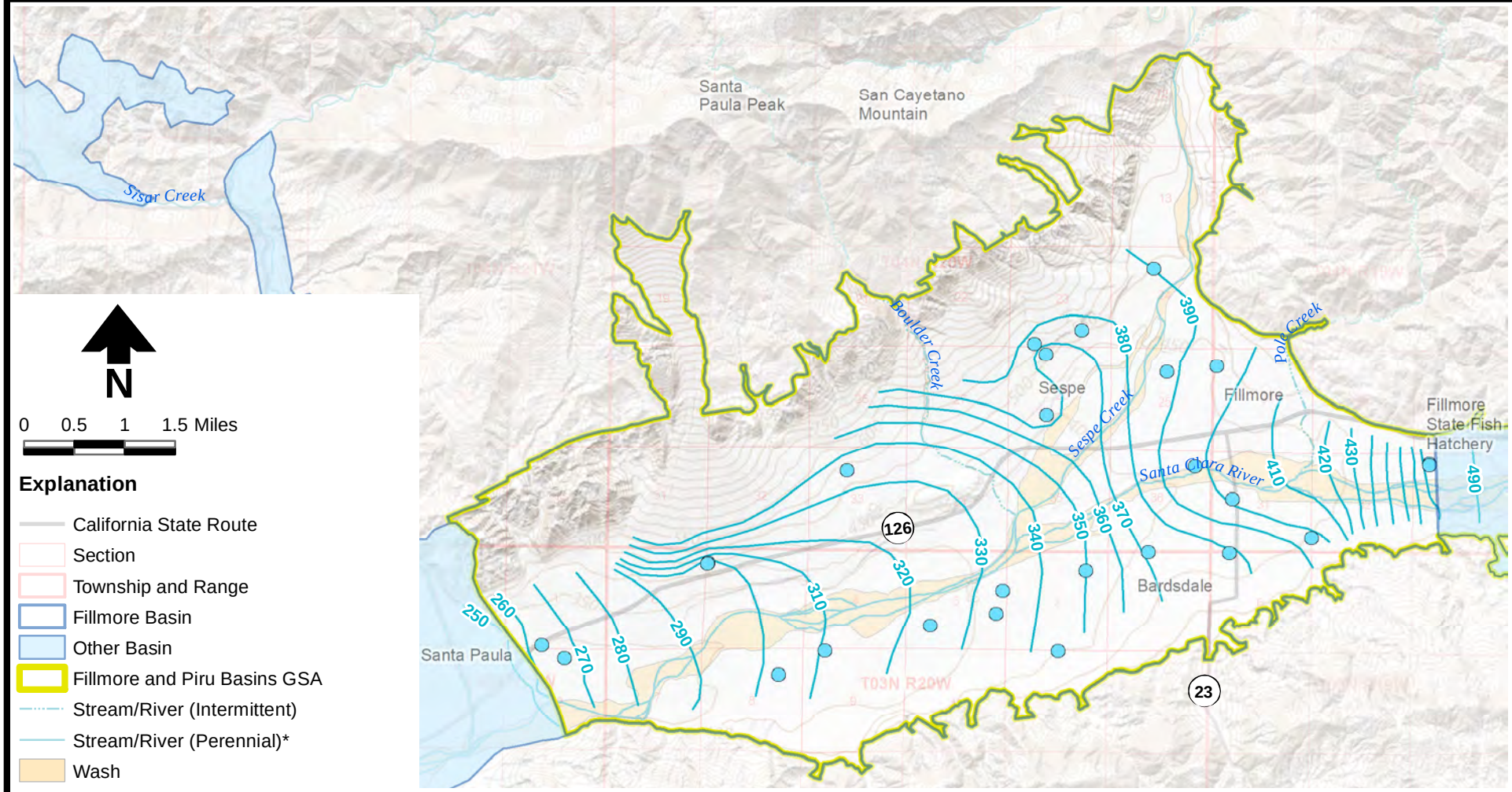
K:\PROJECTS\WATER RESOURCE SERVICES\PUBLIC\DB19.1084.00 FILLMORE PIRU BASINS GSP\GIS\MXDS\GSP\FILLMORE\FINAL\FIG_2.2-17_GWECONTOUR_PRINCIPAL_2019_FALL.MXD



N

0 0.5 1 1.5 Miles

Explanation

- California State Route
- Section
- Township and Range
- Fillmore Basin
- Other Basin
- Fillmore and Piru Basins GSA
- Stream/River (Intermittent)
- Stream/River (Perennial)*
- Wash
- Index Contours
- Intermediate Contours
- Well used for GWL contouring
- -360- GW Elevation Contour (Fall 2019)

Basemap: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021.

Notes:

* Perennial streams (designated by the U.S. Geological Survey [USGS] National Hydrography Dataset [NHD]) exhibit interrupted perennial (i.e., intermittent to ephemeral) conditions in the Santa Clara River Valley (Hanson et al., 2003; SFEI, 2011; Beller et al., 2016; United, 2017).

1. Land (index/intermediate) elevation contours are in feet relative to the North American Vertical Datum of 1988 (NAVD88).
2. GW elevation contours are provided at 10-foot intervals by United Water Conservation District, based on GWL data measured 9/9-11/14/2019, in feet relative to approximate mean sea level (ft-msl), the National Geodetic Vertical Datum of 1929 (NGVD29).
3. GWL: groundwater level

Fillmore and Piru Basins Groundwater Sustainability Agency

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet | Projection: Lambert Conformal Conic | Datum: North American 1983

Figure 2.2-17

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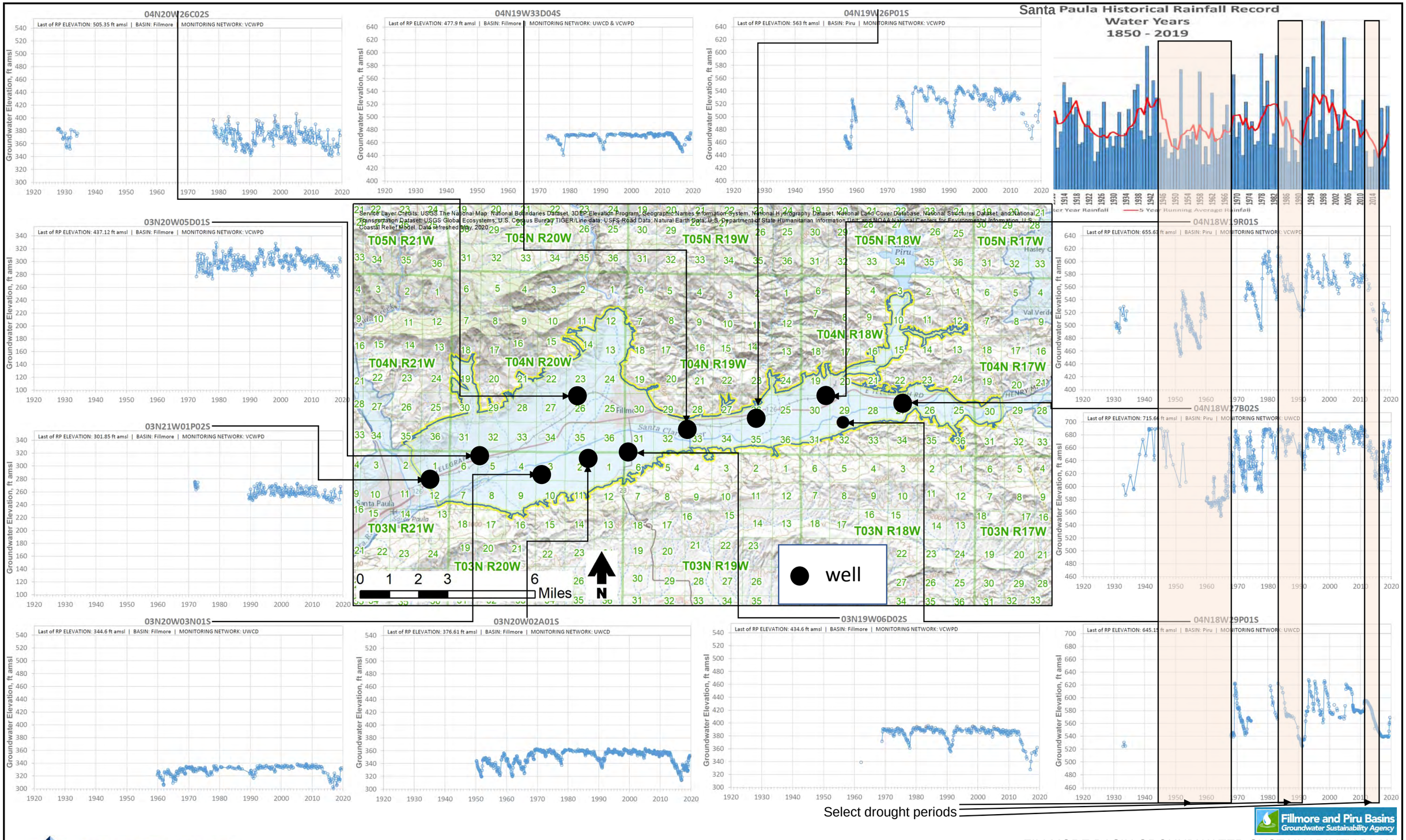
FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Groundwater Elevation Contours in the Principal Aquifer, Fall 2019

K:\Projects\Water Resource Services\Public\DB19.1084.00 Fillmore Piru Basins GSP\GSPs\Fillmore Basin GSP sections\figures\figures_Fillmore_2.2_tabloid.pptx



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FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Long-Term Groundwater Level Hydrographs in Map View

Figure 2.2-18

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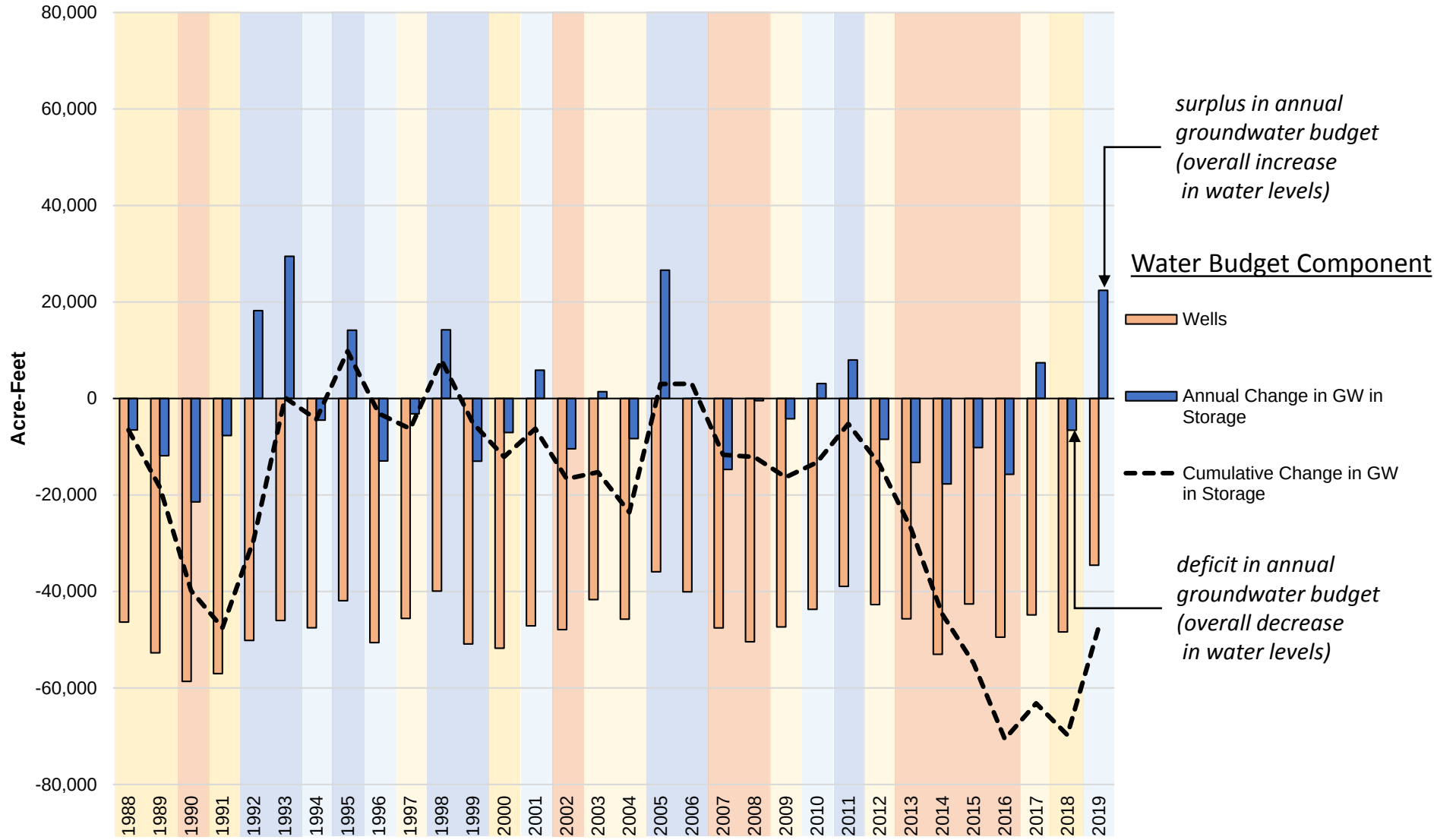

Notes:
- Information is from United (2021a,e)
- GW: groundwater

Fillmore and Piru Basins Groundwater Sustainability Agency

Figure 2.2-19

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Estimates of the Change in Groundwater in Storage

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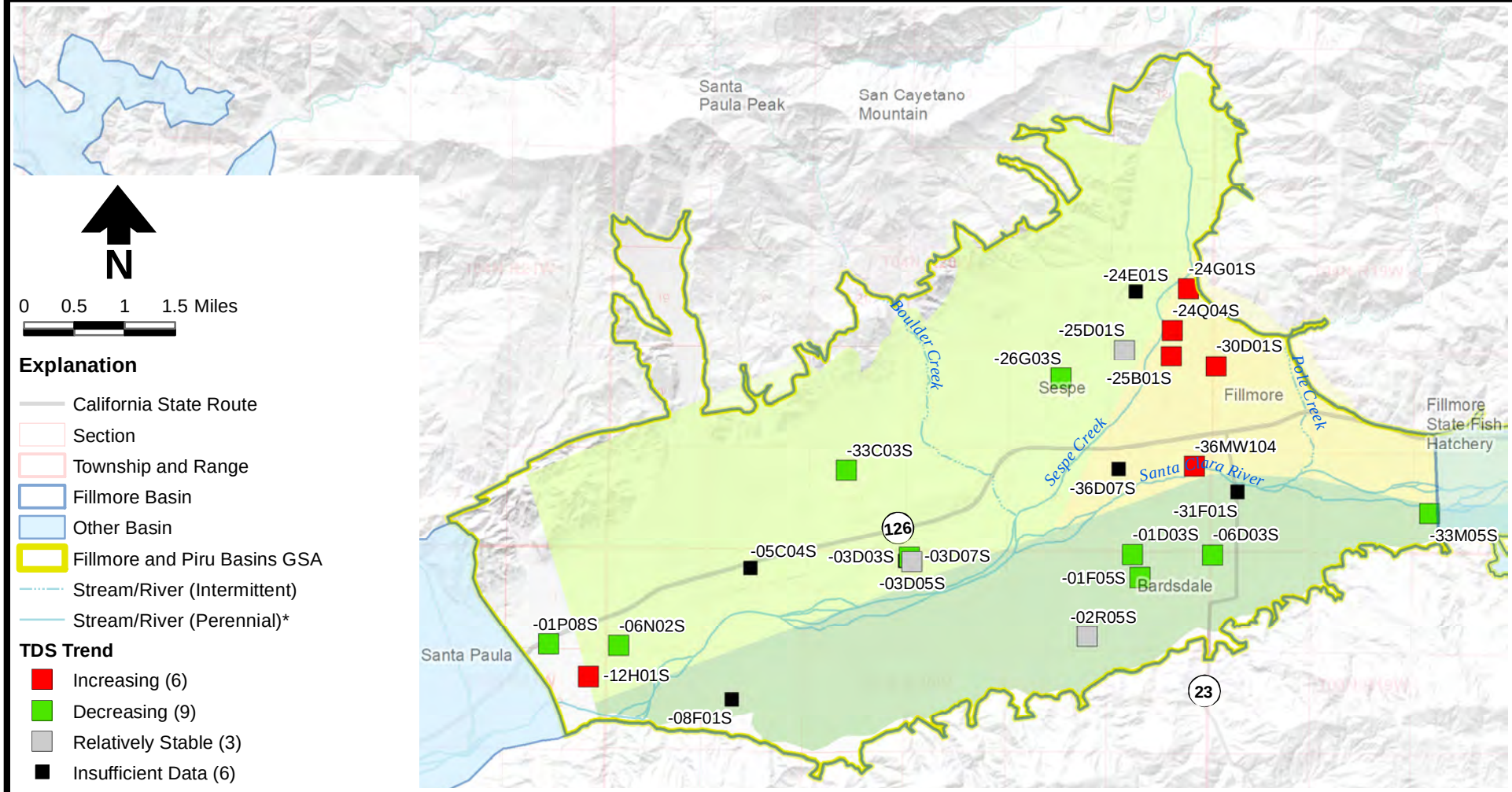
K:\PROJECTS\WATER RESOURCE SERVICES\PUBLIC\DB19.1084.00 FILLMORE PIRU BASINS GSP\GIS\MXDS\GSP\FILLMORE\FINAL\FIG_2.2-20_GWQ_TREND_TDS.MXD



N

0 0.5 1 1.5 Miles

Explanation

- California State Route
- Section
- Township and Range
- Fillmore Basin
- Other Basin
- Fillmore and Piru Basins GSA
- Stream/River (Intermittent)
- Stream/River (Perennial)*

TDS Trend

- Increasing (6)
- Decreasing (9)
- Relatively Stable (3)
- Insufficient Data (6)

SNMP WQ Objective Area

- Pole Creek Fan area
- Remaining Fillmore area
- South side of Santa Clara River

Basemap: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021.

Notes:

* Perennial streams (designated by the U.S. Geological Survey [USGS] National Hydrography Dataset [NHD]) exhibit interrupted perennial (i.e., intermittent to ephemeral) conditions in the Santa Clara River Valley (Hanson et al., 2003; SFEI, 2011; Beller et al., 2016; United, 2017).

1. Trends are quantified at wells with water quality (WQ) data available since 2000.
2. LARWQCB: Los Angeles Regional Water Quality Control Board
3. SNMP: Salt and Nutrient Management Plan, a component of the LARWQCB Basin Plan for Coastal Watersheds of Los Angeles and Ventura County
4. WQ Objective Area boundaries represent the original Department of Water Resources (DWR) Bulletin 118 basin boundaries.

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Map of Groundwater Quality Trends, Total Dissolved Solids (TDS)

Figure 2.2-20

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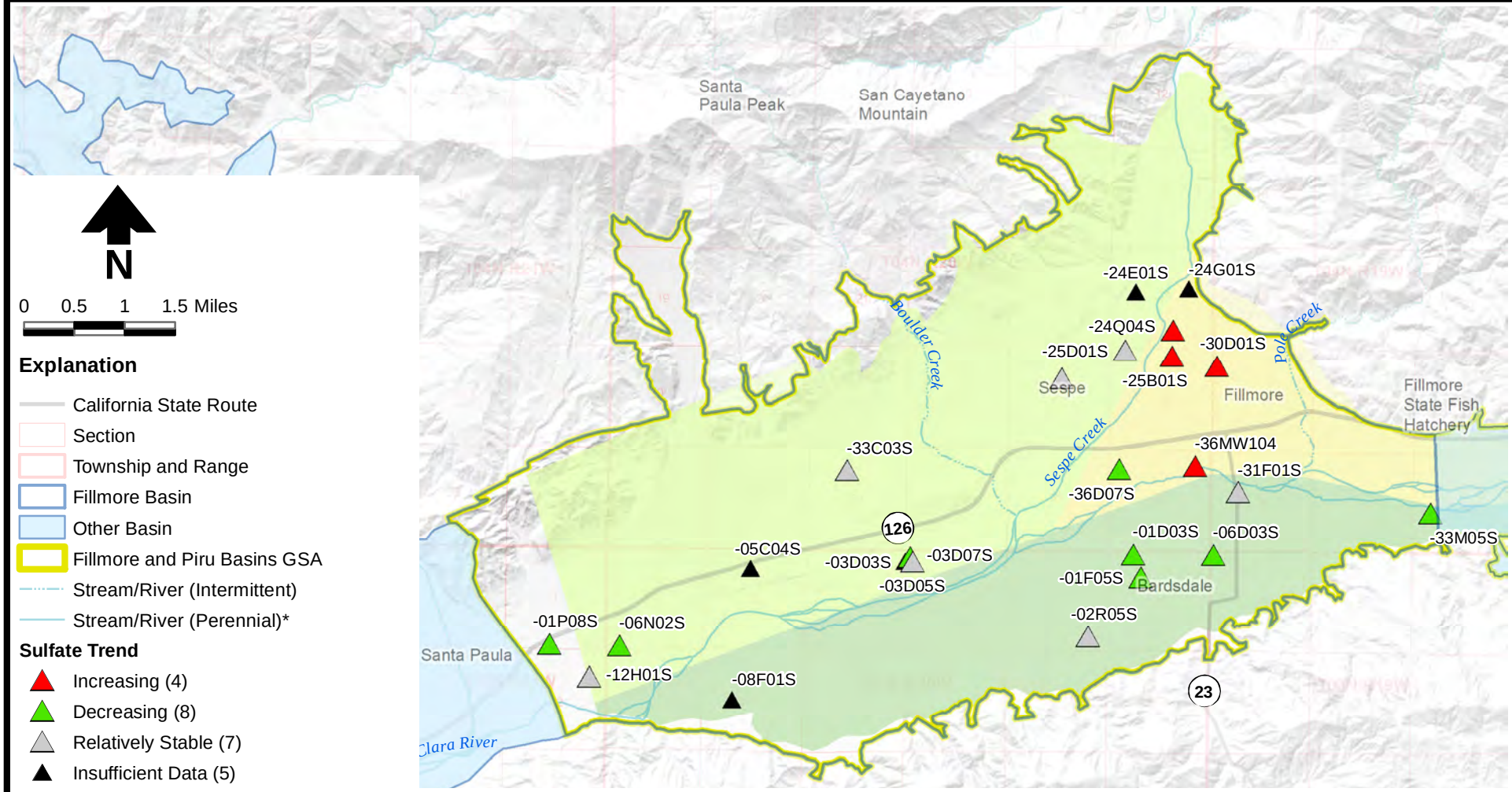
12/16/2021 DB19.1084

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet | Projection: Lambert Conformal Conic | Datum: North American 1983

K:\PROJECTS\WATER RESOURCE SERVICES\PUBLIC\DB19.1084.00 FILLMORE PIRU BASINS GSP\GIS\MXDS\GSP\FILLMORE\FINAL\FIG_2.2-21_GWQ_TREND_SO4.MXD



Basemap: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021.

Notes:

* Perennial streams (designated by the U.S. Geological Survey [USGS] National Hydrography Dataset [NHD]) exhibit interrupted perennial (i.e., intermittent to ephemeral) conditions in the Santa Clara River Valley (Hanson et al., 2003; SFEI, 2011; Beller et al., 2016; United, 2017).

1. Trends are quantified at wells with water quality (WQ) data available since 2000.
2. LARWQCB: Los Angeles Regional Water Quality Control Board
3. SNMP: Salt and Nutrient Management Plan, a component of the LARWQCB Basin Plan for Coastal Watersheds of Los Angeles and Ventura County
4. WQ Objective Area boundaries represent the original Department of Water Resources (DWR) Bulletin 118 basin boundaries.

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Map of Groundwater Quality Trends, Sulfate (SO4)

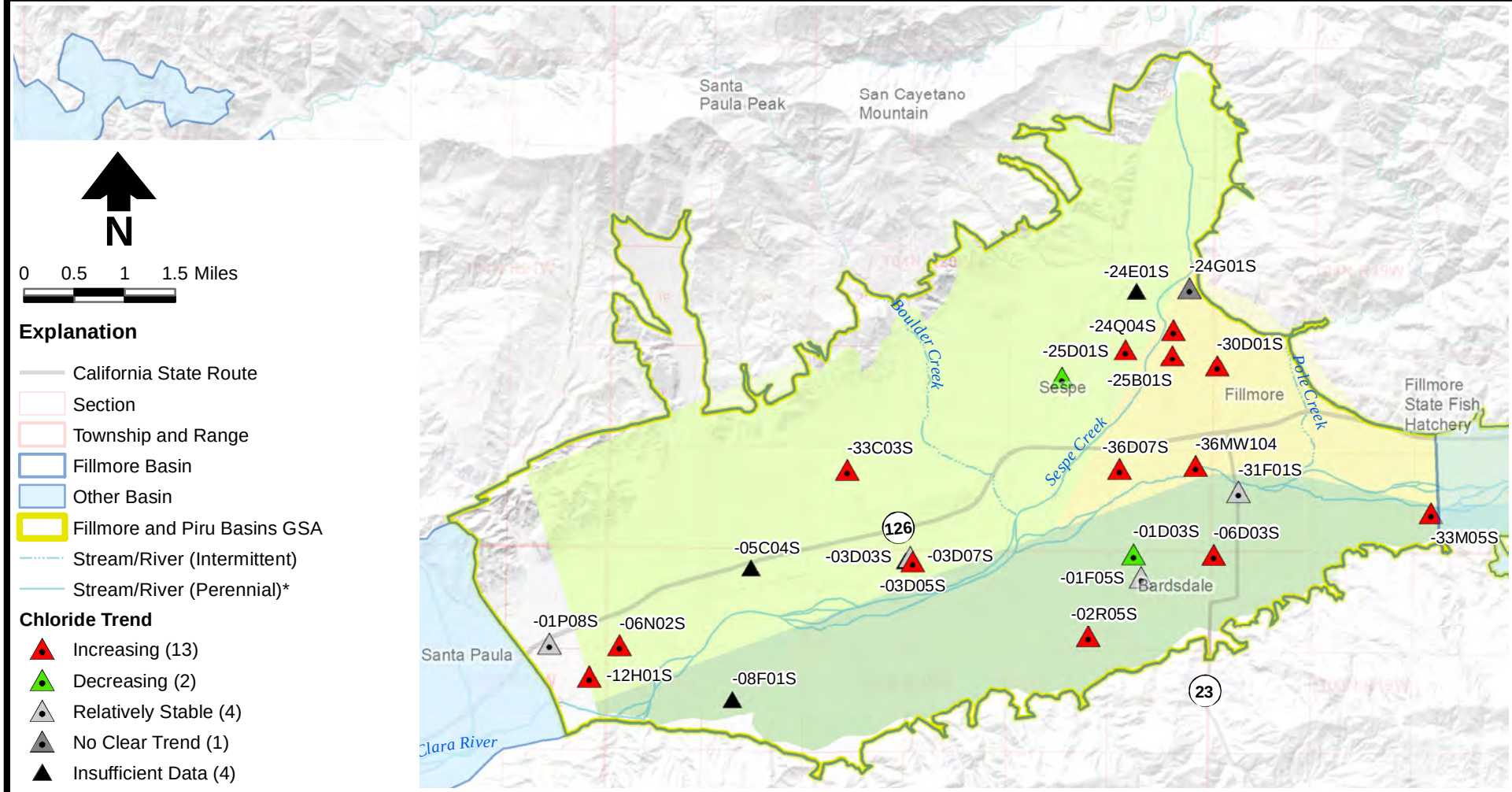
Figure 2.2-21

DBS&A Daniel B. Stephens & Associates, Inc.

12/16/2021 DB19.1084

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet | Projection: Lambert Conformal Conic | Datum: North American 1983

K:\PROJECTS\WATER RESOURCE SERVICES\PUBLIC\DB19.1084.00 FILLMORE PIRU BASINS GSP\GIS\MXDS\GSP\FILLMORE\FINAL\FIG_2.2-22_GWQ_TREND_CL.MXD



N

0 0.5 1 1.5 Miles

Explanation

- California State Route
- Section
- Township and Range
- Fillmore Basin
- Other Basin
- Fillmore and Piru Basins GSA
- Stream/River (Intermittent)
- Stream/River (Perennial)*

Chloride Trend

- Increasing (13)
- Decreasing (2)
- Relatively Stable (4)
- No Clear Trend (1)
- Insufficient Data (4)

SNMP WQ Objective Area

- Pole Creek Fan area
- Remaining Fillmore area
- South side of Santa Clara River

Basemap: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021.

Notes:

* Perennial streams (designated by the U.S. Geological Survey [USGS] National Hydrography Dataset [NHD]) exhibit interrupted perennial (i.e., intermittent to ephemeral) conditions in the Santa Clara River Valley (Hanson et al., 2003; SFEI, 2011; Beller et al., 2016; United, 2017).

