVENER	TOPIC(S)

5. GSP Plan Comments

DATE	AGENCY	COMMENTER/ COMMENT	RESPONSE

6. Communications Section

Agency's decision-making process	
Identification of opportunities for public engagement	
How public input and response will be used	
How the Agency encourages the active involvement of diverse social, cultural and economic elements of the population	
Method the Agency follows to inform the public about progress	
Method the Agency follows to inform the public about implementation, including the status of projects and actions	

7. GSP Checksheet

Following Is a summary of requirements for Groundwater Sustainability Plans (GSP) that focus on plan elements with some form of decision making or discretionary activity associated with that section of the plan. Thinking about the community and its interests, what types of questions need to be addressed for this section of the plan to be adequate? What, if any, minimum standards or best practices should be considered as this plan section is prepared?

Technical and Reporting Standards			Issues, Interests, Needs, Options
Article 3. 352.2	Monitoring Protocols	• Monitoring protocols adopted by the GSA for data collection and management • Monitoring protocols that are designed to detect changes in groundwater levels, groundwater quality, inelastic surface subsidence for basins for which subsidence has been identified as a potential problem, and flow and quality of surface water that directly affect groundwater levels or quality or are caused by groundwater extraction in the basin	

Administrative Information			Issues, Interests, Needs, Options
Article 5. 354.8(f) 10727.2(g)	Land Use Elements or Topic Categories of Applicable General Plans	• Summary of general plans and other land use plans • Description of how implementation of the GSP may change water demands or affect achievement of sustainability and how the GSP addresses those effects • Description of how implementation of the GSP may affect the water supply assumptions of relevant land use plans • Information regarding the implementation of land use plans outside the basin that could affect the ability of the Agency to achieve sustainable groundwater management	

Administrative Information			Issues, Interests, Needs, Options
354.14	Hydrogeologic Conceptual Model	• Selection/Description of the Hydrogeologic Conceptual Model	
354.18 10727.2(a)(3)	Water Budget Information	• Description of inflows, outflows, and change in storage • Quantification of overdraft • Estimate of sustainable yield • Quantification of current, historical, and projected water budgets	
354.24	Sustainability Goal	• Description of the sustainability goal	
354.28 10727.2(d)(1) 10727.2(d)(2)	Minimum Thresholds	• Description of each minimum threshold and how they were established for each sustainability indicator • Relationship for each sustainability indicator • Description of how selection of the minimum threshold may affect beneficial uses and users of groundwater • Standards related to sustainability indicators • How each minimum threshold will be quantitatively measured	
354.44	Projects and Management Actions	• Description of projects and management actions that will help achieve the basin's sustainability goal • Measurable objective that is expected to benefit from each project and management action • Circumstances for implementation • Public noticing • Permitting and regulatory process • Time-table for initiation and completion, and the accrual of expected benefits • Expected benefits and how they will be evaluated • • Management of groundwater extractions and recharge	
354.44(b)(2) 10727.2(d)(3		• Overdraft mitigation projects and management actions	

The GSP also includes additional planning elements involving descriptions of existing conditions, features, activities and jurisdictional topics. Those sections are based on existing factual information and should be reviewed for tone, approach, accuracy, and completeness.

Thinking about the GSP planning requirements that involve descriptions of existing conditions, features, activities and jurisdictional topics what issues, interests, needs and/or options would you and/or your community like considered in the planning process?