1. Trends are quantified at wells with water quality (WQ) data available since 2000.
2. LARWQCB: Los Angeles Regional Water Quality Control Board
3. SNMP: Salt and Nutrient Management Plan, a component of the LARWQCB Basin Plan for Coastal Watersheds of Los Angeles and Ventura County
4. WQ Objective Area boundaries represent the original Department of Water Resources (DWR) Bulletin 118 basin boundaries.

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Map of Groundwater Quality Trends, Chloride (Cl)

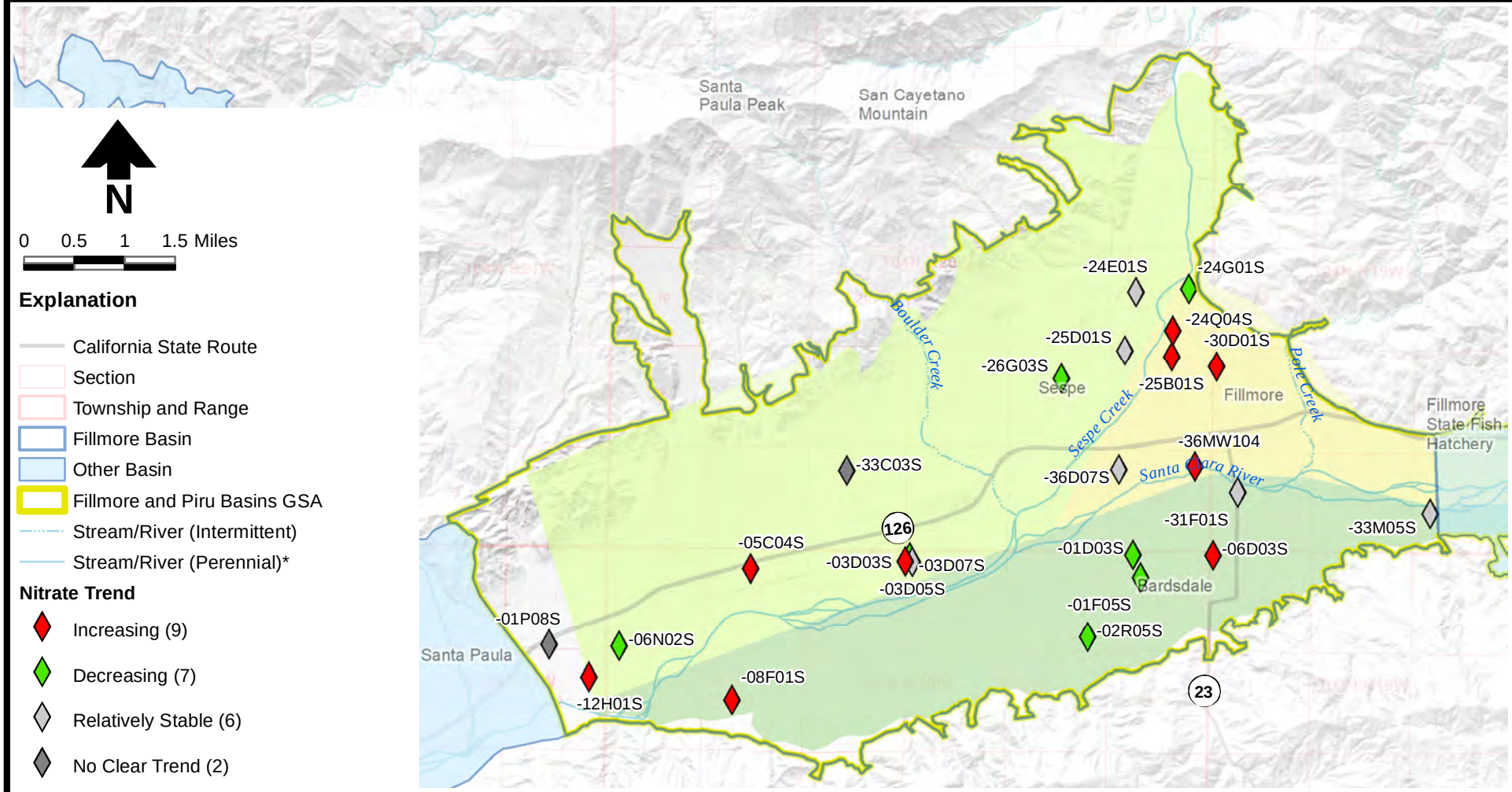
Figure 2.2-22

DBS&A Daniel B. Stephens & Associates, Inc.

12/16/2021 DB19.1084

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet | Projection: Lambert Conformal Conic | Datum: North American 1983

K:\PROJECTS\WATER RESOURCE SERVICES\PUBLIC\DB19.1084.00 FILLMORE PIRU BASINS GSP\GIS\MXDS\GSP\FILLMORE\FINAL\FIG_2.2-23_GWQ_TREND_NO3.MXD



Explanation

- California State Route
- Section
- Township and Range
- Fillmore Basin
- Other Basin
- Fillmore and Piru Basins GSA
- Stream/River (Intermittent)
- Stream/River (Perennial)*

Nitrate Trend

- Increasing (9)
- Decreasing (7)
- Relatively Stable (6)
- No Clear Trend (2)

SNMP WQ Objective Area

- Pole Creek Fan area
- Remaining Fillmore area
- South side of Santa Clara River

Basemap: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021.

Notes:

* Perennial streams (designated by the U.S. Geological Survey [USGS] National Hydrography Dataset [NHD]) exhibit interrupted perennial (i.e., intermittent to ephemeral) conditions in the Santa Clara River Valley (Hanson et al., 2003; SFEI, 2011; Beller et al., 2016; United, 2017).

1. Trends are quantified at wells with water quality (WQ) data available since 2000.
2. LARWQCB: Los Angeles Regional Water Quality Control Board
3. SNMP: Salt and Nutrient Management Plan, a component of the LARWQCB Basin Plan for Coastal Watersheds of Los Angeles and Ventura County
4. WQ Objective Area boundaries represent the original Department of Water Resources (DWR) Bulletin 118 basin boundaries.

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Map of Groundwater Quality Trends, Nitrate (NO3)

Figure 2.2-23

DBS&A Daniel B. Stephens & Associates, Inc.

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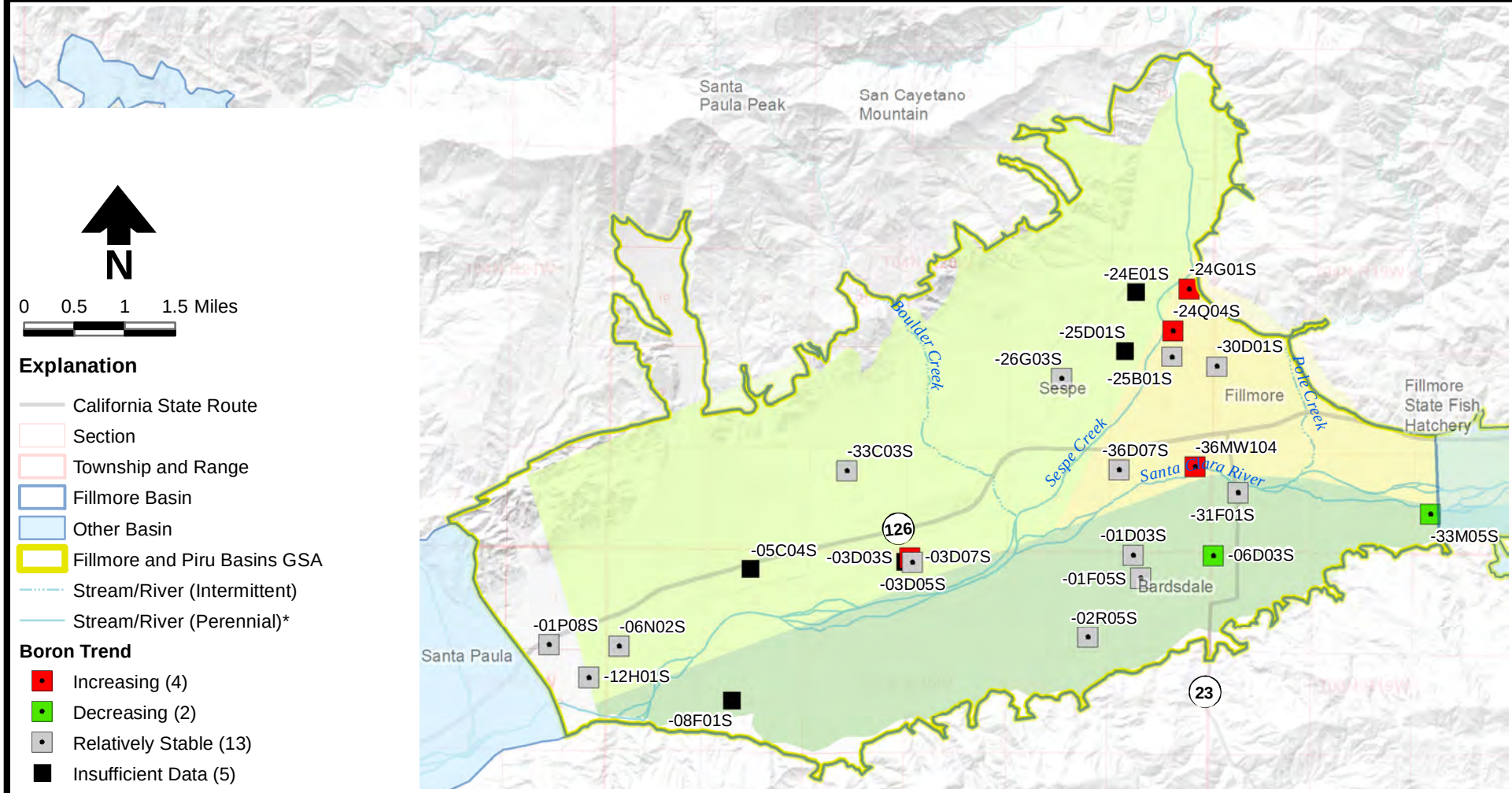
Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet | Projection: Lambert Conformal Conic | Datum: North American 1983

K:\PROJECTS\WATER RESOURCE SERVICES\PUBLIC\DB19.1084.00 FILLMORE PIRU BASINS GSP\GIS\MXDS\GSP\FILLMORE\FINAL\FIG_2.2-24_GWQ_TREND_B.MXD



N

0 0.5 1 1.5 Miles

Explanation

- California State Route
- Section
- Township and Range
- Fillmore Basin
- Other Basin
- Fillmore and Piru Basins GSA
- Stream/River (Intermittent)
- Stream/River (Perennial)*

Boron Trend

- Increasing (4)
- Decreasing (2)
- Relatively Stable (13)
- Insufficient Data (5)

SNMP WQ Objective Area

- Pole Creek Fan area
- Remaining Fillmore area
- South side of Santa Clara River

Basemap: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021.

Notes:

* Perennial streams (designated by the U.S. Geological Survey [USGS] National Hydrography Dataset [NHD]) exhibit interrupted perennial (i.e., intermittent to ephemeral) conditions in the Santa Clara River Valley (Hanson et al., 2003; SFEI, 2011; Beller et al., 2016; United, 2017).

1. Trends are quantified at wells with water quality (WQ) data available since 2000.
2. LARWQCB: Los Angeles Regional Water Quality Control Board
3. SNMP: Salt and Nutrient Management Plan, a component of the LARWQCB Basin Plan for Coastal Watersheds of Los Angeles and Ventura County
4. WQ Objective Area boundaries represent the original Department of Water Resources (DWR) Bulletin 118 basin boundaries.

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Map of Groundwater Quality Trends, Boron (B)

Figure 2.2-24

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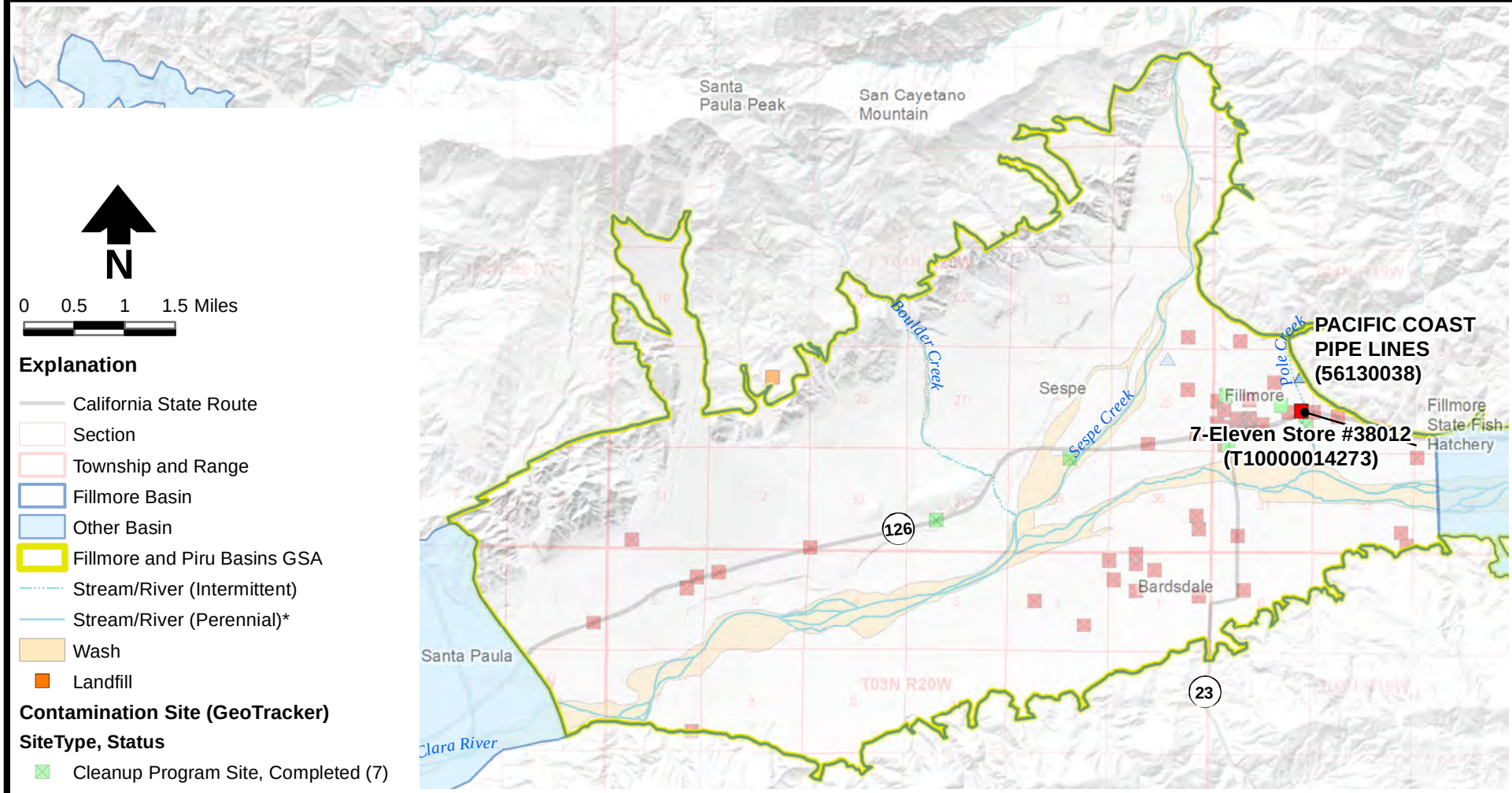
Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet | Projection: Lambert Conformal Conic | Datum: North American 1983

K:\PROJECTS\WATER RESOURCE SERVICES\PUBLIC\DB19.1084.00 FILLMORE PIRU BASINS GSP\GIS\MXDS\GSP\FILLMORE\FINAL\FIG_2.2-25_GWQ_CONTAMINATIONSITES.MXD



N

0 0.5 1 1.5 Miles

Explanation

- California State Route
- Section
- Township and Range
- Fillmore Basin
- Other Basin
- Fillmore and Piru Basins GSA
- Stream/River (Intermittent)
- Stream/River (Perennial)*
- Wash
- Landfill

Contamination Site (GeoTracker)

SiteType, Status

- Cleanup Program Site, Completed (7)
- Cleanup Program Site, Open (2)
- DTSC (2)
- LUST Cleanup Site, Completed (54)
- LUST Cleanup Site, Open (1)

Basemap: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021.

Notes:

* Perennial streams (designated by the U.S. Geological Survey [USGS] National Hydrography Dataset [NHD]) exhibit interrupted perennial (i.e., intermittent to ephemeral) conditions in the Santa Clara River Valley (Hanson et al., 2003; SFEI, 2011; Beller et al., 2016; United, 2017).

1. SWRCB: State Water Resources Control Board
2. Known contamination sites from SWRCB GeoTracker database (as of July 21, 2021) that have affected groundawter are shown in solid color (e.g., the 2 sites in the City of Fillmore), while other sites with insignificant impacts on groundwater are transparent.
3. DTSC: Department of Toxic Substances Control
4. LUST: Leaky Underground Storage Tank

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet | Projection: Lambert Conformal Conic | Datum: North American 1983

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Known Groundwater Contamination Sites Map

Figure 2.2-25

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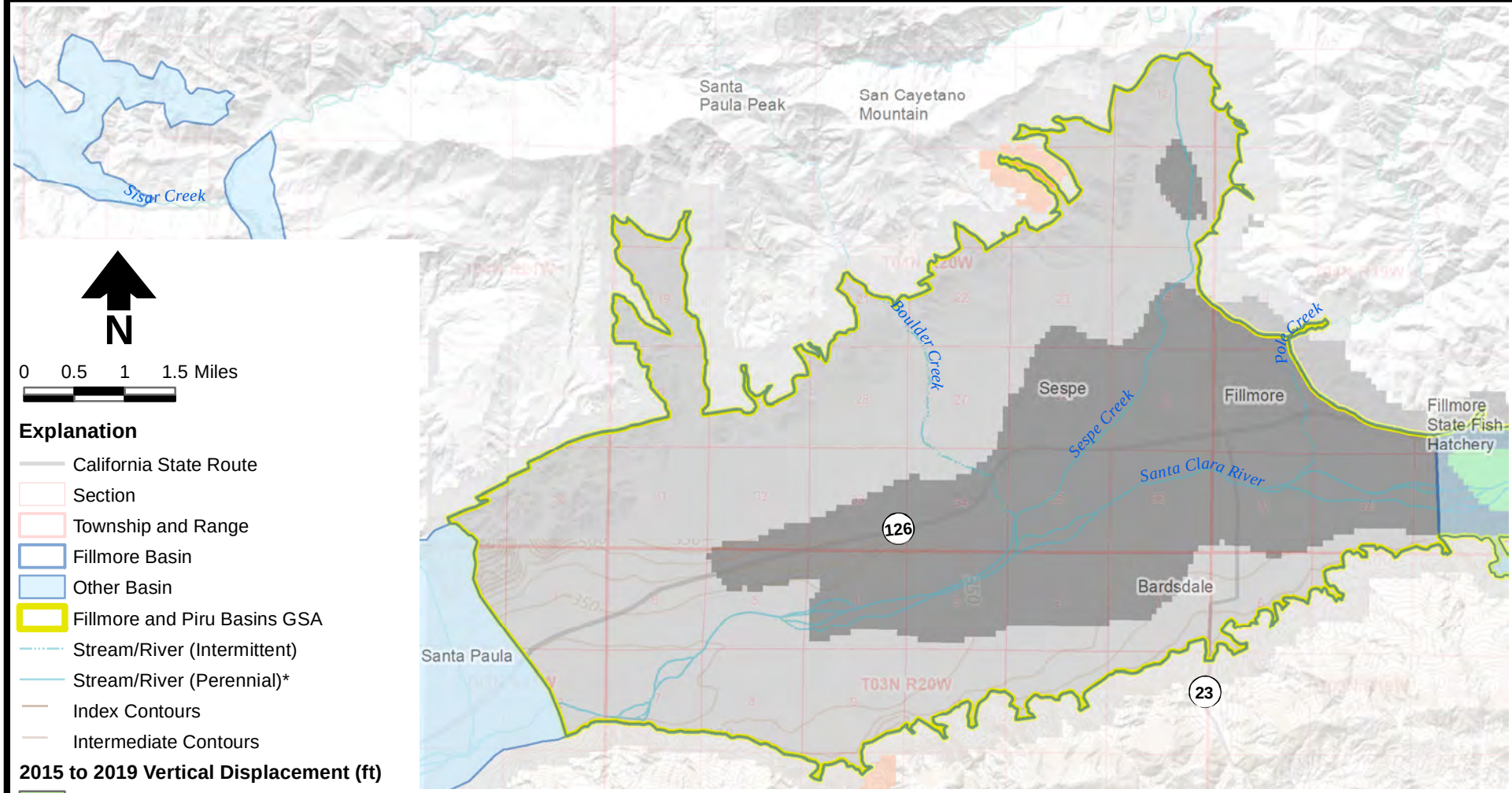
K:\PROJECTS\WATER RESOURCE SERVICES\PUBLIC\DB19.1084.00 FILLMORE PIRU BASINS GSP\GIS\MXDS\GSP\FILLMORE\FINAL\FIG_2.2-26_CUMULATIVESUBSIDENCEINSAR.MXD



Explanation

- California State Route
- Section
- Township and Range
- Fillmore Basin
- Other Basin
- Fillmore and Piru Basins GSA
- Stream/River (Intermittent)
- Stream/River (Perennial)*
- Index Contours
- Intermediate Contours

2015 to 2019 Vertical Displacement (ft)

- +0.05 to +0.1
- 0.00 to +0.05
- -0.05 to 0.00
- -0.1 to -0.05

Basemap: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021.

Notes:

* Perennial streams (designated by the U.S. Geological Survey [USGS] National Hydrography Dataset [NHD]) exhibit interrupted perennial (i.e., intermittent to ephemeral) conditions in the Santa Clara River Valley (Hanson et al., 2003; SFEI, 2011; Beller et al., 2016; United, 2017).

1. Cumulative land subsidence measurements come from TRE Altimira Interferometric Synthetic Aperture Radar (InSAR), via DWR.
   a. Cumulative subsidence (vertical displacement) values are insignificant (i.e., within the range of error) +/-0.1 foot.
2. Land (index/intermediate) elevation contours are in feet relative to the North American Vertical Datum of 1988 (NAVD88).

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet | Projection: Lambert Conformal Conic | Datum: North American 1983

Figure 2.2-26

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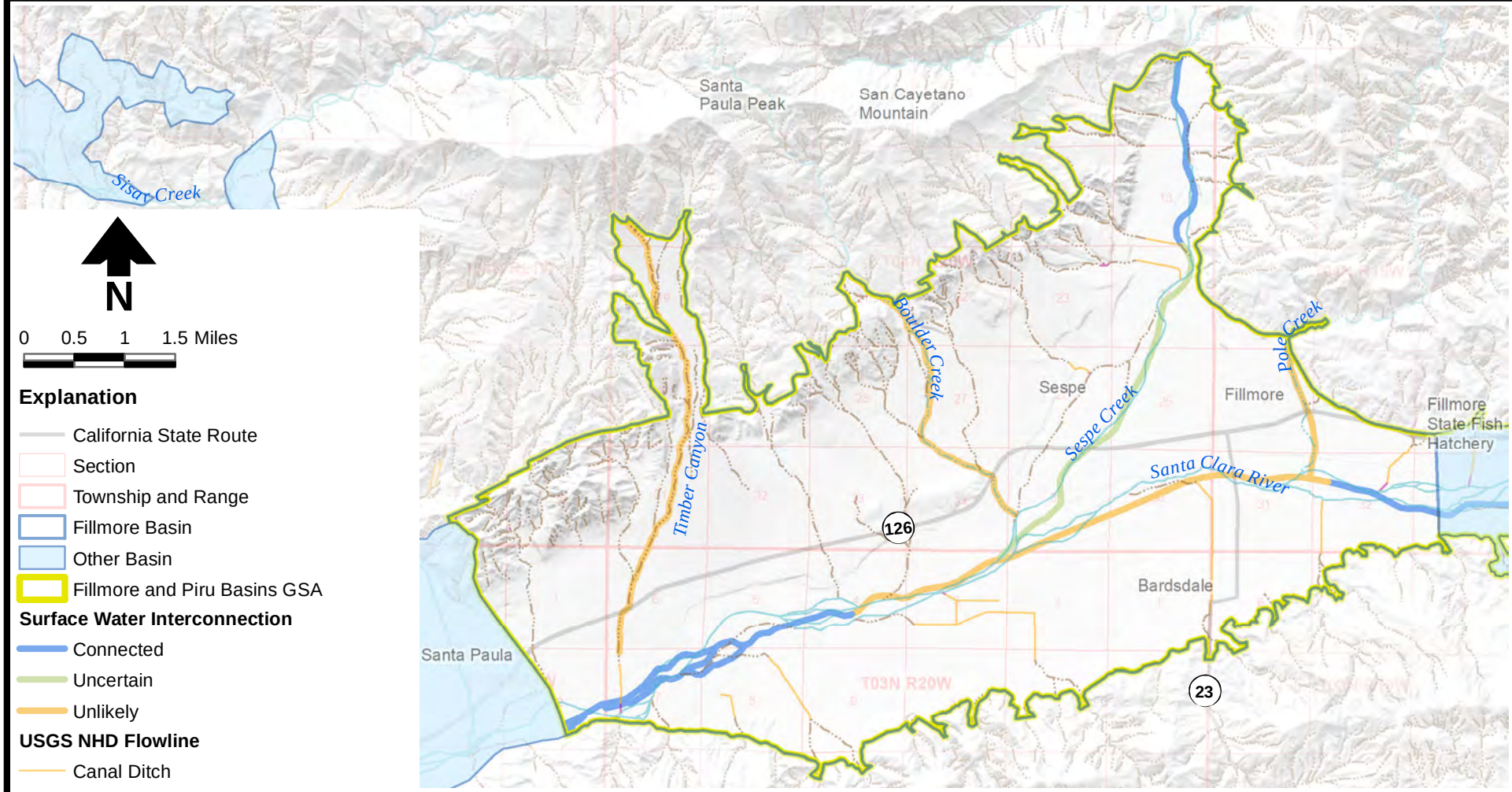
Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Cumulative Land Subsidence Map

K:\PROJECTS\WATER RESOURCE SERVICES\PUBLIC\DB19.1084.00 FILLMORE PIRU BASINS GSP\GIS\MXDS\GSP\FILLMORE\FINAL\FIG_2.2-27_SW_INTERCONNECTEDMAP.MXD



N

0 0.5 1 1.5 Miles

Explanation

- California State Route
- Section
- Township and Range
- Fillmore Basin
- Other Basin
- Fillmore and Piru Basins GSA

Surface Water Interconnection

- Connected
- Uncertain
- Unlikely

USGS NHD Flowline

- Canal Ditch
- Stream/River (Intermittent)
- Stream/River (Perennial)*
- Stream/River (Ephemeral)
- Artificial Path

Basemap: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021.

Notes:

* Perennial streams (designated by the U.S. Geological Survey [USGS] National Hydrography Dataset [NHD]) exhibit interrupted perennial (i.e., intermittent to ephemeral) conditions in the Santa Clara River Valley (Hanson et al., 2003; SFEI, 2011; Beller et al., 2016; United, 2017).