Administrative Information			Issues, Interests, Needs, Options
354.10	Notice and Communication	• Description of beneficial uses and users • List of public meetings • GSP comments and responses • Decision-making process • Public engagement • Encouraging active involvement • Informing the public on GSP implementation progress	
354.20	Management Areas	Reason for creation of each management area • Minimum thresholds and measurable objectives for each management area • Level of monitoring and analysis • Explanation of how management of management areas will not cause undesirable results outside the management area • Description of management areas	Note (may not apply)
354.26	Undesirable Results	• Description of undesirable results • Cause of groundwater conditions that would lead to undesirable results • Criteria used to define undesirable results for each sustainability indicator • Potential effects of undesirable results on beneficial uses and users of groundwater	
10727.2(d)(5)	Surface Water Supply	• Description of surface water supply used or available for use for groundwater recharge or in-lieu use	

8. Legally required GSA /GSP Web Posting Requirements

GSP Code Section	Item to be Posted	Responsible	Timing	√
§ 353.6. Initial Notification	1. General information about the Agency's process for developing the Plan 2. Manner in which interested parties may contact the Agency 3. How parties may participate in the development and implementation of the Plan	GSP developing agencies	Prior to initiating plan development	
Water Code Section	**Item to be Posted**	**Responsible**	**Timing**	**√**
§10725.2(c)	1. In addition to any other applicable procedural requirements, provide notice of the proposed adoption of the groundwater sustainability plan and provide for electronic notice to any person who requests electronic notification.	GSA	Prior to adoption	
§ 10730 Fees	1. Notice of the time and place of meetings involving imposition or increasing of fees 2. General explanation of the matter to be considered 3. Statement that the data required by this section is available and the method by which to acquire it.	Agency imposing or increasing fees	Prior to imposing or increasing a fee	
Government Code Section	**Item to be Posted**	**Responsible**	**Timing**	**√**
§ 54954.2 Agendas	1. Post Meeting Agenda *Requirements* a. Direct link must be standalone and cannot only be part of a "contextual" menu which would require users to search for the link on the website - If a direct link is provided, then a second	Any local agency subject to Brown Act *(Note – only applies to agencies with a website; however, under SGMA*	After January 1, 2019 72 hours in Advance of a Regular Meeting	

	link can be provided in a contextual menu. b. If an agency uses an integrated agenda management platform that is specifically for posting board agenda meetings, then the agency does not have to comply with this requirement if: i. the agency posts a direct link to the platform which contains the agency agenda on its primary website; ii. the current agenda is the first available at the top of the platform; and iii. the agency complies with specific open format requirements. c. Agenda must be in a format that is retrievable, downloadable, index able, and electronically searchable by commonly used Internet search applications. d. Must be platform independent, machine readable, and in a form that is available free of charge to the public so that they may reuse or redistribute the agenda. (For example - PDF)	*the GSP agencies are required to have a website.)*		

Other - Optional

Government Code Section	Item to be Posted	Responsible	Timing	√
§ 6253 Public Records Request	1. Allows for agencies to post documents subject to a Public Records Act request on the web and for the web location to be given as a reference in lieu of the document. frequently requested documents			

	a. Provides an exception for individual requestors without internet access			

California Government Code Requirements - Newspapers

CODE	PUBLIC OUTREACH REQUIREMENT	√
6060 Whenever any law provides that publication of notice shall be made pursuant to a designated section of this article, such notice shall be published in a newspaper of general circulation for the period prescribed, the number of times, and in the manner provided in that section. As used in this article, "notice" includes official advertising, resolutions, orders, or other matter of any nature whatsoever that are required by law to be published in a newspaper of general circulation. **6066** Publication of notice pursuant to this section shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. The period of notice commences upon the first day of publication and terminates at the end of the fourteenth day, including therein the first day.	4. Must publish notices in a newspaper of general circulation as prescribed. 5. Publication shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. 6. The period of notice begins the first day of publication and terminates at the end of the fourteenth day, (which includes the first day.) **Timing**: *Prior to adopting fees*	

9. Outreach Venues

GSA representatives have identified a list of potential outreach venues in the Subbasin, shown in **Table 2**

Table 7. Potential Outreach Venues in the Tracy Subbasin

Organization/Event Name	Type of Organization/Event	Location
Contra Costa County Farm Bureau	Agricultural	Contra Costa County
Brentwood Lions Club	Civic/Community	Brentwood
Discovery Bay Chamber of Commerce	Commercial	Discovery Bay
Oakley Chamber of Commerce	Commercial	Oakley
Discovery Bay Lions Club	Civic/Community	Discovery Bay
Earth Day	Event	Multiple locations throughout Subbasin
Brentwood City Council	Government/Municipal	Brentwood
Brentwood Planning Commission	Government/Municipal	Brentwood
Contra Costa County Board of Supervisors	Government/Municipal	Contra Costa County
Contra Costa County Municipal Advisory Council – Byron and Bethel Island	Government/Municipal	Contra Costa County

Contra Costa County Municipal Advisory Council - Knightsen	Government/Municipal	Contra Costa County
Contra Costa County Transportation, Water, Infrastructure Committee	Government/Municipal	Contra Costa County
Oakley City Council	Government/Municipal	Oakley
Building Industrial Association - East Bay Chapter	Industrial	Contra Costa County
Industrial Association of Contra Costa County	Industrial	Contra Costa County
Farmers Market	Other	Brentwood
East County Water Management Association Board Meeting	Other	Contra Costa County
Realtor groups	Other	Multiple locations throughout Subbasin

Interbasin Coordination under the Sustainable Groundwater Management Act (SGMA)

Agencies preparing a Groundwater Sustainability Plan (GSP) under SGMA are encouraged to work with other agencies in adjacent basins to facilitate exchange of technical information, assist with preparation of GSPs, coordinate basin boundary modifications, and conduct outreach to regional stakeholders.

Interbasin coordination is also important to ensure that implementation of a GSP will not adversely affect an adjacent basin's ability to implement is GSP or impede its ability to achieve its sustainability goal. GSAs may develop a voluntary Interbasin Agreement to establish compatible sustainability goals and understanding regarding the fundamental elements of each agency's GSP. Interbasin agreements should facilitate the exchange of technical information between agencies and include a process to resolve disputes concerning the interpretation of that information. (23 CCR § 357.2). A summary of elements to be included in an interbasin agreement is provided below.

Interbasin Coordination Agreement Checklist

	Interbasin Coordination Agreement Element	CA Code of Regulations
General Information		
☐	Identity of each basin participating in and covered by the terms of the agreement.	23 CCR § 357.2 (a)(1)
☐	A list of the Agencies or other public agencies or other entities with groundwater management responsibilities in each basin.	23 CCR § 357.2 (a)(2)
☐	A list of the Plans, Alternatives, or adjudicated areas in each basin.	23 CCR § 357.2 (a)(3)
Technical Information		
☐	An estimate of groundwater flow across basin boundaries, including consistent and coordinated data, methods and assumptions.	23 CCR § 357.2 (b)(1)
☐	An estimate of stream-aquifer interactions at boundaries.	23 CCR § 357.2 (b)(2)
☐	A common understanding of the geology and hydrology of the basins and the hydraulic connectivity as it applies to the Agency's determination of groundwater flow across basin boundaries and description of the different assumptions utilized by different Plans and how the Agencies reconciled those differences.	23 CCR § 357.2 (b)(3)
☐	Sustainable management criteria and a monitoring network that would confirm that no adverse impacts result from the implementation of the Plans of any party to the agreement. If minimum thresholds or measurable objectives differ substantially between basins, the agreement should specify how the Agencies will reconcile those differences and manage the basins to avoid undesirable results. The Agreement should identify the differences that the parties consider significant and include a plan and schedule to reduce uncertainties to collectively resolve those uncertainties and differences.	23 CCR § 357.2 (b)(4)
Conflict Resolution		
☐	A description of the process for identifying and resolving conflicts between Agencies that are parties to the agreement.	23 CCR § 357.2 (c)
Submission to DWR		

	Interbasin Coordination Agreement Element	CA Code of Regulations
☐	Interbasin agreements submitted to the Department shall be posted on the Department's website.	23 CCR § 357.2 (d)