1. Surface water interconnection (with groundwater) is conceptualized per Stillwater Sciences (2021a).

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet | Projection: Lambert Conformal Conic | Datum: North American 1983

Figure 2.2-27

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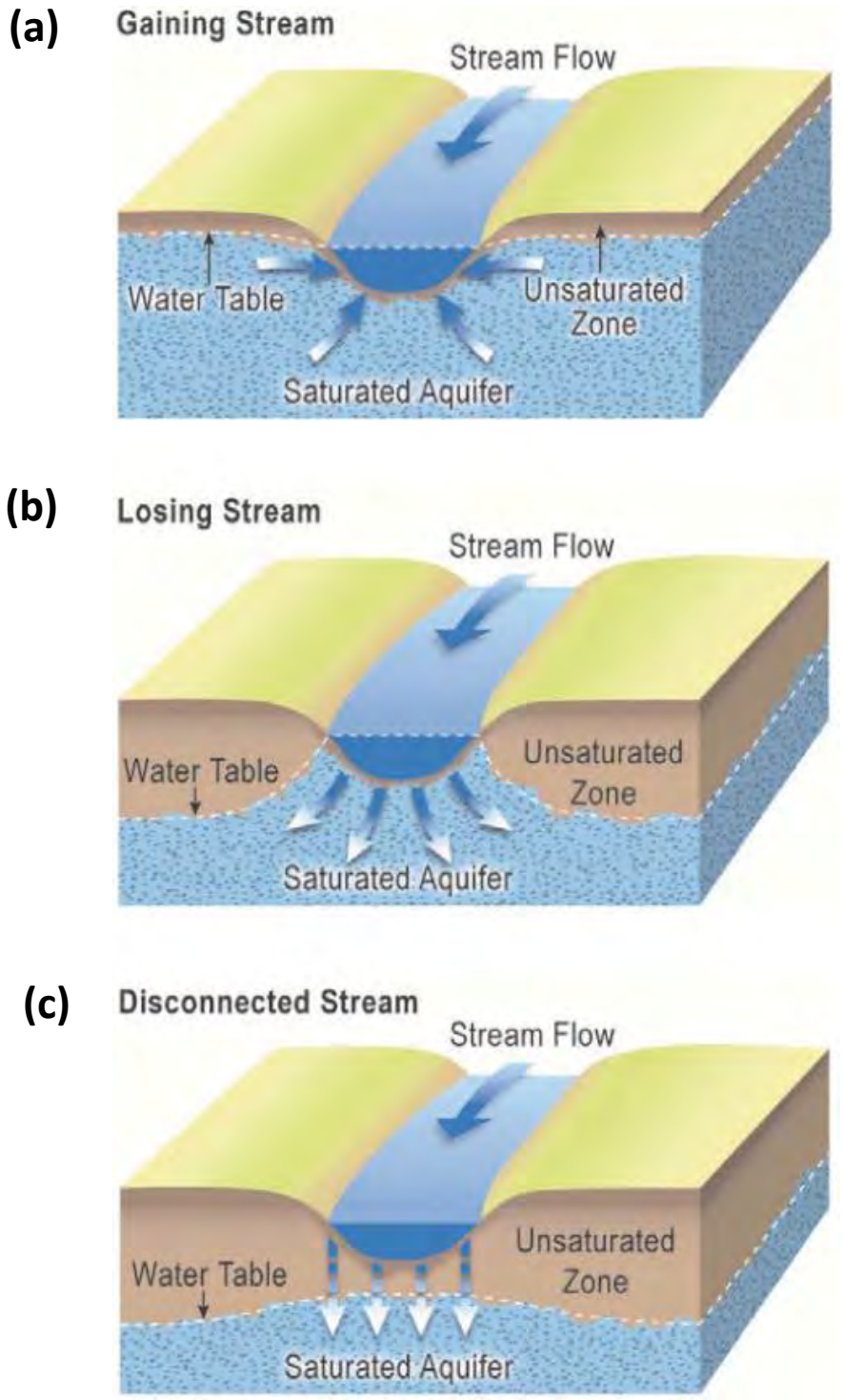
12/16/2021 DB19.1084

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Interconnected Surface Water Reaches Map



Notes:
- Figure is from DWR (2018d).
- Gaining stream conditions are similar to interconnected "rising" groundwater conditions.
- Losing stream conditions represent stream recharge (or induced recharge due to stream flow depletions) to interconnected groundwater.
- Disconnected stream conditions represent stream segments where groundwater levels are too deep to affect surface water depletion rates, yet streams continue to recharge groundwater at relatively high rates (i.e., due to large hydraulic gradients between surface water and groundwater).

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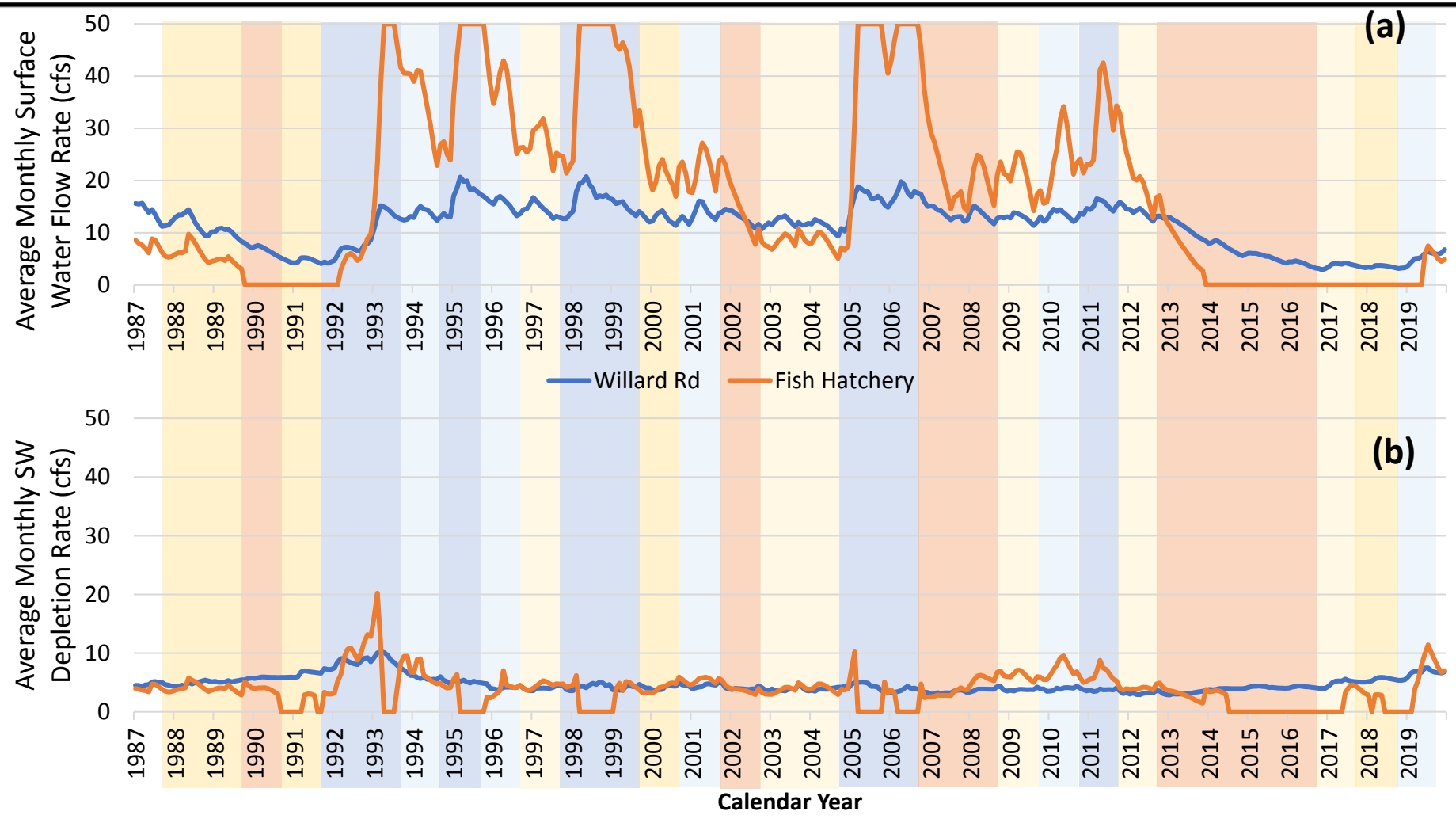


Notes:

- SW: surface water
- cfs: cubic feet per second (flow rate); 1 cfs = ~724 acre-feet/year (AFY).
- Surface water flow rates are estimated based on strong correlations between measured groundwater levels and surface water flows (United, 2017, 2021a,e).
- Surface water depletion rates are calculated based on the difference in surface water flows, estimated from correlations with groundwater levels simulated with United groundwater flow model (VRGWFM; United 2021a) scenarios that represent historical pumping rates and historical pumping rates reduced by 50% (no pumping within 1-mile band centered along the Santa Clara River).

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

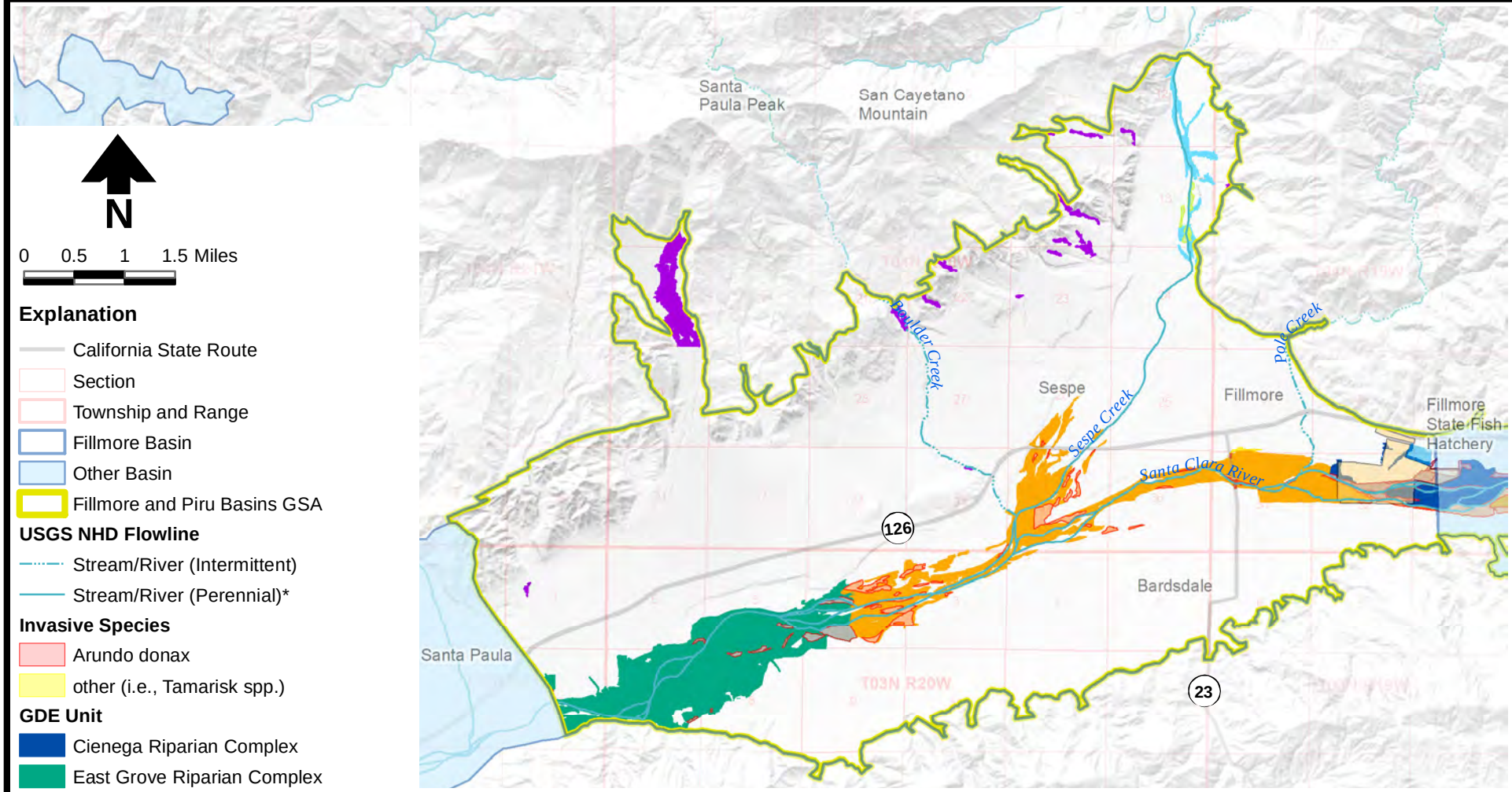
Surface Water Flow and Depletion Rate Estimates at the Areas of Rising Groundwater

Figure 2.2-29

DBS&A Daniel B. Stephens & Associates, Inc.

12/16/2021 DB19.1084

K:\PROJECTS\WATER RESOURCE SERVICES\PUBLIC\DB19.1084.00 FILLMORE PIRU BASINS GSP\GIS\MXDS\GSP\FILLMORE\FINAL\FIG_2.2-30_GDEUNITS.MXD



N

0 0.5 1 1.5 Miles

Explanation

- California State Route
- Section
- Township and Range
- Fillmore Basin
- Other Basin
- Fillmore and Piru Basins GSA

USGS NHD Flowline

- Stream/River (Intermittent)
- Stream/River (Perennial)*

Invasive Species

- Arundo donax
- other (i.e., Tamarisk spp.)

GDE Unit

- Cienega Riparian Complex
- East Grove Riparian Complex
- Santa Clara River Riparian Shrubland
- Sespe Creek Riparian
- Tributary Riparian

CDFW Lands and Easements

- Ecological Reserve
- Fish Hatchery

Basemap: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021.

Notes:

* Perennial streams (designated by the U.S. Geological Survey [USGS] National Hydrography Dataset [NHD]) exhibit interrupted perennial (i.e., intermittent to ephemeral) conditions in the Santa Clara River Valley (Hanson et al., 2003; SFEI, 2011; Beller et al., 2016; United, 2017).

1. GDE: groundwater-dependent ecosystem
2. GDE unit and invasive species' extents are from Stillwater Sciences (2021a).
3. CDFW: California Department of Fish and Wildlife

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet | Projection: Lambert Conformal Conic | Datum: North American 1983

Figure 2.2-30

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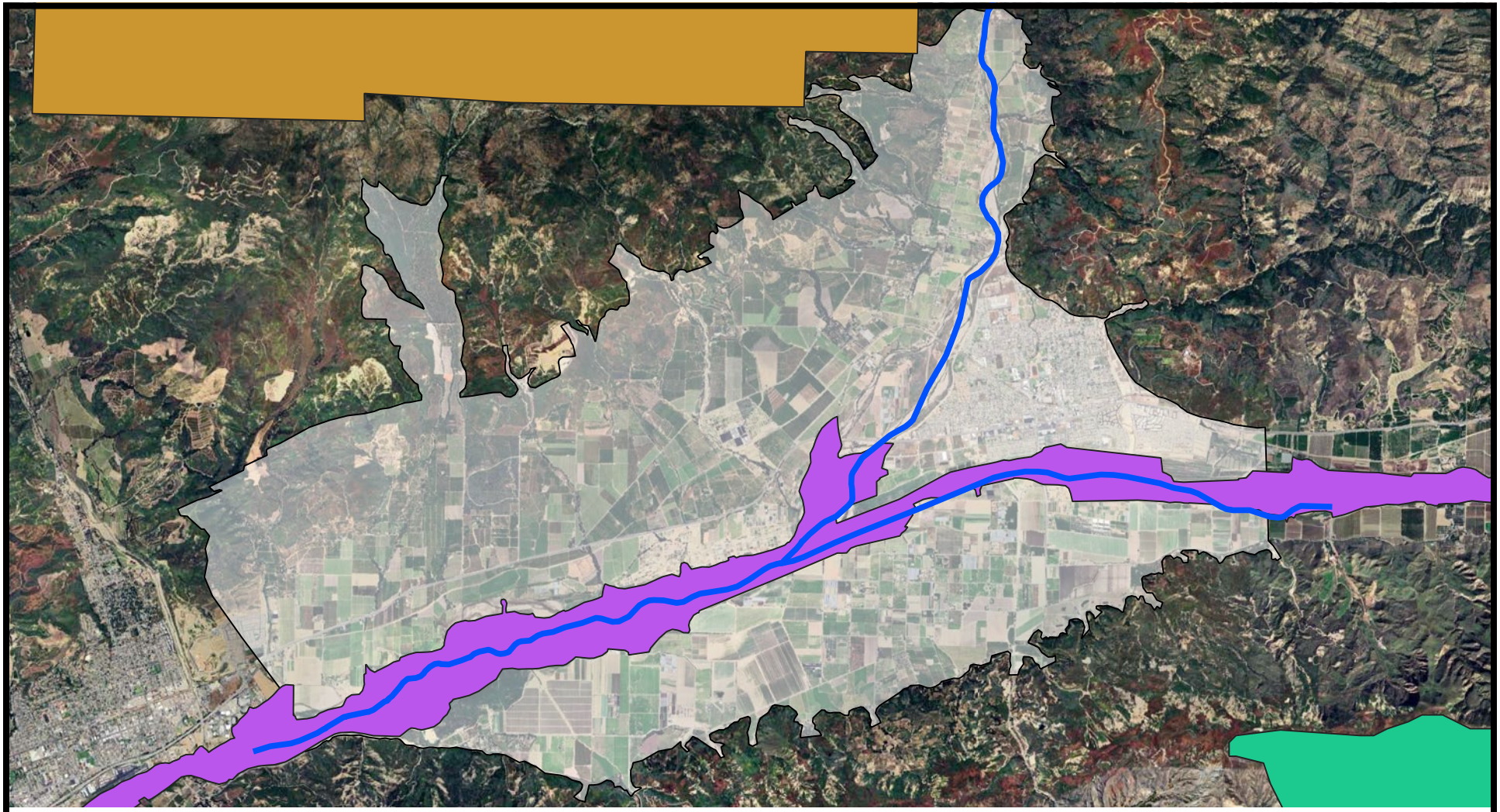
Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Groundwater Dependent Ecosystem (GDE) Units Map



Sources: USFWS, NMFS

Explanation

Critical Habitat (USFWS)
- California condor
- Southwestern willow flycatcher
- Coastal California gnatcatcher

Beneficial Use Designation (NMFS)
- spawning, rearing, migration

Groundwater Basin Boundary

0 0.5 1 mi

N

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

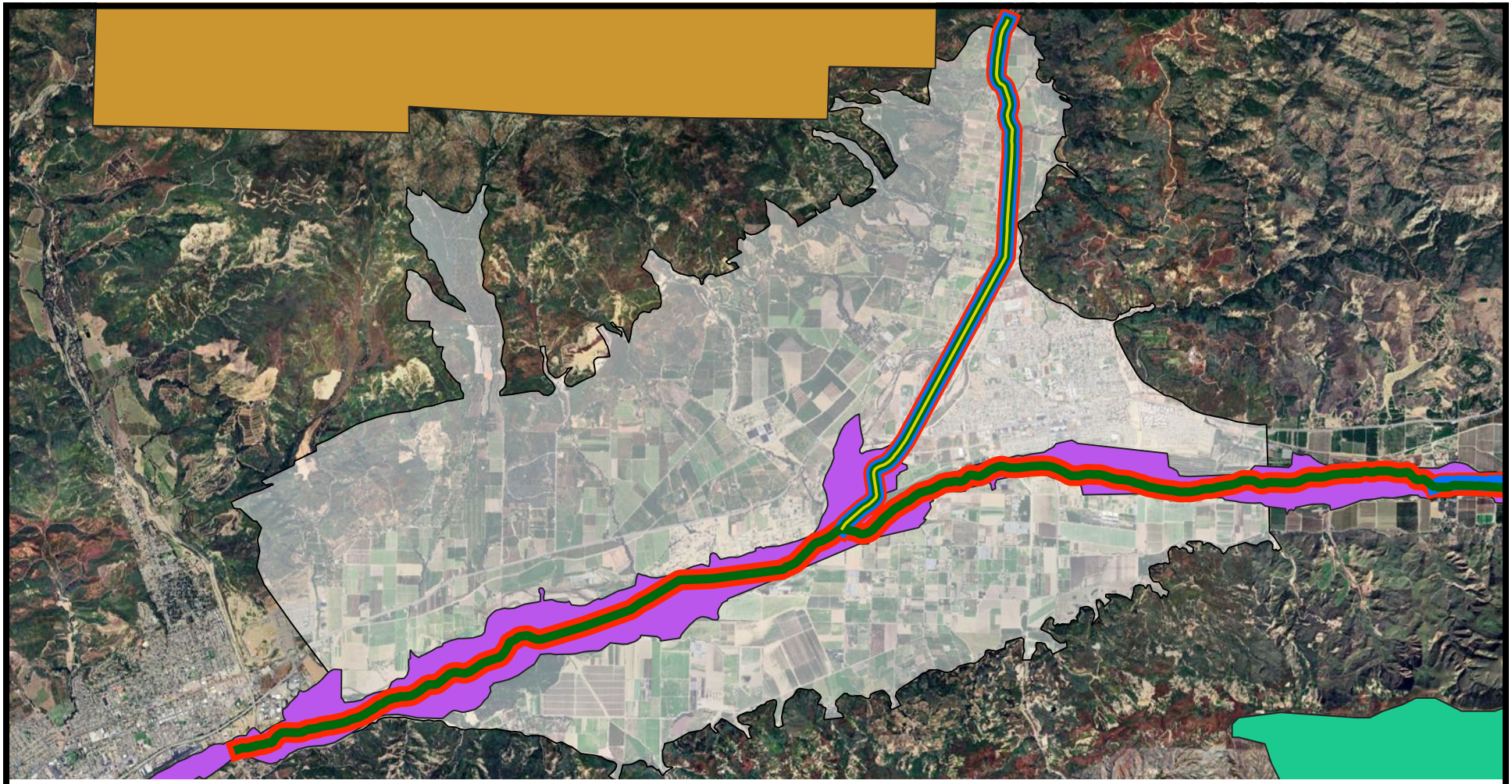
Critical Habitat and Designated Beneficial Uses NMFS

DBS&A a Geo-Logic Company

06/14/2024 DB23.1279

Figure 2.2-31

C:\Users\500\OneDrive - Geo-Logic Associates Inc\Documents\Local Project Files\Fillmore-Piru\GIS\QGZs\Fillmore GSP.qgz



Sources: USFWS, LARWQCB

Explanation

Critical Habitat (USFWS)
- California condor
- Southwestern willow flycatcher
- Coastal California gnatcatcher

Beneficial Use Designation (LARWQCB)
- Spawning
- Migration
- Cold Freshwater Habitat
- Warm Freshwater Habitat

Groundwater Basin Boundary

0 0.5 1 mi

N

Notes:
1. Not all LARWQCB designated beneficial uses shown for visualization purposes.

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Critical Habitat and Designated Beneficial Uses LARWQCB

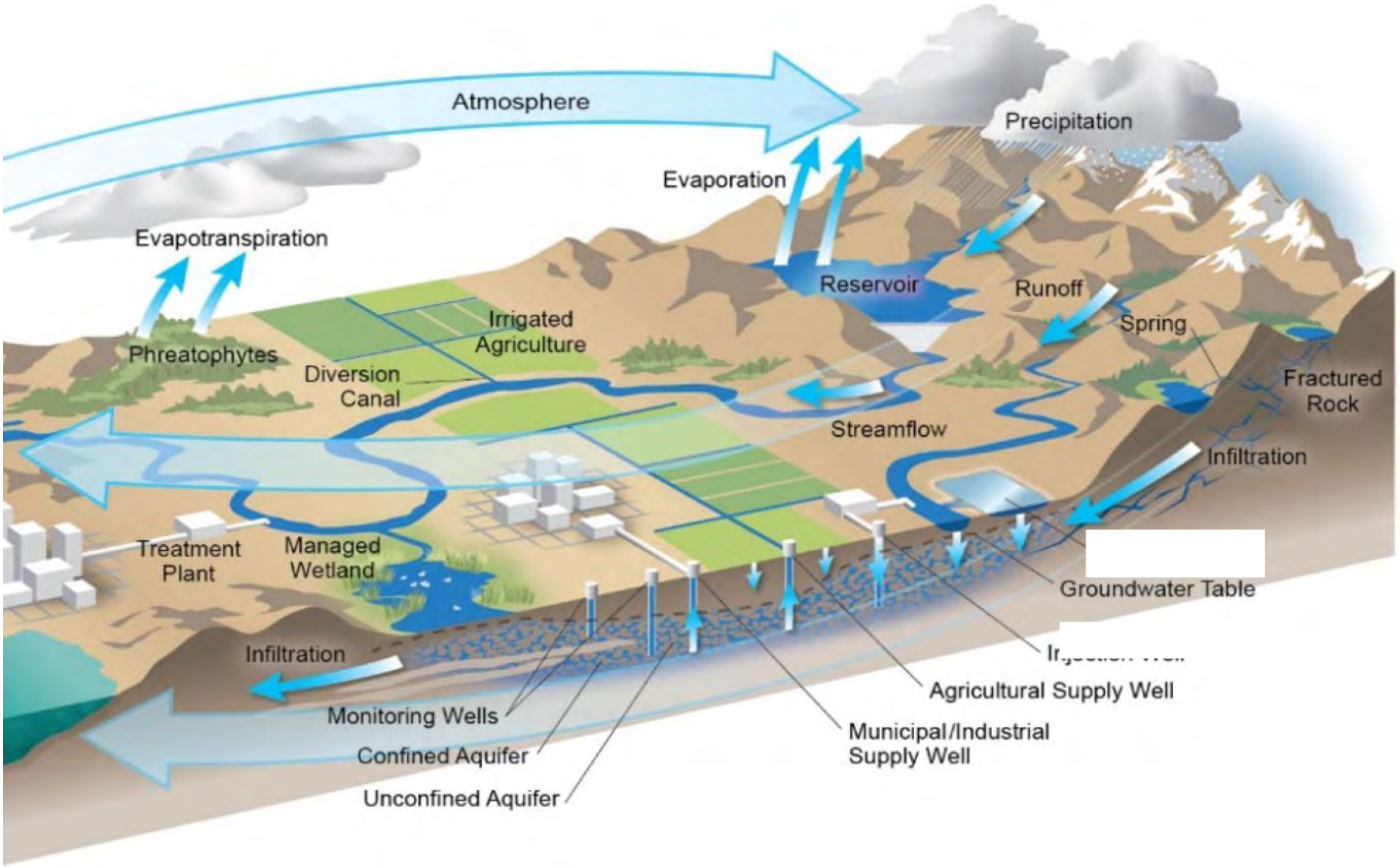
DBS&A a Geo-Logic Company

06/14/2024

DB23.1279

Figure 2.2-32

C:\Users\500\OneDrive - Geo-Logic Associates Inc\Documents\Local Project Files\Fillmore-Piru\GIS\QGZs\Fillmore GSP.qgz



Notes:
- Figure is modified from DWR, 2016d.

Figure 2.2-33

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Water Budget Schematic

DBS&A Daniel B. Stephens & Associates, Inc.

12/16/2021 DB19.1084

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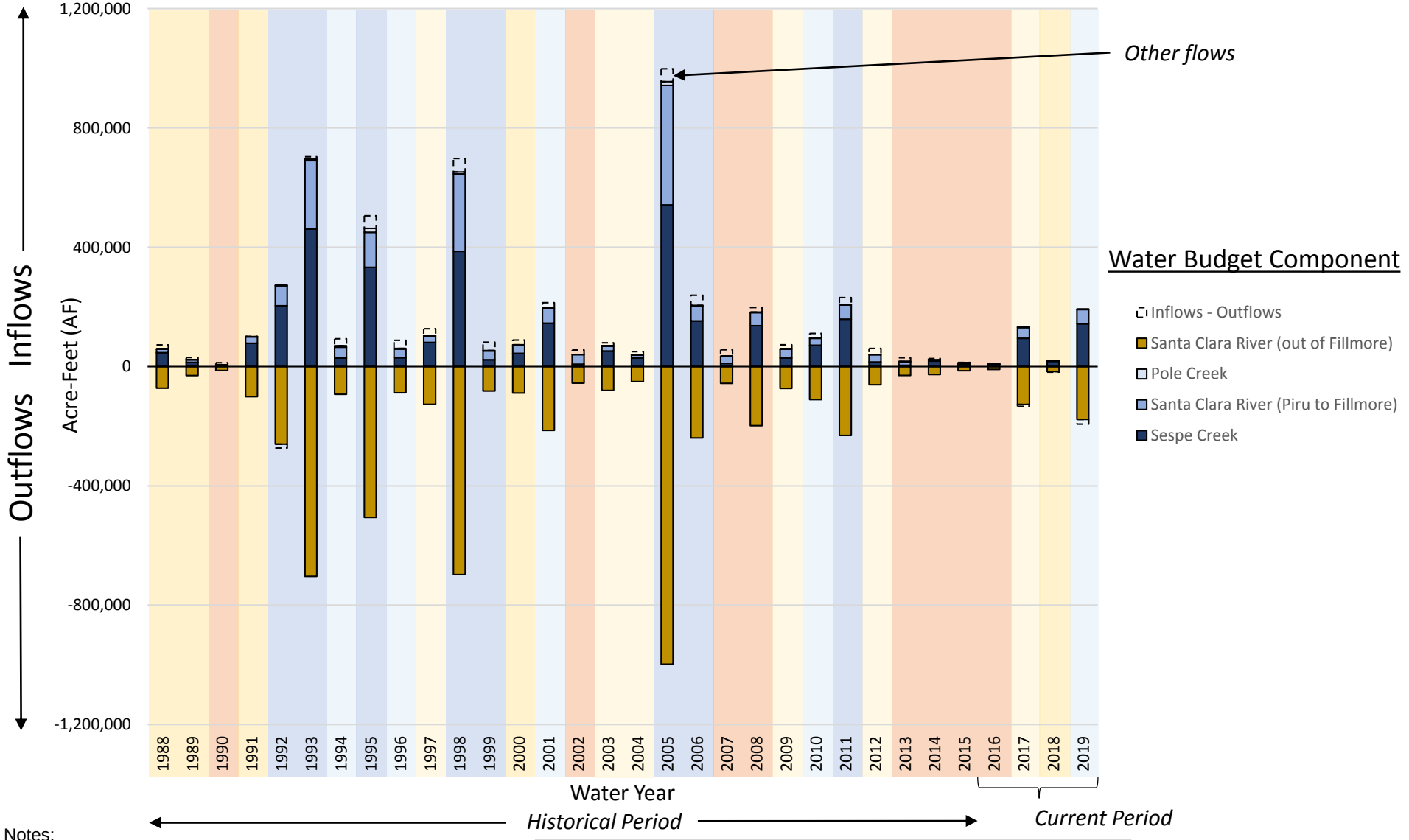

Notes:
- Information is from United Water Conservation District (2021a,e)
- Other flows (inflows-outflows) represent net gaining stream (positive values) or losing stream conditions (negative values).

Water Year Type

critical	dry	below normal	above normal	wet

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Historical and Current Annual Surface Water Budget

DBS&A Daniel B. Stephens & Associates, Inc.

12/16/2021 DB19.1084

Figure 2.2-34

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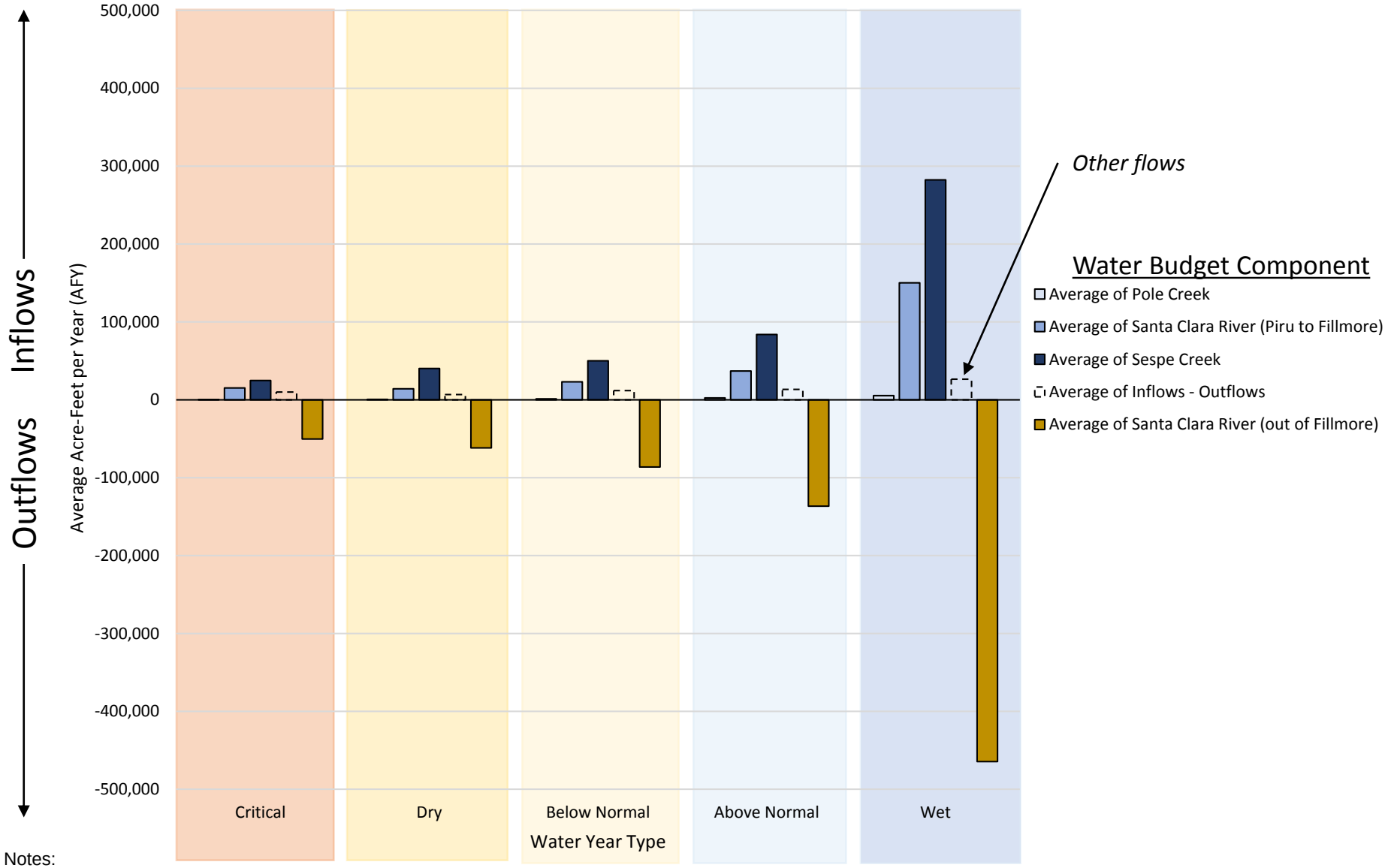

Notes:
- Information is from United Water Conservation District (2021a,e).
- Other flows (inflows-outflows) represent net gaining stream (positive values) or losing stream conditions (negative values).

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Historical and Current Average Annual Surface Water Flows by Water Year Type

Figure 2.2-35

DBS&A Daniel B. Stephens & Associates, Inc.

12/16/2021 DB19.1084

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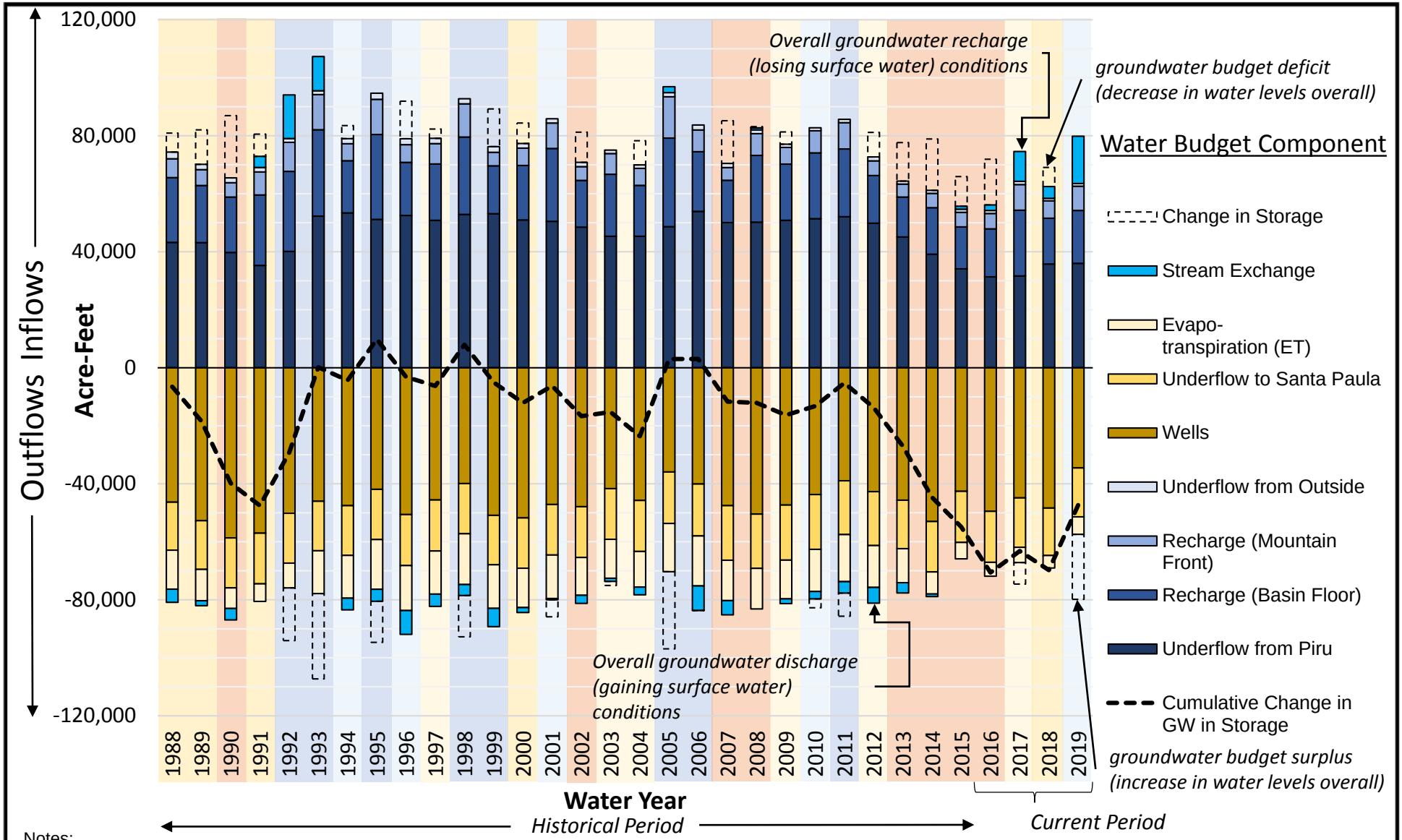

Notes:
- Information is from United Water Conservation District (2021a,e).
- Change in storage values are placed on opposite side of positive and negative y-axis directions, to demonstrate a balanced water budget (i.e., $inputs + outputs + change\ in\ storage = 0$).
- GW: groundwater

Water Year Type

critical	dry	below normal	above normal	wet

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Historical and Current Annual Groundwater Budget

Figure 2.2-36

DBS&A Daniel B. Stephens & Associates, Inc.

12/16/2021 DB19.1084

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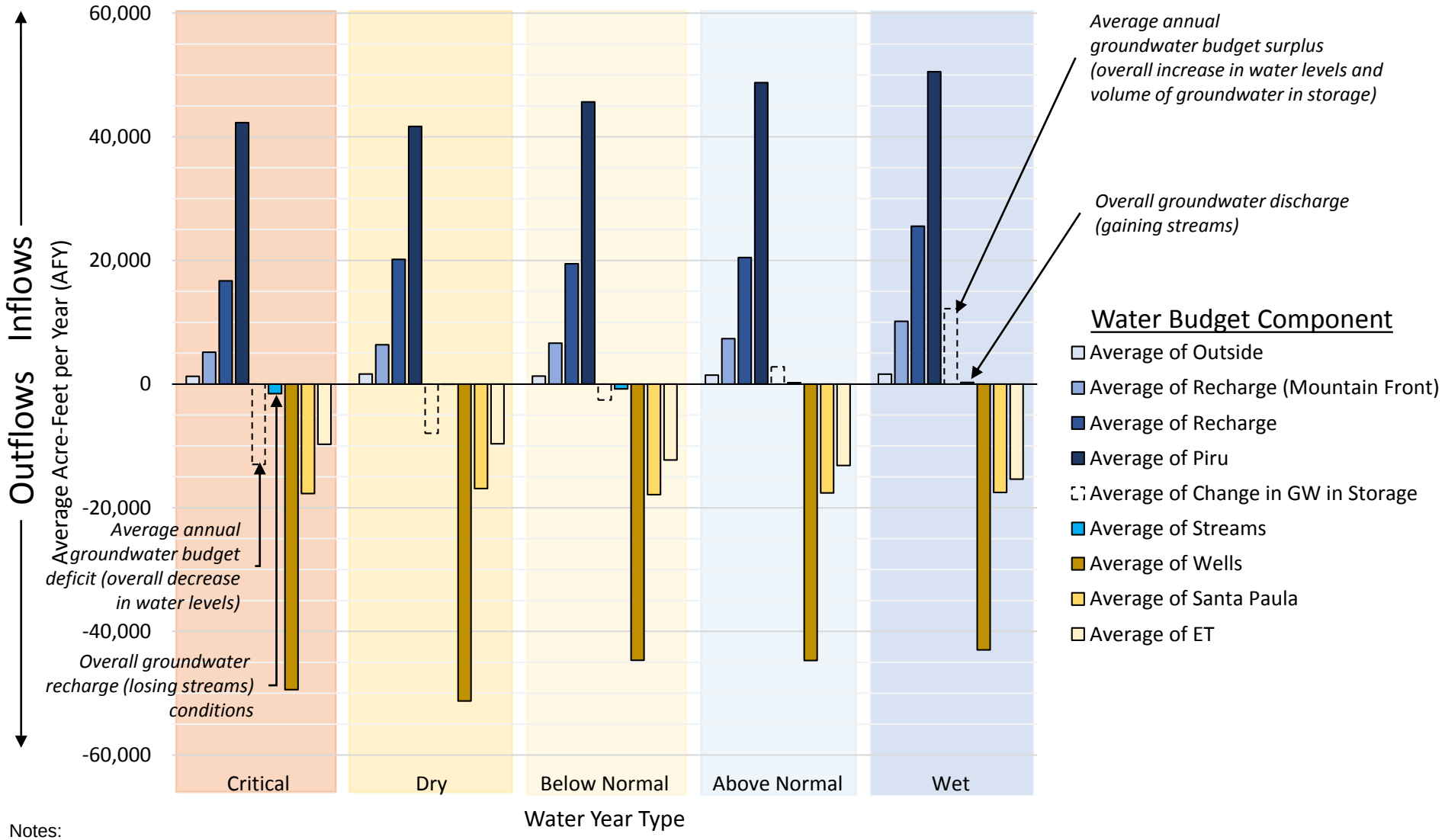

Notes:

- Information is from United Water Conservation District (2021a,e).
- Change in storage values represent the imbalance between inflows and outflows (i.e., $inputs + outputs = change\ in\ groundwater\ in\ storage$).
- Average pumping rates during dry water years are considered biased high, because the majority of these years occurred during the late 1980s and early 1990s drought, when more wells were pumping (and have since become inactive).
- GW: groundwater

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Historical and Current Average Annual Groundwater Flows by Water Year Type

Figure 2.2-37

DBS&A Daniel B. Stephens & Associates, Inc.

12/16/2021 DB19.1084

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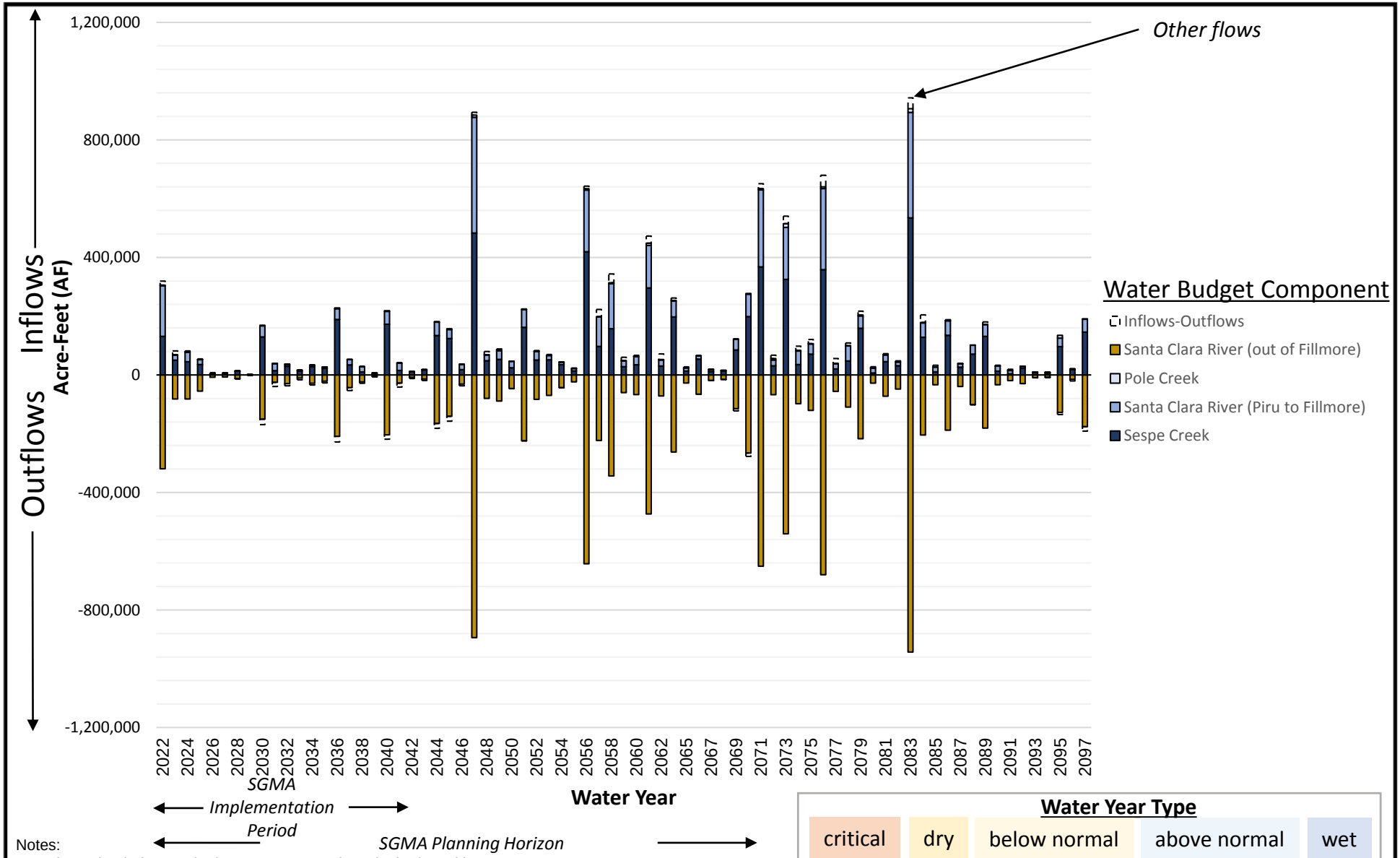

Notes:
- Information is from United Water Conservation District (2021b).
- Other flows (inflows-outflows) represent net gaining stream (positive values) or losing stream conditions (negative values).

Figure 2.2-38

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Projected Annual Surface Water Budget

DBS&A Daniel B. Stephens & Associates, Inc.

12/16/2021 DB19.1084

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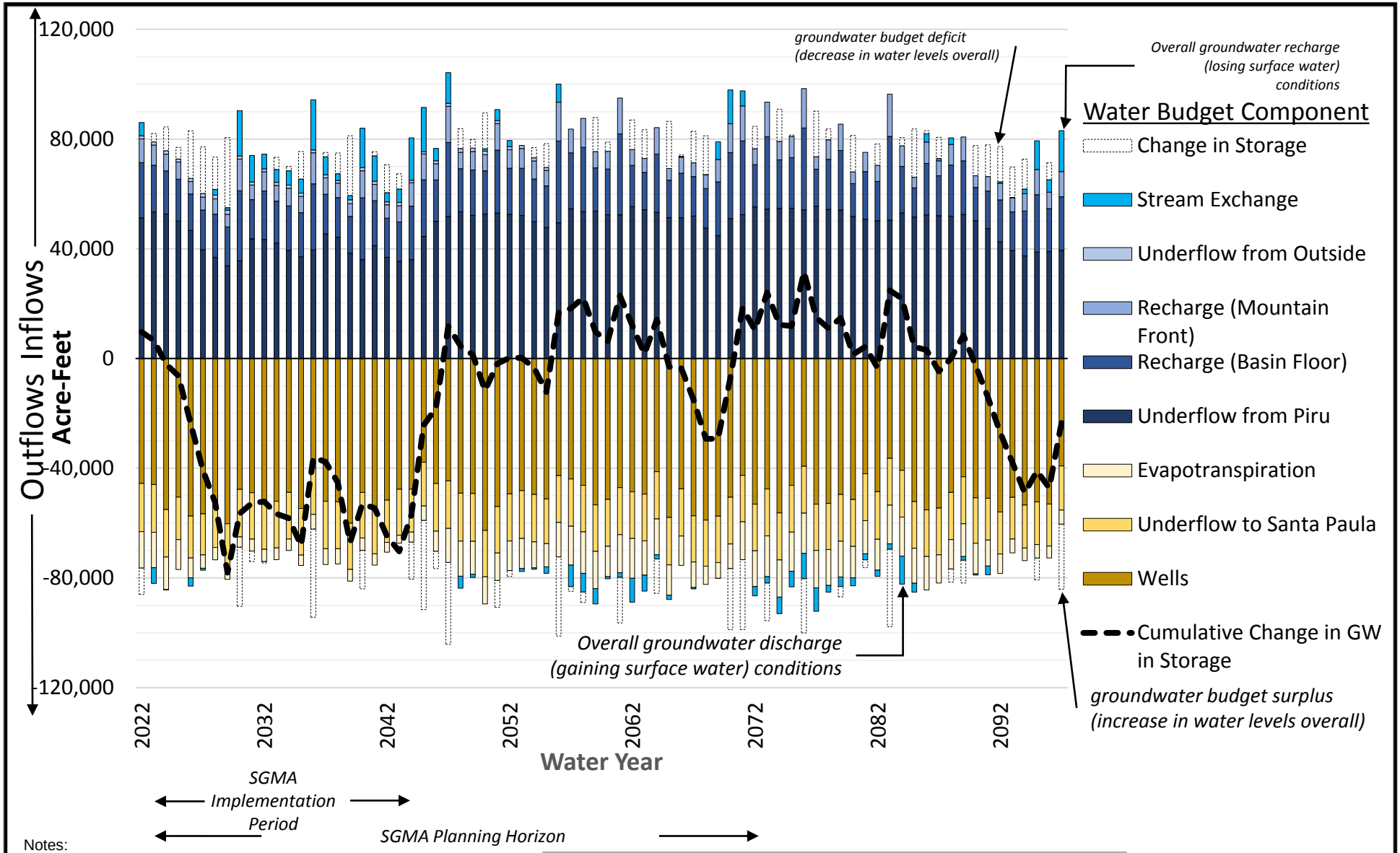


Notes:
- Information is from United Water Conservation District (2021b).
- Change in storage values are placed on opposite side of positive and negative y-axis directions, to demonstrate a balanced water budget (i.e., $inputs + outputs + change\ in\ storage = 0$).
- GW: groundwater

Water Year Type

critical	dry	below normal	above normal	wet

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

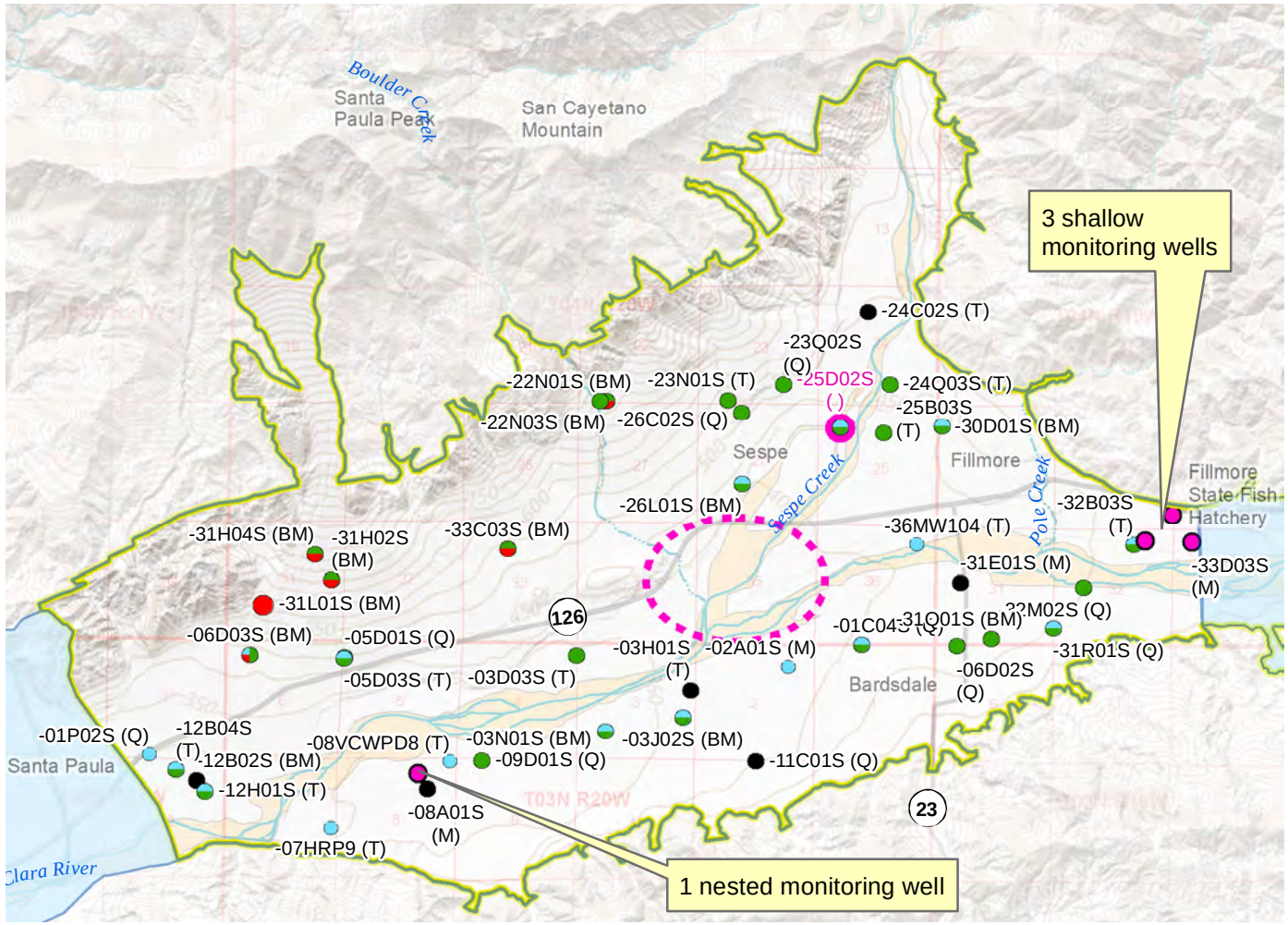
Projected Annual Groundwater Budget

DBS&A Daniel B. Stephens & Associates, Inc.

12/16/2021 DB19.1084

Figure 2.2-39

K:\PROJECTS\WATER RESOURCE SERVICES\PUBLIC\DB19.1084.00 FILLMORE PIRU BASINS GSP\GIS\MXDS\GSP\FILLMORE\FINAL\FIG_3.5-01_MONITORINGNETWORK_GW_LEVEL.MXD



Basemap: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021.

Explanation

- Index Contours
- Intermediate Contours
- California State Route
- Section
- Township and Range
- Fillmore Basin
- Other Basin
- Fillmore and Piru Basins GSA
- Limited shallow GW level data (1)
- Pending new well installation (4)

Pending Existing Well to Include

Aquifer Zone

- A+B (1)

GWL Monitoring Site (Well)

Aquifer Zone

Principal Aquifer

- A (5)
- A+B (10)
- B (14)

Non-Principal Aquifer

- A+B+C (1)
- B+C (4)
- C (1)
- unknown (6)

USGS NHD Flowline

- Stream/River (Intermittent)
- Stream/River (Perennial)*

USGS NHD Area

- Wash

Notes:

* Perennial streams (designated by the U.S. Geological Survey [USGS] National Hydrography Dataset [NHD]) exhibit interrupted perennial (i.e., intermittent to ephemeral) conditions in the Santa Clara River Valley (Hanson et al., 2003; SFEI, 2011; Beller et al., 2016; United, 2017).

1. Aquifer zones A and B are considered merged and constitute the Principal Aquifer; Aquifer zone C constitutes a non-principal aquifer.
2. GWL: groundwater level
3. Land (index/intermediate) contours are in feet relative to the North American Vertical Datum of 1988 (NAVD88).

Monitoring Frequency:
T: transducer (6x/day)
M: monthly
BM: bi-monthly
Q: quarterly

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet | Projection: Lambert Conformal Conic | Datum: North American 1983

Fillmore and Piru Basins Groundwater Sustainability Agency

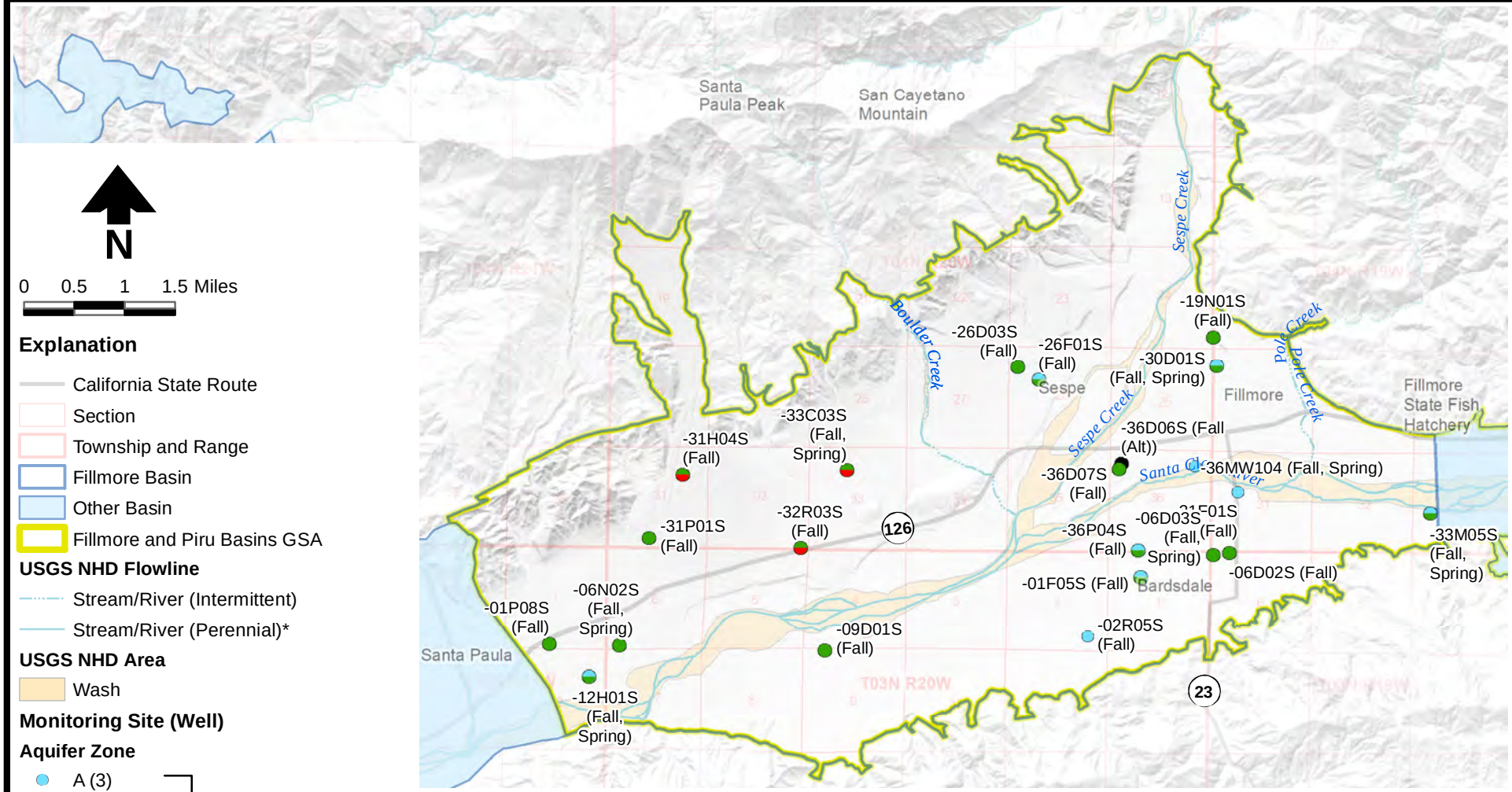
FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Groundwater Elevation Monitoring Network and Data Gaps Map

Figure 3.5-1

DBS&A
Daniel B. Stephens & Associates, Inc.
12/16/2021 DB19.1084

K:\PROJECTS\WATER RESOURCE SERVICES\PUBLIC\DB19.1084.00 FILLMORE PIRU BASINS GSP\GIS\MXDS\GSP\FILLMORE\FINAL\FIG_3.5-02_MONITORINGNETWORK_GW_QUALITY.MXD



Basemap: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021.

Notes:
* Perennial streams (designated by the U.S. Geological Survey [USGS] National Hydrography Dataset [NHD]) exhibit interrupted perennial (i.e., intermittent to ephemeral) conditions in the Santa Clara River Valley (Hanson et al., 2003; SFEI, 2011; Beller et al., 2016; United, 2017).
1. Aquifer zones A and B are considered merged and constitute the Principal Aquifer; Aquifer zone C constitutes a non-principal aquifer.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet | Projection: Lambert Conformal Conic | Datum: North American 1983

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

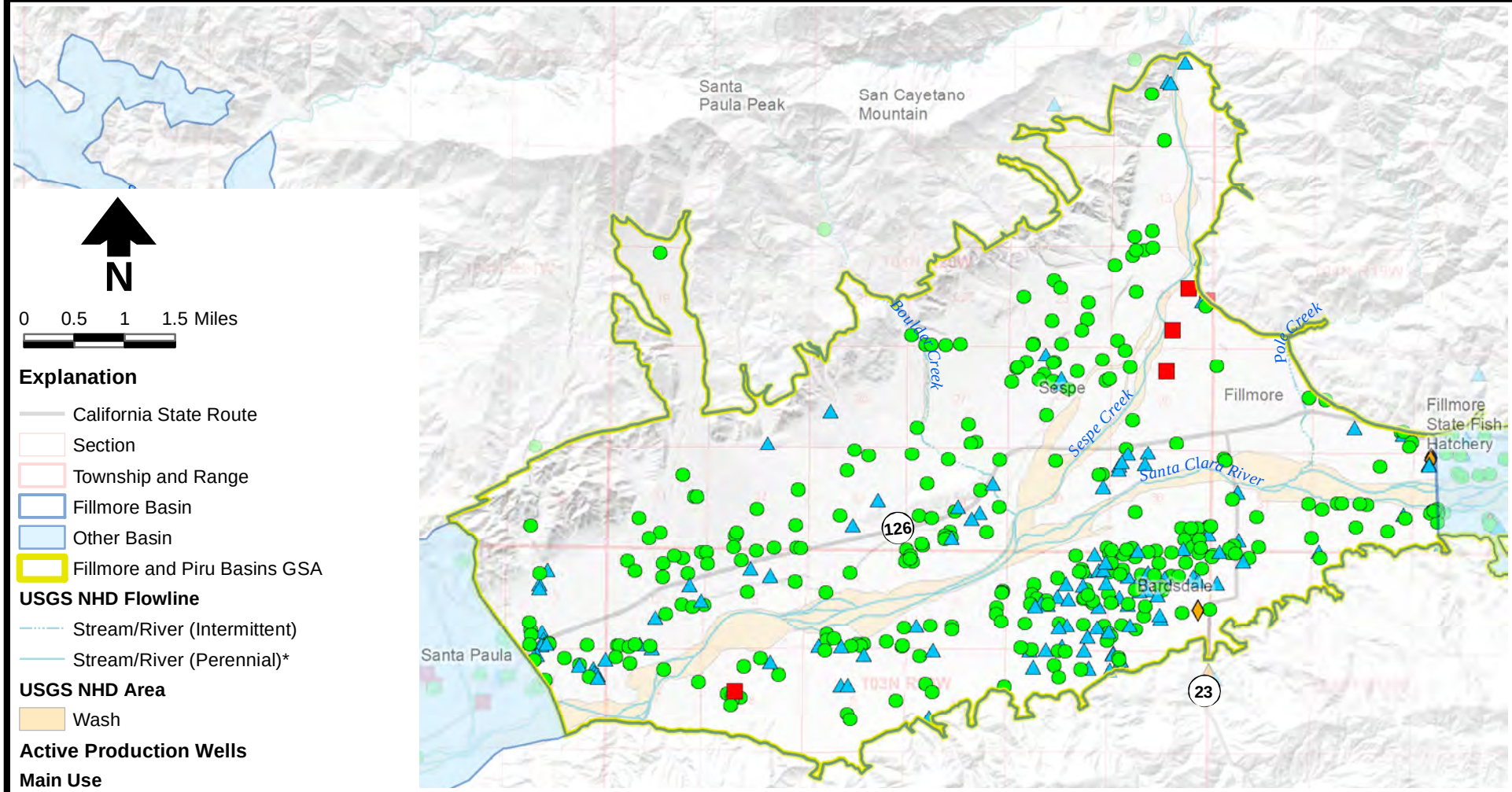
Groundwater Quality Monitoring Network Map

Figure 3.5-2

DBS&A Daniel B. Stephens & Associates, Inc.

12/16/2021 DB19.1084

K:\PROJECTS\WATER RESOURCE SERVICES\PUBLIC\DB19.1084.00 FILLMORE PIRU BASINS GSP\GIS\MXDS\GSP\FILLMORE\FINAL\FIG_3.5-03_MONITORINGNETWORK_GW_EXTRACTIONS.MXD



Explanation

- California State Route
- Section
- Township and Range
- Fillmore Basin
- Other Basin
- Fillmore and Piru Basins GSA

USGS NHD Flowline

- Stream/River (Intermittent)
- Stream/River (Perennial)*

USGS NHD Area

- Wash

Active Production Wells

Main Use

- Agricultural (297)
- Domestic (119)
- Industrial (3)
- Municipal (5)

Basemap: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021.

Notes:

* Perennial streams (designated by the U.S. Geological Survey [USGS] National Hydrography Dataset [NHD]) exhibit interrupted perennial (i.e., intermittent to ephemeral) conditions in the Santa Clara River Valley (Hanson et al., 2003; SFEI, 2011; Beller et al., 2016; United, 2017).

1. Transparent well symbology represents wells outside the Basin that are also monitored for production by United Water Conservation District.
2. Well counts represent well types within the Basin.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet | Projection: Lambert Conformal Conic | Datum: North American 1983

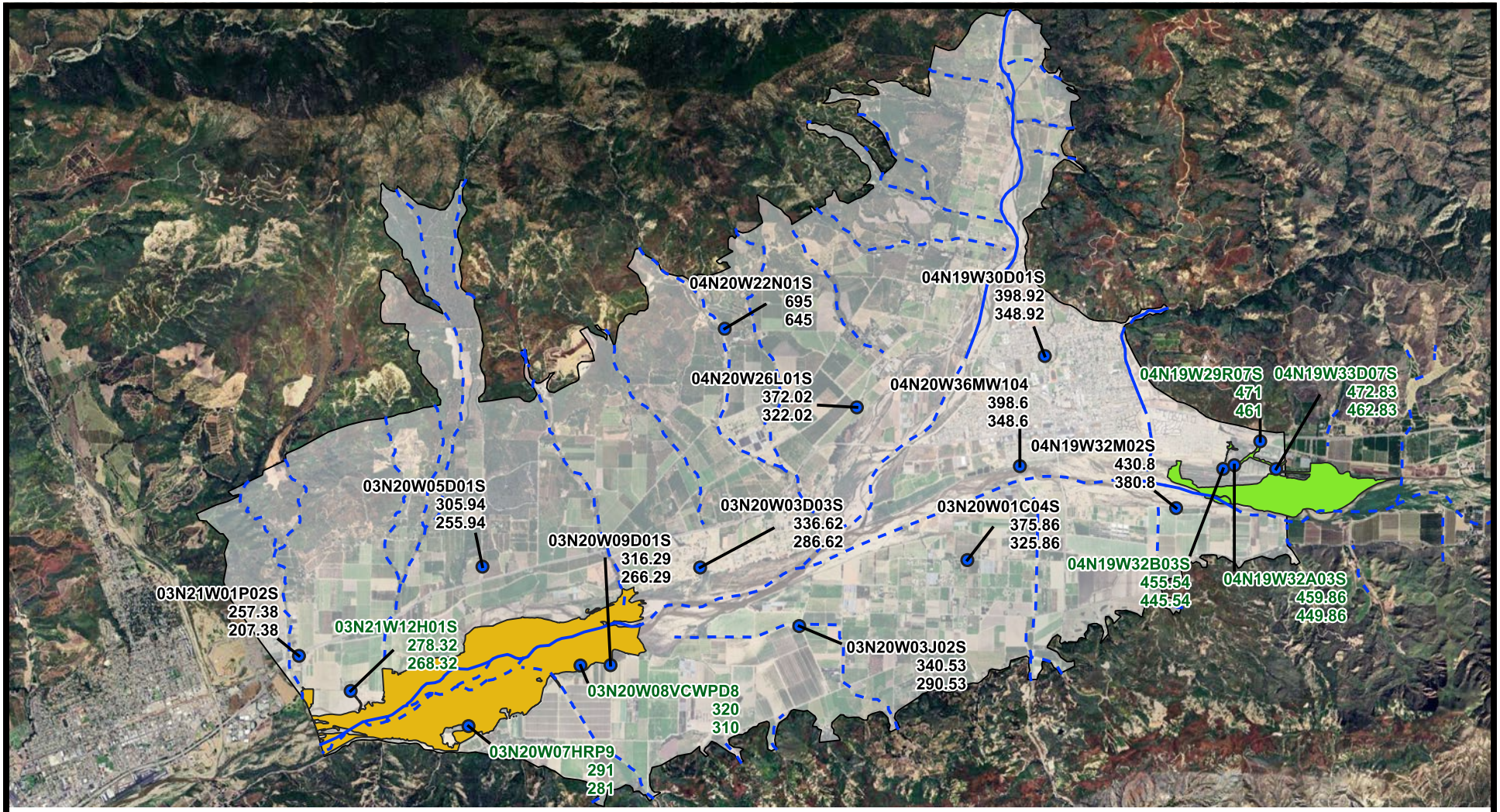
Figure 3.5-3

DBS&A
Daniel B. Stephens & Associates, Inc.
12/16/2021 DB19.1084

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Groundwater Extractions Monitoring Network Map



Source: https://fillmore-piru.gladata.com

Explanation

- Well Name
  Measureable Objective (ft msl)
  Minimum Threshold (ft msl)

Streams
- Perennial
- Intermittent

Critical Groundwater Dependent Ecosystems
- East Grove
- Cienega Springs

Groundwater Basin Boundary

Notes:
1. Green label indicates MT is protective of vegetative GDEs

0 0.5 1 mi

N

Fillmore and Piru Basins Groundwater Sustainability Agency

FILLMORE BASIN GROUNDWATER SUSTAINABILITY PLAN

Groundwater Elevation Minimum Thresholds and Measurable Objectives

DBS&A a Geo-Logic Company

06/12/2024 DB23.1279

Figure 3.5-4

C:\Users\500\OneDrive - Geo-Logic Associates Inc\Documents\Local Project Files\Fillmore-Piru\GIS\QGZs\Fillmore GSP.qgz

Fillmore and Piru Basins
Groundwater Sustainability Agency

Appendix A

Joint Powers Authority (JPA) Agreement

BOARD MINUTES
BOARD OF SUPERVISORS, COUNTY OF VENTURA, STATE OF CALIFORNIA

SUPERVISORS STEVE BENNETT, LINDA PARKS,
KELLY LONG, PETER C. FOY AND JOHN C. ZARAGOZA
April 25, 2017 at 11:00 a.m.

Adoption of a Resolution Authorizing and Directing the Execution of a Joint Exercise of Powers Agreement Creating the Fillmore and Piru Basins Groundwater Sustainability Agency. (Public Works Agency)

(X) All Board members are present.

(X) The following persons are heard: Jeff Pratt and Tony Morgan.

(X) The following document is submitted to the Board for consideration:
(X) Board Letter
(X) JPA
(X) Exhibit 1
(X) Handout: Letter from United Water Conservation District
(X) Comment Letters from Tony Morgan, David Rowlands, and E. Remson

(X) Upon motion of Supervisor Long, seconded by Supervisor Bennett, and duly carried, the Board hereby approves recommendations and changes Section 1.25 to "Representative" means an employee of The County of Ventura authorized to act on behalf of the Board of Supervisors or an employee of the City of Fillmore authorized to act on behalf of the Fillmore City Council or an employee of United Water Conservation District authorized to act on behalf of the United Water Conservation District Board of Directors.; and Section 6.4.3 to One (1) Member Director appointed by the Board of Directors for the United Water Conservation District. The Member Director will be a member of the United Water Conservation District Board of Directors or a Representative.

I hereby certify that the annexed instrument is a true and correct copy of the document which is on file in this office.
Dated: 4/27/17
MICHAEL POWERS
Clerk of the Board of Supervisors
County of Ventura, State of California
By: Lori Gaines
Deputy Clerk of the Board

By: _____
Brian Palmer
Chief Deputy Clerk of the Board

Item #33
4/25/17

RESOLUTION NO. 17-022

RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF VENTURA APPOINTING A SUPERVISOR OR REPRESENTATIVE TO THE BOARD OF DIRECTORS OF THE FILLMORE AND PIRU BASINS GROUNDWATER SUSTAINABILITY AGENCY

WHEREAS, the United Water Conservation District, the City of Fillmore, and the County of Ventura ("Member Agencies") intend to enter into a joint exercise of powers agreement ("JPA Agreement") creating the Fillmore and Piru Basins Groundwater Sustainability Agency ("FPBGSA"); and

WHEREAS, the JPA Agreement requires the governing board of each Member Agency to appoint a Director to the FPBGSA Board of Directors ("FPBGSA Board") by resolution;

NOW, THEREFORE, BE IT RESOLVED that the Ventura County Board Supervisors takes the following actions:

1. The Board of Supervisors hereby appoints Kelly Long to the FPBGSA Board.
2. The Board of Supervisors hereby confirms that the Director appointed pursuant to this resolution is authorized to represent the County's interests with respect to all matters that come before the FPBGSA Board.

Upon motion of Supervisor Bennett, seconded by Supervisor, Parks, and duly carried, the Board hereby approves and adopts this resolution on the 18th day of April, 2017

Chair, Board of Supervisors
County of Ventura

ATTEST:
Michael Powers,
Clerk of the Board of Supervisors
County of Ventura, State of California.

By: _____
Deputy Clerk of the Board

RESOLUTION NO. 17-024

RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF VENTURA AUTHORIZING AND DIRECTING THE EXECUTION OF A JOINT EXERCISE OF POWERS AGREEMENT CREATING THE FILLMORE AND PIRU BASINS GROUNDWATER SUSTAINABILITY AGENCY

WHEREAS, the California Legislature has adopted, and the Governor has signed into law, the Sustainable Groundwater Management Act of 2014 ("SGMA"), which authorizes local agencies to manage groundwater in a sustainable fashion; and

WHEREAS, in order to exercise the authority granted in SGMA, a local agency or combination of local agencies must elect to become a groundwater sustainability agency ("GSA") ; and

WHEREAS, the United Water Conservation District, the City of Fillmore, and the County of Ventura, ("Member Agencies") are all local agencies, as SGMA defines that term; and

WHEREAS, the Member Agencies each exercise jurisdiction upon lands overlying the Fillmore Basin and Piru Basins (designated basin numbers 4-4.05, and 4-4.06 respectively in the California Department of Water Resources' CASGEM groundwater basin system) ("Basins") and are all committed to the sustainable management of the Basin's groundwater resources; and

WHEREAS, the Member Agencies have determined that the sustainable management of the Basins pursuant to SGMA may best be achieved through the cooperation of the Member Agencies operating through a joint powers authority; and

WHEREAS, the County of Ventura is a County duly organized and validly existing under the Constitution and laws of the State of California; and

WHEREAS, the County, upon authorization of the Ventura County Board of Supervisors, may pursuant to Article 1 (commencing with Section 6500) of Chapter 5 of Division 7 of Title 1 of the Government Code ("JPA Act"), enter into a joint exercise of powers agreement with one or more other public agencies pursuant to which such contracting parties may jointly exercise any power common to them or conferred on them by the JPA Act; and

WHEREAS, all of the Member Agencies are public agencies as defined in the JPA Act; and

WHEREAS, the Member Agencies intend to enter into a joint exercise of powers agreement pursuant to the JPA Act ("JPA Agreement") pursuant to which the Fillmore and Piru Basins Groundwater Sustainability Agency ("FPBGSA") will be created to, among other things, take all actions deemed necessary by the FPBGSA to ensure sustainable management of the Basins as required by SGMA; and

WHEREAS, under California law and the JPA Agreement, the FPBGSA will be a public entity separate and apart from the parties to the JPA Agreement and the debts, liabilities, and obligations of the FPBGSA will not be the debts, liabilities, or obligations of the County or of the other Member Agencies, or of any representatives of either the County or the other Member Agencies serving on the governing body of the FPBGSA ("FPBGSA Board"); and

WHEREAS, the Board of Supervisors has determined it to be in the County's best interest and in the public interest to execute the JPA Agreement attached to this Resolution as Exhibit 1 ; and

WHEREAS, adoption of this resolution does not constitute a "project" under the California Environmental Quality Act (CEQA) because it involves organizational or administrative activities that will not result in direct or indirect physical changes in the environment (CEQA Guidelines Section 15378(b)(5).).

NOW, THEREFORE, BE IT RESOLVED that the Ventura County Board Supervisors takes the following actions:

1. The JPA Agreement attached hereto as Exhibit 1 is hereby approved.

2. The Chair of the Board of Supervisors is hereby authorized to sign the JPA Agreement on behalf of the County of Ventura.

3. The Clerk of the Board of Supervisors is hereby authorized and directed to attest the signature of the authorized signatory, and to affix and attest the seal of the County of Ventura as may be required or appropriate in connection with the execution and delivery of the JPA Agreement.

Upon motion of Supervisor Long, seconded by Supervisor Bennett, and duly carried, the Board hereby approves and adopts this resolution on the 25th day of April, 2017.

Chair, Board of Supervisors County of Ventura

ATTEST:
Michael Powers,
Clerk of the Board of Supervisors
County of Ventura, State of California.

By _____
Deputy Clerk of the Board

RESOLUTION 17-3594

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF FILLMORE APPOINTING A COUNCIL MEMBER OR REPRESENTATIVE TO THE BOARD OF DIRECTORS OF THE FILLMORE AND PIRU BASINS GROUNDWATER SUSTAINABILITY AGENCY

WHEREAS, the United Water Conservation District, the City of Fillmore, and the County of Ventura ("Member Agencies") intend to enter into a joint exercise of powers agreement ("JPA Agreement") creating the Fillmore and Piru Basins Groundwater Sustainability Agency ("FPBGSA"); and

WHEREAS, the JPA Agreement requires the governing board of each Member Agency to appoint a Director to the FPBGSA Board of Directors ("FPBGSA Board") by resolution; and

WHEREAS, the City Council of the City of Fillmore desire to appoint a Councilmember or representative to the FPBGSA Board.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF FILLMORE, CALIFORNIA DOES HEREBY RESOLVE AS FOLLOWS:

Section 1. That Carrie Broggie is hereby appointed to the FPBGSA Board.

Section 2. That the City Council hereby confirms that the person appointed pursuant to this Resolution is authorized to represent the City's interests with respect to all matters that come before the FPBGSA Board.

PASSED, APPROVED AND ADOPTED this 23rd day of May, 2017.

Carrie Broggie, Mayor

ATTEST:

Oliva Carrera Lopez, City Clerk

APPROVED AS TO FORM:

Tiffany J. Israel, City Attorney

CITY OF FILLMORE)

COUNTY OF VENTURA)§

STATE OF CALIFORNIA)

I, Oliva Carrera Lopez, City Clerk of the City of Fillmore, California, do hereby certify that the foregoing Resolution No. 17-3594 was duly passed and adopted by the City Council of the City of Fillmore at the regular meeting thereof, held on the 23rd day of May, 2017, and was signed by the Mayor of the said City, and that the same was passed and adopted by the following vote:

AYES: Broggie, McCall, Minjares, Austin, Holmgren

NOES: NONE

ABSENT: NONE

ABSTAIN: NONE

Oliva Carrera Lopez, City Clerk

Exhibit 1

JOINT EXERCISE OF POWERS AGREEMENT

by and among

THE CITY OF FILLMORE,

THE COUNTY OF VENTURA

and

UNITED WATER CONSERVATION DISTRICT

creating

THE FILLMORE AND PIRU BASINS GROUNDWATER SUSTAINABILITY AGENCY

April 2017

Table of Contents

JOINT EXERCISE OF POWERS AGREEMENT
THE FILLMORE AND PIRU BASINS GROUNDWATER SUSTAINABILITY AGENCY

This **Joint Exercise of Powers Agreement** ("**Agreement**") is made and effective on the last date executed ("**Effective Date**"), by and among the City of Fillmore, the County of Ventura, and United Water Conservation District, sometimes referred to herein individually as a "**Member**" and collectively as the "**Members**" for purposes of forming the Piru Fillmore Groundwater Sustainability Agency ("**Agency**") and setting forth the terms pursuant to which the Agency shall operate. Capitalized defined terms used herein shall have the meanings given to them in Article 1 of this Agreement.

RECITALS

A. Each of the Members is a local agency, as defined by the Sustainable Groundwater Management Act of 2014 ("**SGMA**"), duly organized and existing under and by virtue of the laws of the State of California, and each Member can exercise powers related to groundwater management.

B. For groundwater basins designated by the Department of Water Resources ("**DWR**") as medium- and high-priority but that have not been designated by DWR as subject to critical conditions of overdraft, SGMA requires establishment of a groundwater sustainability agency ("**GSA**") by June 30, 2017, and adoption of a groundwater sustainability plan ("**GSP**") by January 31, 2022.

C. The Piru Basin (designated basin number 4-4.06 in the DWR's Bulletin No. 118) is designated as a high priority sub-basin of the Santa Clara River Valley Basin. The Fillmore Basin (designated basin number 4-4.05 in the DWR's Bulletin No. 118) is designated as a medium-priority sub-basin of the Santa Clara River Valley Basin.

D. Under SGMA and pursuant to Government Code Section 6500, *et seq.*, a combination of local agencies may form a GSA through a joint exercise of powers agreement.

E. The Members have determined that the sustainable management of the Basins pursuant to SGMA may best be achieved through the cooperation of the Members operating through a joint powers agreement.

F. The Joint Exercise of Powers Act of 2000 ("**Act**") authorizes the Members to create a joint powers authority, and to jointly exercise any power common to the Members and to exercise additional powers granted under the Act.

G. The Act, including the Marks-Roos Local Bond Pooling Act of 1985 (Government Code sections 6584, *et seq.*), authorizes an entity created pursuant to the Act to issue bonds, and under certain circumstances, to purchase bonds issued by, or to make loans to, the Members for financing public capital improvements, working capital, liability and other insurance needs or projects whenever doing so would result in significant public benefits, as determined by the Members. The Act further authorizes and empowers a joint powers authority to sell bonds so issued or purchased to public or private purchasers at public or negotiated sales.

H. Based on the foregoing legal authority, the Members desire to create a joint powers authority for the purpose of taking all actions deemed necessary by the joint powers authority to ensure sustainable management of the Basins as required by SGMA.

I. The governing board of each Member has determined it to be in the Member's best interest and in the public interest that this Agreement be executed.

TERMS OF AGREEMENT

In consideration of the mutual promises and covenants herein contained, the Members agree as follows:

ARTICLE 1
DEFINITIONS

The following terms have the following meanings for purposes of this Agreement:

1.1 "Act" means the Joint Exercise of Powers Act, set forth in Chapter 5 of Division 7 of Title 1 of the Government Code, sections 6500, *et seq.*, including all laws supplemental thereto.

1.2 "Agreement" has the meaning assigned thereto in the Preamble.

1.3 "Auditor" means the auditor of the financial affairs of the Agency appointed by the Board of Directors pursuant to Section 13.3 of this Agreement.

1.4 "Agency" has the meaning assigned thereto in the Preamble.

1.5 "Basins" means the Fillmore Basin and Piru Basin, collectively.

1.6 "Board of Directors" or "Board" means the governing body of the Agency as established by Article 6 of this Agreement.

1.7 "Bylaws" means the bylaws adopted by the Board of Directors pursuant to Article 11 of this Agreement to govern the day-to-day operations of the Agency.

1.8 "Director" shall mean a Member Director or Stakeholder Director appointed pursuant to Article 6 of this Agreement.

1.9 "DWR" has the meaning assigned thereto in Recital B.

1.10 "Effective Date" has the meaning assigned thereto in the Preamble.

1.11 "Executive Director" means the chief administrative officer of the Agency to be appointed by the Board of Directors pursuant to Article 10 of this Agreement.

1.12 "Farm Bureau" means the Farm Bureau of Ventura County

1.13 "FBPA" means the Fillmore Basin Pumpers Association, Inc.

1.14 "Fillmore Basin" means the Fillmore Groundwater Basin as designated in DWR's Bulletin 118 as basin number 4-4.05.

1.15 "GSA" has the meaning assigned thereto in Recital B.

1.16 "GSP" has the meaning assigned thereto in Recital B.

1.17 "Member" has the meaning assigned thereto in the Preamble and further means each party to this Agreement that satisfies the requirements of Section 5.1 of this Agreement, including any new members as may be approved by the parties, pursuant to Section 17.3 of this Agreement.

1.18 "Member Director" means a Director appointed pursuant to Article 6 of this Agreement that represents a Member.

1.19 "Officer(s)" means the Chair and Vice Chair/Secretary to be appointed by the Board of Directors pursuant to Section 7.1 of this Agreement.

1.20 "PBPA" means the Piru Basin Pumpers Association, Inc.

1.21 "Piru Basin" means the Piru Groundwater Basin as designated in DWR's Bulletin 118 as basin number 4-4.06.

1.22 "SGMA" has the meaning assigned thereto in Recital A.

1.23 "Stakeholder Director" means a Director appointed pursuant to Article 6 that represents stakeholder interests.

1.24 "State" means the State of California.

1.25 "Representative" means an employee of The County of Ventura authorized to act on behalf of the Board of Supervisors, or an employee of the City of Fillmore authorized to act on behalf of the Fillmore City Council, or an employee of United Water Conservation District authorized to act on behalf of the United Water Conservation District Board of Directors.

1.26 "Nature Conservancy" means The Nature Conservancy

ARTICLE 2
CREATION OF THE AGENCY

2.1 Creation of Agency. There is hereby created pursuant to the Act a joint powers authority, which will be a public entity separate from the Members to this Agreement and shall be known as the Fillmore and Piru Basins Groundwater Sustainability Agency ("**Agency**"). Within thirty (30) days after the Effective Date of this Agreement and after any amendment, the Agency

shall cause a notice of this Agreement or amendment to be prepared and filed with the office of the California Secretary of State containing the information required by Government Code section 6503.5. Within ten (10) days after the Effective Date of this Agreement, the Agency shall cause a statement of the information concerning the Agency, required by Government Code section 53051, to be filed with the office of the California Secretary of State and with the County Clerk for the County of Ventura, setting forth the facts required to be stated pursuant to Government Code section 53051(a).

2.2 Purpose of the Agency. Each Member to this Agreement has in common the power to study, plan, develop, finance, acquire, construct, maintain, repair, manage, operate, control, and govern water supply, projects and exercise groundwater management authority within either or both of the Basins either alone or in cooperation with other public or private non-member entities, and each is a local agency eligible to serve as the GSA, either alone or jointly through a joint powers agreement as provided for by SGMA. This Agreement is being entered into in order to jointly exercise some or all of the foregoing common powers, as appropriate, and for the exercise of such additional powers as may be authorized by law in the manner herein set forth, in order to effectuate the purposes of this Agreement. The purpose of this Agency is to serve as the GSA for the Basins and to develop, adopt, and implement the GSPs for the Basins pursuant to SGMA and other applicable provisions of law.

ARTICLE 3
TERM

This Agreement shall become effective upon its execution by each of the Members and shall remain in effect until terminated pursuant to the provisions of Article 16 (Withdrawal of Members) of this Agreement.

ARTICLE 4
POWERS

The Agency shall possess the power in its own name to exercise any and all common powers of its Members reasonably related to the purposes of the Agency, including but not limited to the following powers, together with such other powers as are expressly set forth in SGMA and as it may be amended in the future. For purposes of Government Code section 6509, the powers of the Agency shall be exercised subject to the restrictions upon the manner of exercising such powers as are imposed on the County of Ventura, and in the event of the withdrawal of the County of Ventura as a Member under this Agreement, then the manner of exercising the Agency's powers shall be those restrictions imposed on the City of Fillmore.

4.1 To exercise all powers afforded to the Agency under SGMA, including without limitation:

4.1.1 To adopt rules, regulations, policies, bylaws and procedures governing the operation of the Agency.

4.1.2 To develop, adopt and implement a GSP for the Basins, and to exercise jointly the common powers of the Members in doing so.

4.1.3 To obtain rights, permits and other authorizations for, or pertaining to, implementation of a GSP for the Basins.

4.1.4 To collect and monitor data on the extraction of groundwater from, and the quality of groundwater in, the Basin.

4.1.5 To acquire property and other assets by grant, lease, purchase, bequest, devise, gift, or eminent domain, and to hold, enjoy, lease or sell, or otherwise dispose of, property, including real property, water rights, and personal property, necessary for the full exercise of the Agency's powers.

4.1.6 To establish and administer a conjunctive use program for the purposes of maintaining sustainable yields in the Basins consistent with the requirements of SGMA.

4.1.7 To exchange and distribute water.

4.1.8 To regulate groundwater extractions as permitted by SGMA.

4.1.9 To spread, sink and inject water into the basin to recharge the groundwater Basins.

4.1.10 To store, transport, recapture, recycle, purify, treat or otherwise manage and control water for beneficial use.

4.1.11 To develop and facilitate market-based solutions for the use, sale, or lease, and management of water rights.

4.1.12 To impose assessments, groundwater extraction fees or other charges, and to undertake other means of financing the Agency as authorized by Chapter 8 of SGMA, commencing at section 10730 of the Water Code.

4.1.13 To exercise the common powers of its Members to develop, collect, provide, and disseminate information that furthers the purposes of the Agency, including but not limited to the operation of the Agency and adoption and implementation of a GSP for the Basins to the Members' legislative, administrative, and judicial bodies, as well as the public generally.

4.1.14 To perform other ancillary tasks relating to the operation of the Agency pursuant to SGMA, including without limitation, environmental review, engineering, and design.

4.2 To apply for, accept and receive licenses, permits, water rights, approvals, agreements, grants, loans, contributions, donations or other aid from any agency of the United States, the State of California or other public agencies or private persons or entities necessary for the Agency's purposes.

4.3 To make and enter contracts necessary to the full exercise of the Agency's power.

4.4 To employ, designate, or otherwise contract for the services of, agents, officers, employees, attorneys, engineers, planners, financial consultants, technical specialists, advisors, and independent contractors.

4.5 To incur debts, liabilities or obligations, to issue bonds, notes, certificates of participation, guarantees, equipment leases, reimbursement obligations and other indebtedness, as authorized by the Act.

4.6 To cooperate, act in conjunction and contract with the United States, the State of California, or any agency thereof, counties, municipalities, public and private corporations of any kind (including without limitation, investor-owned utilities), and individuals, or any of them, for any and all purposes necessary or convenient for the full exercise of the powers of the Agency.

4.7 To sue and be sued in the Agency's own name.

4.8 To provide for the prosecution of, defense of, or other participation in, actions or proceedings at law or in public hearings in which the Members, pursuant to this Agreement, have an interest and employ counsel and other expert assistance for these purposes.

4.9 To accumulate operating and reserve funds for the purposes herein stated.

4.10 To invest money that is not required for the immediate necessities of the Agency, as the Agency determines is advisable, in the same manner and upon the same conditions as Members, pursuant to Government Code section 53601, as that section now exists or may hereafter be amended.

4.11 To undertake any investigations, studies, and matters of general administration.

4.12 To perform all other acts necessary or proper to carry out fully the purposes of this Agreement.

ARTICLE 5
MEMBERSHIP

5.1 Members. The Members of the Agency shall be the City of Fillmore, the County of Ventura, and United Water Conservation District, as long as they have not, pursuant to the provisions hereof, withdrawn from this Agreement.

ARTICLE 6
BOARD OF DIRECTORS

6.1 Formation of the Board of Directors. The Agency shall be governed by a Board of Directors ("**Board of Directors**" or "**Board**"). The Board shall consist of six (6) Directors comprised of representatives who shall be appointed in the manner set forth in Section 6.4 as follows:

6.1.1 Three (3) Member Directors, with one Member director appointed by the governing board of each Member;

6.1.2 A Piru Basin Pumper Stakeholder Director to represent basin pumpers interests within the Piru Basin;

6.1.3 A Fillmore Basin Pumper Stakeholder Director to represent basin pumpers interests within the Fillmore Basin.

6.1.4 An Environmental Stakeholder Director to represent the interests of environmental organizations engaged in the enhancement or protection of the environment overlying the Fillmore Basin or Piru Basin, or both.

6.2 Stakeholder Director Qualifications. For each of the respective Piru and Fillmore Pumper Stakeholder Directors, the Stakeholder Director shall be an individual, or a duly authorized representative of an entity or individual, that either: (i) owns land from which groundwater was produced from the Fillmore or Piru Basin, respectively, for beneficial uses within the year preceding the Stakeholder Director's appointment to the Board; (ii) is a party to an unexpired contract entitling the individual or entity to produce groundwater from land overlying the Fillmore or Piru Basins, respectively, that is owned by another party to the contract and groundwater has been produced pursuant to such contract within the year preceding the Stakeholder Director's appointment to the Board; or (iii) is a mutual water company that produces and serves groundwater from the Fillmore or Piru Basin, respectively, to its shareholders. For the Environmental Stakeholder Director, the Stakeholder Director shall be an active member of a nonprofit, 501(c)(3) organization which has an adopted budget and, at the sole discretion of the Member Directors, meets the following requirements: (i) is currently active within lands overlying the Fillmore Basin or Piru Basin, or both; and (ii) has a mission that advances, or is furthered by, groundwater sustainability.

6.3 Duties of the Board of Directors. The business and affairs of the Agency, and all of the powers of the Agency, including without limitation all powers set forth in Article 4 (Powers), are reserved to and shall be exercised by and through the Board of Directors, except as may be expressly delegated to the Executive Director or others pursuant to this Agreement, Bylaws, or by specific action of the Board of Directors.

6.4 Appointment of Directors. The Directors shall be appointed as follows:

6.4.1 One (1) Member Director appointed by the City Council for the City of Fillmore, which Member Director shall be a member of the City Council for the City of Fillmore or a representative.

6.4.2 One (1) Member Director appointed by the County of Ventura Board of Supervisors. Member Director will be a Supervisor or representative. Strong consideration should be given to appoint the Supervisor representing a district that overlies the Basins at least in part.

6.4.3 One (1) Member Director from appointed by the Board of Directors for the United Water Conservation District. The Member Director will be a member of the United Water Conservation District Board of Directors or a Representative.

6.4.4 The Three (3) Stakeholder Directors shall be appointed as follows:

a) Piru Basin Pumper Stakeholder Director. The Member Directors shall consider, and if acceptable, approve (by a simple majority vote) the Piru Pumper Stakeholder Director, which will be nominated by the PBPA, or the Farm Bureau of Ventura County if, and only if the PBPA is unwilling or unable to nominate a potential Piru Basin Pumper Stakeholder Director. If the Member Directors do not accept a potential Piru Basin Pumper Stakeholder Director nominated by the PBPA or the Farm Bureau of Ventura County, as applicable, the Member Directors shall request additional nomination(s), as necessary. The PBPA, or the Farm Bureau of Ventura County, shall submit its nominees to the Member Directors pursuant to a process specified in the Bylaws, unless directed otherwise by Member Directors. The Member Directors shall consider the nominees at a regular meeting and at that meeting shall approve and appoint the Piru Basin Pumper Stakeholder Director.

b) Fillmore Basin Pumper Stakeholder Director. The Member Directors shall consider, and if acceptable, approve (by a simple majority vote) the Fillmore Basin Pumper Stakeholder Director, which will be nominated by the FBPA, or the Farm Bureau of Ventura County if, and only if the FBPA is unwilling or unable to nominate a potential Fillmore Basin Pumper Stakeholder Director. If the Member Directors do not accept a potential Fillmore Basin Pumper Stakeholder Director nominated by the FBPA or the Farm Bureau of Ventura County, as applicable, the Member Directors shall request additional nomination(s), as necessary. The FBPA, or the Farm Bureau of Ventura County, shall submit its nominees to the Member Directors pursuant to a process specified in the Bylaws, unless directed otherwise by Member Directors. The Member Directors shall consider the nominees at a regular meeting and at that meeting shall approve and appoint the Fillmore Basin Pumper Stakeholder Director.

c) Environmental Stakeholder Director. The Member Directors shall consider, and if acceptable, approve (by a simple majority vote) the Environmental Stakeholder Director, which will be a nominee nominated by the following environmental organizations collectively:

1. Friends of the Santa Clara River
2. California Trout
3. National Audubon Society
4. Sierra Club
5. Santa Clara River Watershed Conservancy
6. Los Padres Forest Watch
7. Central Coast Alliance United for a Sustainable Economy
8. The Nature Conservancy
9. Wishtoyo Foundation
10. Keep Sespe Wild
11. Surfrider Foundation
12. CFROG (Citizens for Responsible Oil & Gas)

or, The Nature Conservancy if, and only if the aforementioned list of organizations is unwilling or unable to nominate a potential Environmental Stakeholder Director. If the Member Directors do not accept a potential Environmental Stakeholder Director nominated by aforementioned list of organizations or The Nature Conservancy, as applicable, the Member Directors shall request an additional nomination, as necessary. The aforementioned list of organizations, shall submit its nominee to the Member Directors pursuant to a process specified in the Bylaws, unless directed otherwise by Member Directors. The Member Directors shall consider the nominees at a regular meeting and at that meeting shall approve and appoint the Environmental Stakeholder Director.

6.5 Director Terms and Removal. Each Director shall be appointed by resolution of that Member's governing body to serve for a term of two years. To stagger the terms of the Directors, the initial terms of the Directors from the City of Fillmore, United Water Conservation District, and Piru Basin Pumpers Association shall be three years. Subsequent terms for those Directors will be two years. A Member's Director may be removed during his or her term or reappointed for multiple terms at the pleasure of the Member that appointed him or her and shall cease to be a Director when no longer a member of their governing agency's governing board. No individual Director may be removed in any other manner, including by the affirmative vote of the other Directors.

6.6 Vacancies. A vacancy on the Board of Directors shall occur when a Director resigns, is removed, or at the end of the Director's term as set forth in Section 6.5. For Member Directors, a vacancy shall also occur when he or she is removed by his or her appointing Member. Upon the vacancy of a Director, the seat shall remain vacant until a replacement Director is appointed as set forth in Section 6.4. Members shall submit any changes in Director positions to the Executive Director by written notice signed by an authorized representative of the Member. The written notice shall include a resolution of the governing board of the Member directing such change in the Director position.

ARTICLE 7
OFFICERS

7.1 Officers. Officers of the Agency shall be a chair and vice chair/secretary. A treasurer shall be appointed consistent with the provisions of Section 13.3. The vice chair/secretary shall exercise all powers of the chair in the chair's absence or inability to act.

7.2 Appointment of Officers. Officers shall be elected annually by, and serve at the pleasure of, the Board of Directors. Officers shall be elected at the first Board meeting, and thereafter at the first Board meeting following January 1st of each year. An Officer may serve for multiple consecutive terms, with no term limit. Any Officer may resign at any time upon written notice to the Board, and may be removed and replaced by a simple majority vote of the full Board.

7.3 Principal Office. The principal office of the Agency shall be established by the Board of Directors, and may thereafter be changed by a simple majority vote of the full Board. The principal office of the Agency shall be located within the jurisdictional boundaries of one or more of the Members.

ARTICLE 8
DIRECTOR MEETINGS

8.1 Initial Meeting. The initial meeting of the Board of Directors shall be held in the County of Ventura, California within sixty (60) days of the Effective Date of this Agreement.

8.2 Time and Place. The Board of Directors shall meet at least quarterly, at a date, time and place set by the Board within the jurisdictional boundaries of one or more of the Members, and at such times as may be determined by the Board.

8.3 Special Meetings. Special meetings of the Board of Directors may be called in accordance with the Ralph M. Brown Act (Government Code section 54950 *et seq.*).

8.4 Conduct. All meetings of the Board of Directors, including special meetings, shall be noticed, held, and conducted in accordance with the Ralph M. Brown Act (Government Code sections 54950, *et seq.*). The Board may use teleconferencing in connection with any meeting in conformance with and to the extent authorized by applicable law.

8.5 Local Conflict of Interest Code. The Board of Directors shall adopt a local conflict of interest code pursuant to the provisions of the Political Reform Act of 1974 (Government Code sections 81000, *et seq.*) at the first meeting following the appointment of the three Stakeholder Directors.

ARTICLE 9
VOTING

9.1 Quorum. A quorum of any meeting of the Board of Directors prior to the approval of the Stakeholder Directors shall consist of two (2) of the Member Directors. Upon approval of the Stakeholder Directors by the Board of Directors, a quorum of any meeting of the Board of Directors shall consist of a majority of the Directors. In the absence of a quorum, any meeting of the Directors may be adjourned by a vote of a simple majority of Directors present, but no other business may be transacted. For purposes of this Article, a Director shall be deemed present if the Director appears at the meeting in person or participates telephonically or by other electronic means, provided the telephone or electronic appearance is consistent with the requirements of the Ralph M. Brown Act.

9.2 Director Votes. Voting by the Board of Directors shall be made on the basis of one vote for each Director, provided however that if the matter to be voted on exclusively concerns one of the Basins and not the other, the pumper Stakeholder Director representing pumper interests in the unaffected Basin may participate in Board discussions of the matter but shall not vote on the matter. Examples of matters that exclusively concern one of the Basins and not the other include, without limitation, a water budget for one Basin, identification of undesirable results in one Basin, groundwater extraction fees applicable to one Basin,

groundwater extraction allocations in one Basin, retention of consultants to study or advise the Board concerning an issue in one Basin, and adoption of a GSP for one Basin. For matters that concern both Basins, both of the pumper Stakeholder Directors may vote on the matter.

9.3 Affirmative Decisions of the Board of Directors. Except as otherwise specified in this Agreement, all decisions of the Board of Directors shall require the affirmative vote of at least four (4) Directors unless either: (i) one or more Directors is absent or conflicted from voting on the matter; or (ii) one of the pumper Stakeholder Directors is prohibited from voting pursuant to Section 9.2, in which case a decision of the Board of Directors shall require the affirmative vote of at least three (3) Directors.

ARTICLE 10
EXECUTIVE DIRECTOR AND STAFF

10.1 Appointment. The Board of Directors may appoint an Executive Director, who may be, though need not be, an officer, employee, or representative of one of the Members. The Executive Director's compensation, if any, shall be determined by the Board of Directors.

10.2 Duties. If appointed, the Executive Director shall be the chief administrative officer of the Agency, shall serve at the pleasure of the Board of Directors, and shall be responsible to the Board for the proper and efficient administration of the Agency. The Executive Director shall have the powers designated by the Board, or otherwise as set forth in the Bylaws.

10.3 Term and Termination. The Executive Director shall serve until he/she resigns or the Board of Directors terminates his/her appointment.

10.4 Staff and Services. The Executive Director may employ such additional full-time and/or part-time employees, assistants and independent contractors who may be necessary from time to time to accomplish the purposes of the Agency, subject to the approval of the Board of Directors. The Agency may contract with a Member or other public agency or private entity for various services, including without limitation, those related to the Agency's finances, purchasing, risk management, information technology and human resources. A written agreement shall be entered between the Agency and the Member or other public agency or private entity contracting to provide such service, and that agreement shall specify the terms on which such services shall be provided, including without limitation, the compensation, if any, that shall be made for the provision of such services.

ARTICLE 11
BYLAWS

The Board of Directors shall cause to be drafted, approve, and amend Bylaws of the Agency to govern the day-to-day operations of the Agency. The Bylaws shall be adopted at or before the first anniversary of the Board's first meeting.

ARTICLE 12
COMMITTEES

The Board of Directors may from time to time appoint one or more advisory committees or establish standing or ad hoc committees to assist in carrying out the purposes and objectives of the Agency. The Board shall determine the purpose and need for such committees and the necessary qualifications for individuals appointed to them. Each standing or ad hoc committee shall include a Director as the chair thereof. Other members of each committee may be composed of those individuals approved by the Board of Directors for participation on the committee. However, no committee or participant on such committee shall have any authority to act on behalf of the Agency.

ARTICLE 13
ACCOUNTING PRACTICES

13.1 General. The Board of Directors shall establish and maintain such funds and accounts as may be required by generally accepted public agency accounting practices. The Agency shall maintain strict accountability of all funds and report all receipts and disbursements of the Agency.

13.2 Fiscal Year. Unless the Board of Directors decides otherwise, the fiscal year for the Agency shall run concurrent with the calendar year.

13.3 Appointment of Treasurer and Auditor; Duties. The treasurer and Auditor shall be appointed in the manner, and shall perform such duties and responsibilities, specified in sections 6505, 6505.5 and 6505.6 of the Act. The treasurer shall be bonded in accordance with the provisions of section 6505.1 of the Act. The treasurer of one of the Members shall be the treasurer of the Agency, to be the depository and have custody of all money of the Agency from whatever source, provided that the Board of Directors may at any time select another treasurer. The Auditor shall be of the same public agency as treasurer, and shall draw all warrants to pay demands against the Agency approved by the Board.

ARTICLE 14
BUDGET AND EXPENSES

14.1 Budget. Within ninety (90) days after the first meeting of the Board of Directors, and thereafter prior to the commencement of each fiscal year, the Board shall adopt a budget for the Agency for the ensuing fiscal year. In the event that a budget is not so approved, the prior year's budget shall be deemed approved for the ensuing fiscal year, and any groundwater extraction fee or assessment(s) of contributions of Members, or both, approved by the Board during the prior fiscal year shall again be assessed in the same amount and terms for the ensuing fiscal year.

14.2 Agency Funding and Contributions. For the purpose of funding the expenses and ongoing operations of the Agency, the Board of Directors shall maintain a funding account in connection with the annual budget process. The Board of Directors may fund the Agency as provided in Chapter 8 of SGMA, commencing with section 10730 of the Water Code. As authorized by Government Code Section 6504, the Members may make initial contributions,

payments and advances for operating the Agency, all of which shall be repaid to the Members pursuant to, and with accrued interest, as set forth in Section 14.3 herein. The Members agree that the Agency, and not the Members, have the sole responsibility to develop and implement a funding program to fiscally and fully implement the Agency's SGMA compliance efforts and ongoing operations.

14.3 Return of Contributions. In accordance with Government Code section 6512.1, repayment or return to the Members of all or any part of any contributions made by Members and any revenues by the Agency may be directed by the Board of Directors at such time and upon such terms as the Board of Directors may decide; provided that (1) any distributions shall be made in proportion to the contributions paid by each Member to the Agency, and (2) any capital contribution paid by a Member voluntarily, and without obligation to make such capital contribution pursuant to Section 14.2, shall be returned to the contributing Member, together with accrued interest at the annual rate published as the yield of the Local Agency Investment Fund administered by the California State Treasurer, before any other return of contributions to the Members is made. The Agency shall hold title to all funds and property acquired by the Agency during the term of this Agreement.

14.4 Issuance of Indebtedness. The Agency may issue bonds, notes or other forms of indebtedness, as permitted under Section 4.5, provided such issuance be approved at a meeting of the Board.

ARTICLE 15
LIABILITIES

15.1 Liability. In accordance with Government Code section 6507, and as authorized by Government Code Section 6508.1, the debt, liabilities and obligations of the Agency shall be the debts, liabilities and obligations of the Agency alone, and not the Members.

15.2 Indemnity. To the fullest extent permitted by law, funds of the Agency may be used to defend, indemnify, and hold harmless the Agency, each Member, each Director, and any officers, agents and employees of the Agency for their actions taken within the course and scope of their duties while acting on behalf of the Agency. To the fullest extent permitted by law, the Agency agrees to save, indemnify, defend and hold harmless each Member from any liability, claims, suits, actions, arbitration proceedings, administrative proceedings, regulatory proceedings, losses, expenses or costs of any kind, whether actual, alleged or threatened, including attorney's fees and costs, court costs, interest, defense costs, and expert witness fees, where the same arise out of, or are in any way attributable in whole or in part, to acts or omissions of the Agency or its employees, officers or agents or negligent acts or omissions (not including gross negligence or wrongful conduct) of the employees, officers or agents of any Member, while acting within the course and scope of a Member relationship with the Agency. In addition, to the fullest extent permitted by law, the Agency shall indemnify, defend and hold harmless, each Member from any liabilities incurred as a result of handling, receipt, use, or disposal of hazardous materials, hazardous substances, and hazardous wastes how so ever defined under Federal, State, or local laws, ordinances, or regulations.

15.3 Privileges and Immunities. All of the privileges and immunities from liability, exemption from laws, ordinances and rules, all pension, relief, disability, workers compensation, and other benefits which apply to the activity of officers, agents, or employees of any of the Members when performing their respective functions shall apply to them to the same degree and extent while engaged in the performance of any of the functions and other duties under this Agreement. None of the officers, agents, or employees appointed by the Board of Directors shall be deemed, by reason of their employment by the Board of Directors, to be employed by any of the Members or, by reason of their employment by the Board of Directors to be subject to any of the requirements of such Members.

15.4 Liability Insurance. The Board of Directors shall obtain, and maintain in effect, appropriate liability insurance to cover the activities of the Agency's Directors and staff in the ordinary course of their duties.

ARTICLE 16
WITHDRAWAL OF MEMBERS

16.1 Unilateral Withdrawal. Subject to the Dispute Resolution provisions set forth is Section 17.9, a Member may unilaterally withdraw from this Agreement without causing or requiring termination of this Agreement, effective upon one hundred eighty (180) days written notice to the Executive Director.

16.2 Rescission or Termination of Agency. This Agreement may be rescinded and the Agency terminated by unanimous written consent of all Members, except during the outstanding term of any Agency indebtedness.

16.3 Effect of Withdrawal or Termination. Upon termination of this Agreement or unilateral withdrawal, a Member shall remain obligated to pay its share of all debts, liabilities and obligations of the Agency required of the Member pursuant to terms of this Agreement, and that were incurred or accrued prior to the effective date of such termination or withdrawal, including, without limitation, those debts, liabilities and obligations pursuant to Sections 4.11 and 14.4. Any Member who withdraws from the Agency shall have no right to participate in the business and affairs of the Agency or to exercise any rights of a Member under this Agreement or the Act, but shall continue to share in distributions from the Agency on the same basis as if such Member had not withdrawn, provided that a Member that has withdrawn from the Agency shall not receive distributions in excess of the contributions made to the Agency while a Member. The right to share in distributions granted under this Section 16.3 shall be in lieu of any right the withdrawn Member may have to receive a distribution or payment of the fair value of the Member's interest in the Agency.

16.4 Return of Contribution. Upon termination of this Agreement, any surplus money on-hand shall be returned to the Members in proportion to their contributions made. To the extent permitted by law, the Board of Directors shall first offer any property, works, rights and interests of the Agency for sale to the Members on terms and conditions determined by the Board of Directors. If no such sale to Members is consummated, the Board of Directors shall offer the property, works, rights, and interest of the Agency for sale to any non-member for good and

adequate consideration. The net proceeds from any sale shall be distributed among the Members in proportion to their contributions made.

ARTICLE 17
MISCELLANEOUS PROVISIONS

17.1 No Predetermination or Irretrievable Commitment of Resources. Nothing herein shall constitute a determination by the Agency or any of its Members that any action shall be undertaken or that any unconditional or irretrievable commitment of resources shall be made, until such time as the required compliance with all local, state, or federal laws, including without limitation the California Environmental Quality Act, National Environmental Policy Act, or permit requirements, as applicable, has been completed.

17.2 Notices. Notices to a Director or Member hereunder shall be sufficient if delivered to the Board Clerk, City Clerk or Board Secretary of the respective Director or Member and addressed to the Director or Member. Delivery may be accomplished by U.S. Postal Service, private mail service or electronic mail.

17.3 Amendments to Agreement. This Agreement may be amended or modified at any time only by subsequent written agreement approved and executed by all of the Members.

17.4 Agreement Complete. The foregoing constitutes the full and complete Agreement of the Members. This Agreement supersedes all prior agreements and understandings, whether in writing or oral, related to the subject matter of this Agreement that are not set forth in writing herein.

17.5 Severability. Should any part, term or provision of this Agreement be decided by a court of competent jurisdiction to be illegal or in conflict with any applicable federal law or any law of the State of California, or otherwise be rendered unenforceable or ineffectual, the validity of the remaining parts, terms, or provisions of this Agreement shall not be affected thereby, provided, however, that if the remaining parts, terms, or provisions do not comply with the Act, this Agreement shall terminate.

17.6 Withdrawal by Operation of Law. Should the participation of any Member to this Agreement be decided by the courts to be illegal or in excess of that Member's authority or in conflict with any law, the validity of this Agreement as to the remaining Members shall not be affected thereby.

17.7 Assignment. The rights and duties of the Members may not be assigned or delegated without the written consent of all other Members. Any attempt to assign or delegate such rights or duties in contravention of this Agreement shall be null and void.

17.8 Binding on Successors. This Agreement shall inure to the benefit of, and be binding upon, the successors, and assigns of the Members, whose assignments have complied with Section 17.7 herein.

17.9 Dispute Resolution. In the event that any dispute arises among the Members relating to (i) this Agreement, (ii) the rights and obligations arising from this Agreement, (iii) a

Member proposing to withdraw from membership in the Agency, or (iv) a Member proposing to initiate litigation in relation to legal rights to groundwater within, or the management of, either of the Basins, the aggrieved Member or Members proposing to withdraw from membership shall provide written notice to the other Members of the controversy or proposal to withdraw from membership. Within thirty (30) days after such written notice, the Members shall attempt in good faith to resolve the controversy through informal means. If the Members cannot agree upon a resolution of the controversy within thirty (30) days from the providing of written notice specified above, the dispute shall be submitted to mediation prior to commencement of any legal action or prior to withdrawal of a Member proposing to withdraw from membership. The mediation shall be no less than a full day (unless agreed otherwise among the Members) and the cost of mediation shall be paid in equal proportion among the Members. The mediator shall be either voluntarily agreed to, or, if the parties cannot agree upon a mediator, appointed by the Superior Court upon a suit and motion for appointment of a neutral mediator. Upon completion of mediation, if the controversy has not been resolved, any Member may exercise all rights to bring a legal action relating to the controversy or withdraw from membership as otherwise authorized pursuant to this Agreement. The Agency shall also participate in mediation upon request by a Stakeholder Director concerning a dispute alleged by the Stakeholder Director concerning the management of either of the Basins or rights to extract groundwater from either of the Basins, with the terms of such mediation to be conducted in the same manner provided for in this Section 17.9 for disputes between or among Members.

17.10 Counterparts. This Agreement may be executed in counterparts. No counterpart shall be deemed to be an original or presumed delivered unless and until the counterpart executed by the other Members to this Agreement is in the physical possession of the Member seeking enforcement thereof.

17.11 Singular Includes Plural. Whenever used in this Agreement, the singular form of any term includes the plural form and the plural form includes the singular form.

17.12 Member Authorization. The governing bodies of the Members have each authorized execution of this Agreement, as evidenced by the respective signatures below.

IN WITNESS WHEREOF, the Members hereto have executed this Agreement by authorized officials thereof on the dates indicated below, which Agreement may be executed in counterparts.

[Signatures on Following Page]

CITY OF FILLMORE

DATED: 6-1-2017

APPROVED AS TO FORM:

By: Carrie D. Bozanich

Title: Mayor, Fillmore

By: Tiffany Brand

Title: City Attorney

COUNTY OF VENTURA

DATED: _____

APPROVED AS TO FORM:

By: _____

Title: _____

By: _____

Title: _____

UNITED WATER CONSERVATION DISTRICT

DATED: _____

APPROVED AS TO FORM:

By: _____

Title: _____

By: _____

Title: _____

CITY OF FILLMORE

DATED: _____

APPROVED AS TO FORM:

By: _____

Title: _____

By: _____

Title: _____

COUNTY OF VENTURA

DATED: 5/22/17

APPROVED AS TO FORM:

By: _____

Title: Director - PWA

By: _____

Title: Assistant County Counsel

UNITED WATER CONSERVATION DISTRICT

DATED: May 5, 2017

APPROVED AS TO FORM:

By: Bruce E. Dandy

Title: President

By: _____

Title: District Legal Counsel

Fillmore and Piru Basins
Groundwater Sustainability Agency

Appendix B

Communication and Engagement Plan

Fillmore and Piru Basins Groundwater Sustainability Agency Stakeholder Communications and Engagement Plan

October 27, 2021

Fillmore and Piru Basins
Groundwater Sustainability Agency

Contents

Purpose

California's Sustainable Groundwater Management Act (SGMA) of 2014 requires broad and diverse stakeholder involvement in the development and implementation of Groundwater Sustainability Plans (GSP) by Groundwater Sustainability Agencies (GSA). The purpose of this Stakeholder Communications and Engagement Plan (C&E Plan) is to set forth the Fillmore and Piru Basins Groundwater Sustainability Agency's (FPBGSA or Agency) methods for conducting stakeholder engagement, consistent with the requirements of SGMA. This C&E Plan provides a roadmap and tools for outreach and engagement and makes transparent to stakeholders, their opportunities to participate in the Agency's decision-making process. This Plan was used to guide stakeholder engagement during GSP development and will be used during GSP implementation.

SGMA requires GSAs to consider the interests of all Beneficial Users and Uses of groundwater in the Basins. Beneficial Users and Uses are defined in SGMA Section 10723.2 (discussed below under "SGMA Stakeholder Engagement Requirements and Guidance"). The GSP Emergency Regulations (Section Section 354.10) require that GSAs document in a communication section of the GSP, their efforts to actively engage diverse social, cultural, and economic elements of the population within their basins; opportunities provided for public engagement and input; and how public input is used by the Agency.

Broad and meaningful stakeholder engagement and active participation in the decision-making process will assure regulatory compliance and will increase community awareness of the GSP and potential Beneficial User support during SGMA implementation.

Note: This Plan presents a set of potential outreach methods for stakeholder engagement by the FPBGSA that were considered during preparation of GSPs for the Fillmore and Piru Basins and that may be used during implementation of the GSPs. The Agency will select appropriate outreach tools for each stakeholder event. The GSPs identify outreach and engagement activities that occurred during GSP preparation (see Section 2.1.5 Notice and Communication). In order to ensure an adaptive, responsive approach to stakeholder outreach and engagement, this plan may be updated and amended during its implementation.

Background

Fillmore and Piru Basins

The Fillmore and Piru Groundwater Subbasins (Basins) are within the Santa Clara River Valley in Ventura County. The California Department of Water Resources (DWR) has assigned a High Priority ranking to both Basins, principally because groundwater is the primary source of water for all water users.

The Basins are situated downstream and west of the Santa Clara River Valley East Subbasin, and upstream and east of the Santa Paula Subbasin, and are hydrogeologically connected to each other and to the upstream and downstream basins.

The Basins are characterized by diverse communities and varying land use including urban and agricultural areas. By acreage, agricultural use makes up the largest developed portion of the Basins.

Basin Governance, Decision-Making, and Guiding Principals

The FPBGSA is a joint powers authority created by the County of Ventura, City of Fillmore, United Water Conservation District (UWCD) for the purpose of implementing SGMA and is governed by a Joint Exercise of Powers Agreement (JPA). The JPA establishes a Board of Directors comprised of three Member Directors (one from each Member Agency), one Director representing the Fillmore Pumpers Association, one Director representing the Piru Pumpers Association, and an Environmental Stakeholder Director to govern and make decisions for the Agency. The JPA and the Agency's Bylaws set forth voting procedures that shall be used to make decisions on the GSP and its implementation (JPA Section 9,2 and Bylaws Section 3.4).

According to these procedures, voting by the Board of Directors shall be made on the basis of one vote for each Director, provided however, that if the matter to be voted on exclusively concerns one of the Basins and not the other, the pumper Stakeholder Director representing pumper interests in the unaffected Basin may participate in Board discussions of the matter but shall not vote on the matter. All decisions of the Board shall require the affirmative vote of at least four (4) Directors, unless one or more Directors is absent or conflicted from voting on the matter, or a pumper Stakeholder Director is prohibited from voting per this section, in which case a decision of the Board shall require the affirmative vote of at least three (3) Directors.

The FPBGSA has developed a set of Guiding Principles that describe commitments and common interests Agency leaders have agreed to follow as they implement SGMA. These Guiding Principles are posted on the Agency's website (https://s29420.pcdn.co/wp-content/uploads/2019/11/2019-11-21-FPBGSA-Guiding-Principles-FINAL-Approved-on-11-21-19.pdf). They include general principles of understanding and specific principles related to governance, communication and education, funding and finances, and SGMA implementation and sustainability.

SGMA Stakeholder Engagement Requirements and Guidance

SGMA and its GSP Emergency Regulations provide a number of requirements related to stakeholder engagement during GSP preparation and of documentation within the GSP. These requirements include:

- SGMA (Section 10723.2) calls for consideration of all interests of all beneficial uses and users of groundwater:

  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.

  (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.

- SGMA (Section 10723.4) requires the maintenance of an interested persons list:

  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.

- SGMA GSP Emergency Regulations (Section 354.10) set forth notification requirements as follows:

  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.

  1. *An explanation of the Agency's (GSAs) 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 (GSA) encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin.*

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

DWR has prepared a *Guidance Document for Groundwater Sustainability Plan Stakeholder Communication and Engagement* (DWR Guidance Document) (January 2018) to assist GSAs in providing broad and meaningful stakeholder engagement. **Figure 1** presents a summary of SGMA required engagement and notification requirements for all phases of SGMA as presented in the Guidance Document.

Stakeholders (Beneficial Users and Interested Parties)

As described above, SGMA requires the FPBGA to consider all interests of all Beneficial Uses and Users of groundwater and maintain an interested parties list.

To assist GSAs in identifying stakeholders that reflect diverse social, cultural and economic elements of the population, the DWR Guidance Document provides a Stakeholder Engagement Chart that lists various interest and examples of stakeholder groups within each of these categories. This chart is shown below as **Table 1**. For purposes of this C&E Plan, Beneficial Users and interested parties are collectively referred to as stakeholders. At the outset of GSP preparation, the FPBGSA developed an initial stakeholder list, considering the requirements of SGMA, GSP Regulations, and the DWR Guidance Document. This list was expanded as additional stakeholders were identified or requested to be added. This list is presented in **Appendix A** (omitting contact and confidential personal information). It includes Beneficial Users, people who have signed up for the Agency's email list, and other potentially interested parties including local businesses, government agencies, associations, and service organizations.

The list will evolve during GSP development as additional stakeholders are identified.

Public Notification, Education, and Engagement Meetings and Media

The FPBGSA seeks to provide multiple opportunities and formats to notify the public about upcoming meetings, provide GSP status updates, educate all Beneficial Users, and obtain public input about various GSP components. These include Board Meetings, Stakeholder Workshops, the Agency's website, Board Director updates and discussions at meetings held by other agencies and organizations, emails and mailings, social media postings, and local media advertisements and articles. The anticipated functions of these meetings and media are summarized on **Table 2**. The outreach methods listed on Table 2 and described below are intended to present a range of options available to the FPBGSA as it conducts stakeholder engagement. The FPBGSA will chose the appropriate and most effective methods from among these options (likely using some but not necessarily all of the listed options) as well as additional methods that may become available. The outreach approach may change during the course of GSP implementation based on insights gained and feedback from stakeholders.

Figure 1: SGMA Notification and Engagement Requirements

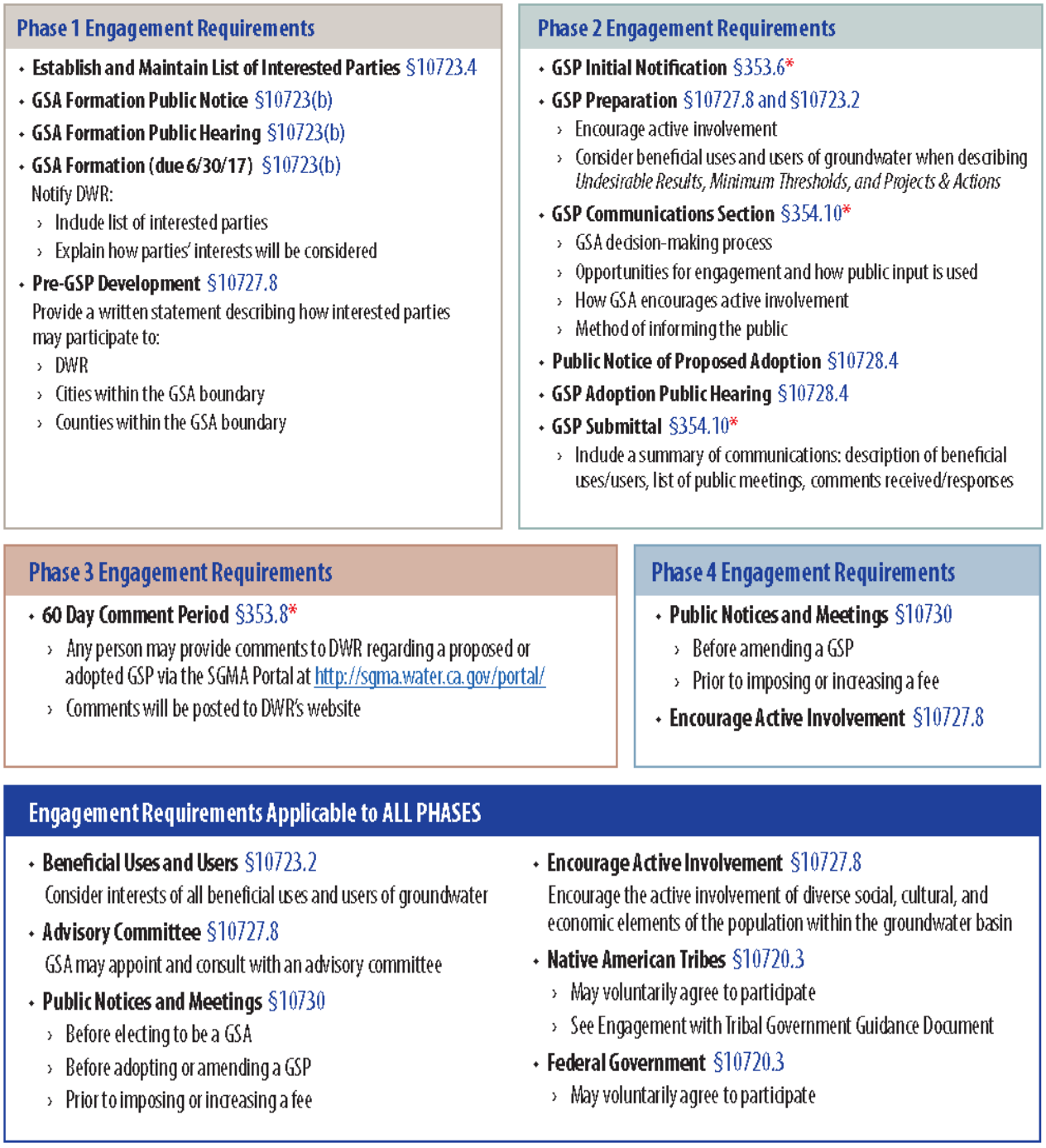


Table 1: Stakeholder Engagement Chart for GSP Development

Category of Interest	Examples of Stakeholder Groups
General Public	• Citizens groups • Community leaders
Land Use	• Municipalities (City, County planning departments) • Regional land use agencies
Private users	• Private pumpers • Domestic users • School systems • Hospitals
Urban/ Agriculture users	• Water agencies • Irrigation districts • Mutual water companies • Resource conservation districts • Farmers/Farm Bureaus
Industrial users	• Commercial and industrial self-supplier • Local trade association or group
Environmental and Ecosystem	• Federal and State agencies – California Department of Fish and Wildlife (CDFW) • Wetland managers • Environmental groups
Economic Development	• Chambers of commerce • Business groups/associations • Elected officials (Board of Supervisors, City Council) • State Assembly Members • State Senators
Human right to water	• Disadvantaged Communities • Small community systems • Environmental Justice Groups
Tribes	• Tribal Government
Federal lands	• Military bases. Department of Defense • Forest Service • National Park Service • Bureau of Land Management • CDFG
Integrated Water Management	• Regional water management groups (IRWM regions) • Flood agencies • Recycled water coalition

Table 2: Notification, Education, and Engagement Meetings and Media

Meetings/Media	Notify and Inform about Upcoming Meetings and Project Status	Educate (SGMA and GSP Topics)	Obtain Public Input
FPBGSA Board Meetings	√	√	√
FPBGSA Stakeholder Workshops	√	√	√
FBBGSA Website	√	√	√
FPBGSA Board Director outreach at meetings held by other agencies and organizations	√	√	
Emails and mailings	√		
Social media (FPBGSA Facebook page)	√		
Local media (newspaper, radio, TV) ads	√		
Local news media articles	√	√	
Other agency and organization communications (websites, newsletters, etc.)	√		

FPBGSA Board Meetings

The FPBGSA Board holds monthly meetings, generally on the third Thursday of the month. These meetings are held in the evenings at the Fillmore City Council Chamber. The Board operates and provides notice for these meetings consistent with the Brown Act (California Government Code 54950 et seq.). As described below regarding the FPBGSA Website, all meeting materials are available to the public on the Agency's website. Public comments are accepted at each meeting.

At Board Meetings, the GSP consultant or Agency staff will make presentations and hold open forums on upcoming GSP decisions. Upcoming Board discussion topics are posted on the Agency's website and Facebook page, and the public is encouraged to attend. Information presented at Board Meetings may also be presented and expanded upon at Stakeholder Workshops, as described below.

FPBGSA Stakeholder Workshops and Implementation Timeline

The FPBGSA may provide Stakeholder Workshops prior to major decisions, as needed. These workshops will provide an opportunity for the public to learn about key topics and milestones, ask questions, and provide input.. At each of these workshops, Agency leadership, staff and/or consultant (as directed by the Agency) will provide a presentation to be followed by ample time for public discussion, questions and answers, and stakeholder input. A budget update will also be provided at each workshop.

The Agency will provide handouts in English and Spanish and Spanish interpretation during the workshops, as warranted.

Appendix B provides a tool to track advertising for these workshops and document discussion topics, attendance, and evaluation comments for use in planning subsequent workshops.

Venues for Stakeholder Workshops

Four local facilities have been identified as potential venues for Stakeholder Workshops in the community:

- Veteran's Memorial Building, 511 2nd Street, Fillmore
- Fillmore Adult Active Center, 533 Santa Clara St, Fillmore
- Piru Community Center, 802 Orchard Street, Piru
- Fillmore City Council Chamber, 250 Central Avenue, Fillmore

Appendix C provides information about the features of each of these venues (e.g., capacity, hours during which the venue is available, internet availability, parking, accessibility, etc.) for consideration as workshops are planned.

The Agency anticipates that these workshops will be held during weekday evenings. It is researching the technical and financial feasibility of providing remote access to these workshops via webcast, livestream, and/or recording.

FPBGSA Website

The FPBGSA maintains a website (https://www.fpbgsa.org/) that provides the Agency's transparent, comprehensive Administrative Record of public input and additional information, including:

- Information about the Agency, the entities comprising the GSA (Ventura County, City of Fillmore, and UWCD), and its Board of Directors
- Notice of Board of Directors and other meetings
- Board of Directors Meeting materials, including agendas (provided in advance of Board Meetings), Board packets, minutes, and presentations
- SGMA information and resource documents
- Recorded presentations
- Technical reports
- Agency administrative documents (JPA, Bylaws, Budget, DWR Grant Application)
- Request for Public Records form
- Press releases
- Agency contact information (phone number and email form)

To support public awareness, the website will provide the following information:

- Stakeholder Workshop invitations and calendar
- A periodically updated list of frequently asked questions (FAQs) and answers
- Public input received at Stakeholder Workshops
- Stakeholder Workshop summaries
- Public Drafts of all SGMA required documents
- A portal for submitting public comment (text and/or document upload)

Outreach at Meetings Held by Other Agencies and Organizations

In addition to the Stakeholder Workshops provided by the GSA for the purpose of GSP engagement, there are a number of meetings held by other agencies and organizations that provide opportunities for stakeholder outreach. FPBGA Board Directors will provide GSP updates and information at the meetings

they attend as representatives of their respective constituencies. Such meetings attended by current Board Directors include but may not be limited to:

- **Ventura County Director**
  - Ventura County Board of Supervisors meetings
  - Santa Clara River Watershed Committee meetings
- **UWCD Director**
  - Ventura County Farm Bureau meetings
  - UCWD Board meetings
- **City of Fillmore Director**
  - Fillmore City Council meetings
- **Fillmore Pumper Stakeholder Director**
  - Fillmore Basin Pumpers Association meetings
  - Santa Paul Basin Pumpers Association meetings
- **Environmental Stakeholder Director**
  - Friends of the Santa Clara River Board meetings
  - Santa Clara River Watershed Committee
  - Santa Clara River Steelhead Coalition
  - Santa Clara River Environmental Groundwater Committee
  - Great Ventura County Groundwater Sustainability Agency Environmental Stakeholder Collaborative
  - California Non-Governmental Groundwater Collaborative
  - Ventura County Integrated Water Management Program Disadvantaged Community stakeholder outreach and education meetings ("WaterTalks" Meetings)
  - GSA Environmental Stakeholder Workshops
- **Piru Pumper Stakeholder Director**
  - Piru Basin Pumpers Association meetings

Appendix D provides a tool to assist in the documentation of outreach conducted at these meetings.

Other meetings that provide opportunities for outreach are:

- Piru Neighborhood Council meetings
- Santa Clarita Valley Water Agency monthly meetings with UWCD

Emails and Mailings

The FPBGSA will send emails and mailings to stakeholders about upcoming Stakeholder Workshops and will provide general GSP updates. Emails will be sent to those on the stakeholder list, described above.

GSP updates will also be provided within mailed UWCD invoices (twice per year, February and September/October) and GSA bills (twice per year, late February/early March and October/November).

Social Media

The Agency maintains a FPBGSA Facebook page (https://www.facebook.com/FPBGSA/) with posts about upcoming meetings. The Agency will provide posts about upcoming Stakeholder Workshops. It will also investigate using Nextdoor as an additional social media platform.

Local Media

The FPBGSA may choose to advertise upcoming Stakeholder Workshops in local newspapers, radio and TV stations, including the following:

- Newspapers:
  - Ventura County Star *(contact: Darrin Peschka, dpeschka@vcstar.com,(805-437-0254)*
  - Fillmore Gazette *(contact: Tenea Golson, info@fillmoregazette.com, 805-524-2481)*
  - Santa Paula Times *(contact: Peggy Kelly, sptimesnewspaper@gmail.com, 805 525-1890)*
  - Citizens Journal *(online news journal, contact: Editor@citizensjournal.us)*
- Radio stations
  - KCLU *(contact: Lance Orozco, kclunews@aol.com (805) 493-3900)*
  - KQRU – Santa Clarita *(for inter-basin communication, contact: Santa Clarita Organization for Planning the Environment, exec-scope@earthlink.net, 661-255-6899)*
  - KVTA – AM, local news *(contact: Tom Spence, tom@kvta.com, studio: 805 650-1590, office: 805 289-1400)*
- Television stations
  - Fillmore Access Television (Channel 10), community bulletin board: https://www.fillmoreca.com/departments/media-services/fillmore-access-television

The Agency may also prepare press release and communicate with journalists to support feature stories in local news media.

Other Agencies' and Organizations' Communication Channels

The FPBGSA may request that the other organizations include information about the GSP and upcoming meetings in their newsletters and/or on their websites, including but not limited to:

- Farm Bureau of Ventura County newsletter (hard copy and email) *(http://www.farmbureauvc.com/)*
- Ventura County Coalition of Labor, Agriculture, and Business website *(http://colabvc.org/)*
- Santa Clara River Conservancy newsletter and website *(https://santaclarariver.org/)*
- Keep Sespe Wild newsletter and website *(http://www.sespewild.org/, Editor Alasdair Coyne: sespecoyne@gmail.com)*
- Los Padres Forest Watch newsletter and website *(https://lpfw.org/)*
- Environmental Coalition newsletter *(contact: Andy Prokopow, andy_prokopow@mail.com, 805-642-4919)*
- Ventura County Agricultural Association newsletter *(https://www.ventura.org/agricultural-commissioner/)*
- Chamber of Commerce website *(http://venturachamber.com/)*
- "Fillmore News…What's Happening Today?" Facebook page *(https://www.facebook.com/groups/235415826509708/?epa=SEARCH_BOX)*

Key Messages

As the FPBGSA begins the process of reaching out to stakeholders to inform and engage them in groundwater management issues and items, it is critical that it share clear and consistent key messages to avoid confusion and misunderstanding. Key messages are as follows:

1. A GSP is **required** by SGMA.
2. The GSP allows for **local control**.
3. and the GSP **empowers** us to manage and maintain the basins.
4. The GSP will increase **certainty** about the future sustainability of our ground water supply.

5. The FPBGSA is committed to an **open and transparent** GSP process.

As described above, the FPBGSA has identified a set of Guiding Principles (posted on the Agency's website (https://s29420.pcdn.co/wp-content/uploads/2019/11/2019-11-21-FPBGSA-Guiding-Principles-FINAL-Approved-on-11-21-19.pdf). These Principles identify additional messages about how the Agency intends to implement SGMA.

Consideration and Use of Public Input

As described in this C&E Plan and to ensure consistency with SGMA Regulations (Section 354.10), the FPBGSA will conduct extensive and broad outreach efforts to engage and seek stakeholder input. To assure that this input is incorporated into the Board's decision-making, the Agency will conduct the following:

1. All public input will be assembled, documented, and maintained as part of the Agency's Administrative Record.
2. The Administrative Record will be maintained by the Clerk of the Board and will be available to the public at the United Water Conservation District.
3. The Agency will aim to make presentation materials available on its website three days prior to each public meeting.
4. The Agency will highlight public input received at each public meeting (questions and comments) in meeting minutes, which will be available on its website.
5. The Administrative Record will be updated prior to each Board Meeting and available to FPBGSA Board members and the public three days before a SGMA decision is made.
6. For each Board meeting at which a decision regarding the GSP shall be made, the Board packet shall include a summary of the public input relevant to that decision as of the time the packet is prepared. This summary shall also be verbally presented to the Board prior to its deliberation. The Board meeting minutes shall memorialize the Board's discussion and consideration of public input prior to Board's decision action.

Evaluation and Assessment

The FPBGSA will evaluate the effectiveness of its outreach and engagement methods throughout the process and in particular following each Stakeholder Workshop. Among the factors to be considered are:

- How well was the workshop attended?
- How did workshop participants find out about the meeting?
- What topics were participants most interested in during the workshop?
- Were the presentations clear and effective in conveying the information needed by stakeholders to understand and take part in GSP development?
- Was there ample time for discussion, questions, and answers?
- Did participants have an opportunity to provide meaningful input?

Appendix E provides an evaluation form that the Agency may use to obtain participant feedback.

Appendix A: Stakeholder List

The following table provides a list of Beneficial Users and potentially interested parties identified to date. This list will evolve during the GSP preparation process.

Beneficial User/Interested Party Category	Stakeholder Name
Beneficial User - public water system	Brownstone Mutual Water Company
Beneficial User - public water system	Citrus Mutual Water Company
Beneficial User - municipal well operator	City of Fillmore
Beneficial User – public water system	Community Mutual Water Company
Beneficial User – public water system	Fillmore Irrigation Company
Beneficial User – public water system	Goodenough Mutual Water Company
Beneficial User – public water system	Hardscrabble Mutual Water Company
Beneficial User – public water system	San Cayetano Mutual Water Company
Beneficial User – public water system	South Mountain Mutual Water Company
Beneficial User – public water system	Southside Improvement Company
Beneficial User – public water system	Storke Mutual Water Company
Beneficial Users – surface water users	Surface water users
Beneficial User – public water system	Timber Canyon Mutual Water Company
Beneficial User – public water system	Toland Road Water System
Beneficial User – public water system	Warring Water Service, Inc.
Beneficial User - public water system	United Water Conservation District
Beneficial Users - well owners, surface water users	UWCD rate payers
Public agency - agricultural	Agricultural Commissioner's Office
Public agency - housing	Area Housing Authority
Association - water agencies	Association of Water Agencies (AWAVC)
Special district - cemetery	Bardsdale Cemetery District
Public agency - library	Blanchard Library
Non-profit - youth	Boys and Girls Club of Santa Clara Valley
Public agency - education	Briggs Elementary School District
Non-profit - housing	Cabrillo Economic Development Corporation
Public agency - environmental	California Department of Fish and Wildlife
Non-profit - environmental	CalTrout
Public agency - city	City of Santa Paula
Non-profit - environmental	Climate First Replacing Oil and Gas (CFROG)
Business - tourist attraction	Fillmore & Western Railway
Association - business	Fillmore Association of Businesses

Appendix A: Stakeholder List (continued)

Public agency - fire protection	Fillmore Fire
Non-profit - fire protection	Fillmore Fire Foundation
Business - news media	Fillmore Gazette
Non-profit - historic museum	Fillmore Historical Museum
Public agency - library	Fillmore Library
Non-profit - community service	Fillmore Lions Club
Public agency - land use planning	Fillmore Planning Department
Public agency - police	Fillmore Police Department
Association - groundwater users	Fillmore Pumpers Association
Non-profit - community service	Fillmore Rotary Club
Public agency - public safety	Fillmore Search and Rescue
Public agency - education	Fillmore Unified School District
Other – interested individuals	Individuals who have signed up for the FPBGSA email list
Non-profit - environmental	Friends of the Santa Clara River
Non-profit - agricultural labor	House Farmworkers
Non-profit - environmental	Keep Sespe Wild
Non-profit - Latino community	League of United Latin American Citizens (LULAC) Santa Clara Valley
Union - labor	LiUNA! Southern California District Council of Laborer's
Non-profit - environmental	Los Padres Forest Watch
Non-profit - Latino community	LULAC District 17
Business - housing	Many Mansions
Public agency - education	Mupu Elementary School District
Public agency - environmental	National Marine Fisheries Service
Non-profit - teens	One Step a La Vez
Special district - cemetery	Piru Cemetery District
Non-profit - community	Piru Neighborhood Council
Association - groundwater users	Piru Pumpers Association
Public agency - education	Santa Clara Elementary School District
Non-profit - environmental	Santa Clara River Environmental Committee
Non-profit - environmental	Santa Clara River Steelhead Coalition
Public agency - environmental	Santa Clara River Watershed Committee
Non-profit - environmental	Santa Clara River Watershed Conservancy
Non-profit - health	Santa Clara Valley Hospice
Public agency – upstream GSA	Santa Clarita Valley Groundwater Sustainability Agency
Public transportation - transportation	Santa Paula Airport
Association - business	Santa Paula Chamber of Commerce
Non-profit - disaster preparedness	Santa Paula Citizen Corps

Appendix A: Stakeholder List (continued)

Public agency - housing	Santa Paula Housing Authority
Non-profit - Latino community	Santa Paula Latino Townhall
Association - religious	Santa Paula Ministerial Association
Public agency - police	Santa Paula Police
Non-profit - community service	Santa Paula Rotary
Business - news media	Santa Paula Times
Public agency - education	Santa Paula Unified School District
Non-profit - environmental	Sierra Club Los Padres Chapter
Non-profit - community service	Soroptomist International of Fillmore
Non-profit - homelessness	Spirit of Santa Paula
Public agency - environmental	State Coastal Conservancy
Non-profit - environmental	Surfrider Foundation
California Native American tribe (no official tribal lands within the Basins)	The Barbareño/Ventureño Band of Mission Indians
Business - news media	The Mountain Enterprise
Non-profit - environmental	The Nature Conservancy
Public agency - education, research	UC Santa Barbara - Riparian Invasion Research Laboratory
Public agency - education	University of California Cooperative Extension
Non-profit - environmental	Ventura Audubon Society
Non-profit - environmental	Ventura Coastkeeper
Public agency - county	Ventura County
Non-profit - labor, agriculture	Ventura County Coalition of Labor, Agriculture and Business (CoLAB)
Public agency - education	Ventura County Community College District (VCCCD)
Association - economic	Ventura County Economic Development Association (VCEDA)
Association - agriculture	Ventura County Farm Bureau
Public agency - fire protection	Ventura County Fire Department (VCFD)
Pubic agency - land use planning	Ventura County Planning Division
Special district - environmental	Ventura County Resource Conservation District
Public agency - sheriff	Ventura County Sheriff's Office
Public agency - environmental	Watersheds Coalition of Ventura County
Non-profit – tribal, environmental	Wishtoyo Foundation

Appendix B: Stakeholder Workshop Outreach Tracking and Documentation Tool

Meeting Date/Location	Email-blast to Stakeholder List? when?	Mailings? When?	Flyer distributed at other meetings/events? Where and when?	Additional outreach and publicity (press release, ads, posting on other websites, notice in other newsletters)	Topics discussed at meeting	# of participants, interests represented	Evaluation, additional comments

Appendix C: Venues for Stakeholder Workshops

Venue	Venue Contact	Room Capacity	Availability (days/hours)	Audiovisual Equipment, Internet Access/Wifi	Parking	Accessible?	Cost
Veteran's Memorial Building 511 2nd Street, Fillmore	Julie Latshaw, jlatshaw@ci.fillmore.ca.us	Ballroom - 500 Back room - 175	24/7	Pull down screen, no projector, no WiFi	Limited parking in the back of the building, street parking. High School parking lot across the street available during non-school hours	Yes (ramp is located in back of building)	Ballroom: $125/2 hours, $275/6 hours Back room: $50/2 hours, $250/6 hours
Fillmore Adult Active Center 533 Santa Clara Street, Fillmore	Julie Latshaw, jlatshaw@ci.fillmore.ca.us	200	Weekdays after 5 pm and weekends	No equipment or WiFi, can project onto back wall	On-site	Yes	No charge
Piru Community Center 802 Orchard Street, Piru	Ventura County Parks Reservation Center: 805-654-3951	Large room-125 Small room - 65	8 am-10 pm, 7 days/week	No equipment or WiFi	On-site	Yes	Large room: $250; Small room: $125 Plus $20 reservation fee and $275 security deposit, On-site security mandatory for events after 6 pm

Appendix D: Venues for Stakeholder Workshops (continued)

Fillmore City Council Chamber 250 Central Avenue, Fillmore	Julie Latshaw, jlatshaw@ci.fillmore.ca.us	Varies depending on layout (dais not conducive for community meetings)	Varies	Must use own equipment; screen on the wall	Behind the building and street parking	Yes	No charge

Appendix D: FPBGSA Board Director Outreach Documentation Tool

Agency/Organization	Meeting Date, Location	Stakeholder interests represented at meeting	GSP information shared/topic discussed	Notes/Comments

Appendix E: Stakeholder Workshop Evaluation Form

Fillmore Piru Basins Groundwater Sustainability Agency
Groundwater Sustainability Plan
Stakeholder Workshop Evaluation

Workshop Date: _____

Please answer the following questions about today's program by circling the appropriate number.

	Excellent	Good	Average	Poor	Very Poor	N/A No Opinion
	(5)	(4)	(3)	(2)	(1)	(0)
1. What is your overall rating of today's program?	5	4	3	2	1	0
2. Rate the usefulness to you of the information in today's program	5	4	3	2	1	0
3. Rate how clearly the material was presented	5	4	3	2	1	0
4. Rate the opportunity provided to ask questions, discuss concerns, and provide input to the GSP	5	4	3	2	1	0
5. Rate the location and accessibility of today's program	5	4	3	2	1	0
6. Rate the length of today's program	5	4	3	2	1	0

ADDITIONAL QUESTIONS AND SPACE FOR COMMENTS ON REVERSE SIDE

Contact Information (OPTIONAL):

*Name:*_____

*Email address:*_____

Phone number: _____

Appendix F: Stakeholder Workshop Evaluation Form (continued)

7. How did you hear about this meeting?

8. What information did you find to be most useful?

9. What additional information or presentations would be useful and interesting to you? *(Please provide your phone number and/or email address if you would like the Agency to contact you regarding this information.)*

10. What suggestions do you have to improve these meetings?

11. Please include any additional comments that you have regarding the event:

Fillmore and Piru Basins
Groundwater Sustainability Agency

Appendix C

List of Public Meetings and Response to Comments

Fillmore and Piru Basins
Groundwater Sustainability Agency

Appendix C-1

List of Public Meetings on GSP Development

FPBGSA Public Meetings on GSP Development		
Date	**Meeting Type**	**GSP Topics**
July 18, 2019	FPBGSA Board Meeting	GSP development update, roles and responsibilities of the GSA and Board Members
September 27, 2019	FPBGSA Board Meeting	GSP development update, Groundwater model progress
November 21, 2019	FPBGSA Board Meeting	GSP development update, draft Guiding Principles, C&E Plan
December 19, 2019	FPBGSA Board Meeting	GSP development update, C&E Plan
January 16, 2020	FPBGSA Board Meeting	GSP development update, C&E Plan, Sampling and Analysis Plan
February 20, 2020	FPBGSA Board Meeting	GSP development update, C&E Plan
April 16, 2020	FPBGSA Board Meeting	GSP development update, Sustainable Management Criteria (SMC)
May 21, 2020	FPBGSA Board Meeting	GSP development update, Groundwater Dependent Ecosystems (GDEs)
June 18, 2020	FPBGSA Board Meeting	GSP development update, groundwater model, management areas
June 25, 2020	Stakeholder Workshop	Introduction to SGMA, hydrogeological conditions, groundwater model, water budget
July 16, 2020	FPBGSA Board Meeting	GSP development update, water budget, future conditions
August 20, 2020	FPBGSA Board Meeting	GSP development update, future conditions, SMC
September 17, 2020	FPBGSA Board Meeting	GSP development update, future conditions
October 1, 2020	Stakeholder Workshop	SMC
October 15, 2020	FPBGSA Board Meeting	GSP development update, SMC
November 4, 2020	FPBGSA Special Board Meeting	SMC
November 19, 2020	FPBGSA Board Meeting	GSP development update, SMC
December 9, 2020	Stakeholder Workshop	Groundwater model
December 17, 2020	FPBGSA Board Meeting	GSP development update, SMC
January 21, 2021	FPBGSA Board Meeting	GSP development update, SMC
February 18, 2021	FPBGSA Board Meeting	GSP development update, SMC
March 18, 2021	FPBGSA Board Meeting and Stakeholder Workshop	GSP development update, GDEs, SMC
April 1, 2021	FPBGSA Special Board Meeting and Stakeholder Workshop	GDEs, SMC
April 15, 2021	FPBGSA Board Meeting	GSP development update, SMC

FPBGSA Public Meetings on GSP Development		
Date	**Meeting Type**	**GSP Topics**
May 6, 2021	FPBGSA Special Board Meeting	SMC
May 20, 2021	FPBGSA Board Meeting	GSP development update, SMC
June 10, 2021	FPBGSA Special Board Meeting	SMC
June 17, 2021	FPBGSA Board Meeting	GSP development update
July 15, 2021	FPBGSA Board Meeting	GSP development update
August 19, 2021	FPBGSA Board Meeting	GSP development update
September 17, 2021	Stakeholder Workshop	Draft GSP
September 23, 2021	FPBGSA Board Meeting and Stakeholder Workshop	Draft GSP
October 21, 2021	FPBGSA Board Meeting	GSP development update

Fillmore and Piru Basins
Groundwater Sustainability Agency

Appendix C-2

Response to Comments on the Draft GSP

Comment Letters on the Fillmore Basin Draft GSP

The Fillmore and Piru Basin Groundwater Sustainability Agency (FPBGSA) received the following comment letters and comments via its website. Each of the comments is included in and responded to on the following Response to Comments table. The full comment letters are available at the FPBGSA website at https://www.fpbgsa.org/comments-received-for-fillmore-basin/.

Letters:

1. Bondy Groundwater Consulting, Inc., September 29, 2021
2. Brokaw, Katie, October 2, 2021
3. California Department of Fish and Wildlife, October 8, 2021
4. California Trout, Inc., October 8, 2021
5. National Marine Fisheries Service, September 22, 2021
6. State University of New York College of Environmental Science and Forestry, University of California Santa Barbara, and Cardiff University, October 9, 2021
7. The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund, October 9, 2021
8. United Water Conservation District, October 8, 2021
9. Ventura County Public Works Agency, Watershed Protection, October 8, 2021

Comments Submitted Via Website:

A. California Department of Fish and Wildlife, October 8, 2021

RESPONSE TO PUBLIC COMMENTS - FILLMORE GSP

GSP	Letter No.	Comment No.	Commenter(s)	Date	Section	Page No.	Line No.	Topic	Comment	Response
Fillmore	1	1-1	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Principal aquifers	Two principal aquifers are proposed in the GSPs. The proposed "Main Aquifer" consists of "Aquifer Systems" A & B. The proposed "Deep Aquifer" consists of "Aquifer System" C. The terminology used in the GSP may not be appropriate and may create confusion for some readers. Specifically, how can an "aquifer" consist of one or more "aquifer systems"? It is recommended that the A, B, and C "Aquifer Systems" be referred to as zones or horizons instead to avoid confusion.	We concur that the usage of Aquifer, Aquifer System, and Aquifer Zone was potentially confusing. Upon consultation with the commenter, UWCD, and DWR, we have adjusted the language in the GSP to a single Principal Aquifer composed of Aquifer Zones A and B. Zone C is designated as a non-Principal Aquifer. References to Aquifer System(s) have been removed.
Fillmore	1	1-2	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Principal aquifers	The identification of multiple principal aquifers appears to be based exclusively on technical criteria without consideration of the management and cost implication. The technical reasons provided include: (1) "the distribution and extent of hydraulic properties (i.e., hydraulic conductivity) in the United (2021a) VRGWFM", (2) unconfined vs. semi-confined conditions, and (3) an aquitard between the B and C "Aquifer Systems". Given that there is only one "Aquifer System" C groundwater elevation monitoring well in each basin, it does not appear that sufficient data are available to evaluate the degree of confinement of "Aquifer System" C. Similarly, there are insufficient borehole data to conclude that the aquitard between "Aquifer Systems" B and C is continuous across the Basins. This is indicated by the GSP cross-sections, which do not depict geologic strata beneath "Aquifer System" B over large portions of the Basins due to a lack of data at depth.	See response to previous comment.
Fillmore	1	1-3	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Principal aquifers	It is unclear whether identification of the "Deep Aquifer" is consistent with the definition of the term "principal aquifer". (GSP Emergency Regulations § 351 (aa) defines "Principal aquifers" as aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems.) Specifically, it is unclear whether the "Deep Aquifer" transmits significant or economic quantities of groundwater to wells. The GSPs indicate that only 1 to 4% of verifiable pumping in the basins occurs from this zone. Furthermore, the GSPs refer to "Deep Aquifer" pumping as "minor" when discounting "Deep Aquifer" data gaps. At a minimum, the designation of the "Deep Aquifer" as a Principal Aquifer contradicts the statements about the "minor" pumping from the "Deep Aquifer".	Aquifer Zone C is no longer referred to as a Principal Aquifer. Although there are a few wells extracting from this zone, the quantity of water being pumped is not a predominant source in the basin.
Fillmore	1	1-4	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Principal aquifers	The most significant concern is the apparent lack of consideration of the management and cost implications of the decision to identify the "Deep Aquifer" as a separate principal aquifer. The GSP does not communicate what management objective(s) would be met by identifying the "Deep Aquifer" as a principal aquifer. Rather, the GSP argues the opposite - that there is little concern about the "Deep Aquifer" because there is only a minor amount of pumping sourced from it. It is unclear why this small amount of pumping requires special consideration in the GSPs and how identifying separate principal aquifers furthers management of the basins. Moreover, the GSP does not consider the costs for complying with the additional self-imposed requirements that come with this decision. Specifically, the GSP Emergency Regulations require the following for each Principal Aquifer: 1. Hydrogeologic Conceptual Model GSP Section: a. General water quality b. Vertical and lateral extent 2. Groundwater Conditions GSP Section: a. Groundwater elevation contour maps b. Groundwater elevation hydrographs c. Hydraulic gradients between the Principal Aquifers 3. Monitoring Network: a. Sufficient density of monitoring wells to collect representative measurements in each Principal Aquifer to: i. Demonstrate groundwater flow directions ii. Demonstrate water quality iii. Calculate hydraulic gradients between Principal Aquifers 4. Annual Reports: a. Change in storage for each Principal Aquifer	See responses to comments 1-1, 1-2, and 1-3.
Fillmore	1	1-5	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Sustainable yield	The sustainable yields presented in the GSPs are based on the "pumping minus change in storage" approach applied to the water budget data. This approach underestimates the sustainable yield because it ignores the fact that the basins refill completely periodically and reject potential recharge during such periods. Simply stated, the basins could recover with higher pumping rates than used in the water budgets. Modeling results presented during various meetings have demonstrated this fact very clearly. Moreover, the basins experienced deeper groundwater levels prior to the historical water budget period without reported undesirable results, further suggesting that the sustainable yield is greater than that which results from a strict application of the "pumping minus change in storage" mathematics. Ideally, the sustainable yield would be estimated using numerical model simulations designed to estimate the true potential and resiliency of the basins. If this is not feasible in the time remaining for GSP completion, then it is recommended that the GSPs be updated to caveat the sustainable yield values as noted above.	- The "pumping minus change in storage" calculation is considered a minimum sustainable yield estimate (based on 50 year historical record adjusted for 2070CT climate change and associated increased pumping demand. The change in storage SMC will be updated to reflect using GW levels as a proxy.

RESPONSE TO PUBLIC COMMENTS - FILLMORE GSP

GSP	Letter No.	Comment No.	Commenter(s)	Date	Section	Page No.	Line No.	Topic	Comment	Response
Fillmore	1	1-6	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Data gaps	GSP Emergency Regulations § 351(l) defines "data gaps" as a "lack of information that significantly affects the understanding of the basin setting or evaluation of the efficacy of Plan implementation and could limit the ability to assess whether a basin is being sustainably managed." A potential interpretation of this definition is that anything identified as a "data gap" would need to be addressed during GSP implementation. The GSP Emergency Regulations make this clear for the monitoring network - "data gaps" must be addressed within five years following GSP adoption (GSP Emergency Regulations § 354.38(d)). A concern is that the term "data gap" is used in the GSP to describe data limitations that are not necessary to address to sustainably manage the Basins and for which the GSA has no plan to address. It is recommended that each use of the term "data gap" be carefully reconsidered to determine if the item in question is really a data gap as defined by the GSP Emergency Regulations. It is recommended that any items that are not truly data gaps (as defined by the GSP Emergency Regulations) and/or that the GSA is not committed to addressing be characterized using a different term, such as "data limitation" or "potential data gap."	"Data gaps" usage will be revised to only reflect HCM and SMC items that limit implementation of the GSP and assessment of sustainability. References to "data gaps" altered to "potential data gaps", where appropriate.
Fillmore	1	1-7	Bondy Groundwater Consulting, Inc.	9/29/2021	2.2.2.7, 3.2.5	NS	NS	Depletions of interconnected surface water - calculations	Calculations of interconnected surface water depletion are presented in Section 2.2.2.7 and referred to in Section 3.2.5. These calculations were developed by running the VRGWFM with historical pumping rates and comparing to a second simulation which employed a hypothetical 50% reduction in basin wide pumping. Appendix J discussed changes in streamflow using a similar analysis that eliminated pumping within 1 mile of the Santa Clara River. Both approaches do not calculate the full amount of depletion, as seems to be required by the GSP Emergency Regulations. In particular, indirect depletion2 is being underestimated. It is recommended that the analysis be revised to include removal of all pumping to fully estimate depletions. Doing so will ensure compliance with the GSP Emergency Regulations and provide a more robust technical basis and transparency for the decision to screen out the depletions of interconnected surface water sustainability indicator.	Our interpretation of the Emergency Regulations are a bit more pragmatic. The goal is to quantify the amount of surface water depletion due to groundwater extractions, which for this basin is possible at the East Grove and Fish Hatchery areas. The relationship between surface water flow (i.e., rising groundwater) is approximated by the empirical relationships between water levels in key wells and manual surface water flow measurements. The manual measurements are constrained to some upper limit that incorporates consideration of personnel safety while gathering the flow data. Hence the data in Figures 2-4 and 3-16 in Appendix J have upper flow rates at or near 50 cfs. The empirical relationship does not extend beyond this value, so if the water levels in the key wells rise to an elevation that falls outside the range of the field measurement (due to the hypothetical elimination of all groundwater extractions in the groundwater flow model), we do not currently have a mechanism to quantify that flow rate. The best available information for this topic is the empirical relationship.
Fillmore	1	1-8	Bondy Groundwater Consulting, Inc.	9/29/2021	3.2.5	NS	NS	Depletions of interconnected surface water - SMC	The justification for not developing SMC for the depletions of interconnected surface water sustainability indicator can be better described. Only a few sentences are devoted to this critical decision. The concern is that the basis for not developing SMC will be unclear to those who did not directly participate in the planning process, including certain stakeholders and DWR reviewers. It is suggested that Section 3.2.5 be expanded to more fully present the rationale for not developing depletions of interconnected surface water SMC. For example, Point No. 2 in Section 3.2.5 should be supported with appropriate references. Pertinent information from the Stillwater memo appendix could be summarized here together with a more detailed description of why the decision to not develop depletions of interconnected surface water SMC is not inconsistent with designation of the Santa Clara River as critical habitat for steelhead. Lastly, consider more fully describing the process for reaching the decision. More description of the number of meetings this matter was discussed, outreach, feedback received, etc. could be included to support the decision.	See the updated language in Appendix J, Section 3.6.5 and GSP Section 3.2.1.
Fillmore	1	1-9	Bondy Groundwater Consulting, Inc.	9/29/2021	Appendix J, Section 3.6.5	NS	NS	Depletions of interconnected surface water - SMC	Appendix J, Section 3.6.5 makes the argument no significant and unreasonable effects will occur because estimated past and future depletion rates are similar. This logic is questionable. For example, could GSAs in the Central Valley continue with subsidence so long as the subsidence rates are less than or equal to historical rates? Probably not. A potentially stronger argument may be that there have not been reported undesirable results historically and depletion rates are not projected to increase; therefore, undesirable results are not expected in the future. The lack of reported undesirable results should be emphasized and supported in the GSP and appendix to provide a more solid basis for not developing depletions of interconnected surface water SMC.	The rate of subsidence is not similar to rate of ISW depletions (the rate of ISW depletion at East Grove and Fish Hatchery areas fluctuates within a range of values through time), while a constant rate of subsidence will result in cumulatively worse conditions over time. Section 3.6.5 in Appendix J has been revised to expand on the rationale for not developing a MT.
Fillmore	1	1-10	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Degraded water quality - SMC	The GSP establishes minimum thresholds and measurable objectives for degraded water quality but then says the GSA is not responsible for meeting them. This approach does not appear to be consistent with the GSP Emergency Regulations because it does not address any degradation that could be caused by pumping or plan implementation. DWR has been very clear that GSPs must address any potential degradation that may be caused by pumping or plan implementation. The GSPs do not provide information concerning whether pumping or plan implementation can potentially cause water quality degradation. If there is no nexus between water quality degradation and groundwater pumping or plan implementation, then the GSPs should present the technical evidence, clearly state there is no nexus, and use this information to further justify the approach for this sustainability indicator. If there is potential for groundwater pumping or plan implementation to degrade water quality, then the GSPs should describe that potential and caveat the SMC by saying the criteria only apply if GSA determines that the degradation in question is being caused by pumping or plan implementation. This is the approach taken by several other GSAs.	Section 3.3.4 of the GSP states that the GSA will continue the water quality monitoring program during GSP implementation to assess if any observed material water quality changes are caused by the implementation actions. Neither historical or current extraction rates or water levels have resulted in undesirable GW quality results. The GSP does not propose any projects or management actions that would change the groundwater extraction regime in the basin.

RESPONSE TO PUBLIC COMMENTS - FILLMORE GSP

GSP	Letter No.	Comment No.	Commenter(s)	Date	Section	Page No.	Line No.	Topic	Comment	Response
Fillmore	1	1-11	Bondy Groundwater Consulting, Inc.	9/29/2021	3.2.3.1, 3.3.1	NS	NS	Chronic lowering of groundwater levels	Section 3.2.3.1 of the GSPs states that an undesirable result for chronic lowering of groundwater levels occurs when groundwater elevations drop below the bottom of well perforations (i.e., screen) in 25% of the representative monitoring sites. Section 3.3.1 goes on to say that "the Agency acknowledges wells going dry is an undesirable result, yet, a certain number of shallow water wells (i.e., less than 100 ft deep) going dry is acceptable (see DBS&A, 2021c [Appendix J]). A concern is that justification for the 25% criterion and "a certain number of shallow water wells going dry" is not supported by an analysis of impacts on beneficial uses. There is a concern that the DWR reviewers may conclude that there is insufficient justification for this criterion. It is suggested that the GSP be expanded to include a description of the effects on beneficial uses that would be expected if groundwater levels reached the minimum threshold levels and to provide justification for why those effects are not considered to be significant and unreasonable.	See Appendix J Section 3.3.1.1 for adjusted language that has been brought forward into the GSP.
Fillmore	1	1-12	Bondy Groundwater Consulting, Inc.	9/29/2021	3.3.2, 3.4 Appendix J	NS	NS	Reduction of groundwater storage	The GSP text and SMC Appendix (Appendix J) are in conflict. The GSP text (Section 3.3.2) uses the sustainable yield for the minimum threshold. In contrast, Appendix J uses groundwater levels as a proxy and adopts the minimum thresholds for the chronic lowering of groundwater levels sustainability indicator. The GSP text (Section 3.4) does not establish a measurable objective. In contrast, Appendix J uses groundwater levels as a proxy and adopts the measurable objective for the chronic lowering of groundwater levels sustainability indicator. The approach proposed in Appendix J is preferred because of the sustainable yield values presented in the GSPs understate the true pumping potential of the basins, as discussed in an earlier comment.	We have adjusted the text to remove the conflict.
Fillmore	1	1-13	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Implementation costs	Implementation costs were not included in the draft GSP. These should be made available as soon as possible for stakeholder review.	Full implementation costs can be developed once the Mitigation Plan for supplying supplemental groundwater supplies to the Cienega Springs Restoration project has been prepared and the Board of Directors has the opportunity to consider the other projects identified in Section 4 of the GSP.
Fillmore	1	1-14	Bondy Groundwater Consulting, Inc.	9/29/2021	3.2.2, 3.2.3	NS	NS	Groundwater levels and quality	GSP Sections 3.2.2 state that "water quality degradation beyond historical conditions" is an undesirable result. GSP Sections 3.2.3 state that "groundwater levels changes (i.e., declines) can extend to any of the applicable undesirable results. When considering these statements together, there is an implication that a causal relationship between groundwater levels and groundwater quality exists. The GSPs do not provide technical information to justify or refute a causal relationship between groundwater levels and groundwater quality. More information should be provided in the GSPs to clarify whether declining groundwater levels cause groundwater quality degradation. The statement in Section 3.2.3 should be revised if it is concluded that declining groundwater levels do not cause groundwater quality degradation.	Pumping does not have an evident impact on GW quality, based on analysis of GW level and quality trends (Appendix K, Section 2.2.2.5.2). The documented historical fluctuations in water levels have not resulted in undesirable results.
Fillmore	2	2-1	Katie Brokaw	10/2/2021	NS	NS	NS	Stakeholder engagement	The GSP seems too succinct in describing the process the GSA and stakeholders went through to develop the Plan. Because the Plan doesn't adequately reflect the great effort behind the Plan, it may result in an avoidable DWR review. DWR should be informed of how much we struggled with key issues for countless hours and how much the GSA engaged with stakeholders to resolve those issues. Otherwise they may conclude that the Plan is simply a "box-checking" exercise and initiate an unnecessary review.	See sections 2.1.5 and 3.2. Further description of stakeholder involvement in GSP development has been added to Section 2.1.5.3.
Fillmore	2	2-2	Katie Brokaw	10/2/2021	NS	NS	NS	Sustainable yield	The approach that the consultants took significantly underestimates the true resiliency and potential of the Fillmore Basin. As indicated by early model runs, this basin can refill with more pumping. I would therefore encourage the consultants to use those model runs where there was a lot more pumping and the Basin still recovered as the basis for our Sustainable Yield. The point should be clearly articulated that our Sustainable Yield is actually much higher than the one the consultants used, which is based on historical water budget.	We have adjusted that language in Section 2.2.3.7 to clarify that the sustainable yield estimate is a minimum value.
Fillmore	2	2-3	Katie Brokaw	10/2/2021	NS	NS	NS	Aquifer designations	It seems unnecessary to break out the deep aquifer C from the other combined category of Aquifers A & B. We are not using the deep aquifer C significantly (only between 1% and 4% of our supply) but breaking it out as a separate principal aquifer will add costs and monitoring effort for an insignificant source. I would suggest combining it with the A & B aquifer category.	See responses to comments 1-1, 1-2, and 1-3.

RESPONSE TO PUBLIC COMMENTS - FILLMORE GSP

GSP	Letter No.	Comment No.	Commenter(s)	Date	Section	Page No.	Line No.	Topic	Comment	Response
Fillmore	2	2-4	Katie Brokaw	10/2/2021	NS	Various pages referenced - see comment text	Various line numbers referenced - see comment text	Data gaps	As I understand it the regulatory definition of "data gap" is a lack of data that significantly impairs our ability to manage the aquifer sustainably. It appears that the consultants in a number of places in the GSP used the term data gap inappropriately when they lacked information or had limited data about something that does not impact our ability to sustainably manage the basin. For example in Section 2-41 lines 2-6, the text reads: "Data gaps exist for the hydraulic gradients between the Main and Deep principal aquifers throughout the Basin that would help refine the HCM; however, these data gaps are not considered significant enough to prevent this Plan from demonstrating that the Basin can be managed sustainably, especially because relatively little groundwater is used from the Deep Aquifer." If the lack of information on the hydraulic gradients is not considered significant enough to prevent the Basin from being managed sustainably, then that lack of information is not, by definition, a "data gap" and therefore, should not be referred as such. It seems to me other instances of the improper use of "data gap" occurred as follows: Section 2-59 starting at Line 20, Section 2-38 starting at Line 3, Section 3-16 starting at Line 7, Section 2-37 starting at Line 24, Section 3-15 staring at Line 9, Section 2-56 starting at Line 16, Section 3-29 starting at Line 17. I would ask the consultants to carefully review their use of "data gap" at these places in the GSP to be sure they are referring to true "data gaps" and not simply to areas where they lack information that is not critical to sustainable management (i.e. "nice to know" but not essential to sustainability).	See the repsonse to comment 1-6. Section 2 and 3 of the GSP have been updated accordingly.
Fillmore	3, A	3,A-1	California Department of Fish and Wildlife (CDFW)	10/8/2021	2.2.1.6, Appendix K	2-37; Appendix K page 132	23-28	Hydrologic Conceptual Model (HCM) data gaps	There is insufficient information in the Draft GSP about the hydrologic interconnection between the shallow aquifer and the Main aquifer. Page 2-37 of the Draft GSP states, "*Data gaps (Figure 2.2-15) in the HCM comprise a lack of groundwater level data in the shallow groundwater of the Main Aquifer along the streams (e.g., Santa Clara River and Sespe Creek), and a lack of groundwater level data in the Deep Aquifer. The shallow groundwater data gaps in the stream areas will be addressed with the installation of monitoring wells by the Agency (per DWR Grant Funding) and installation of shallow monitoring wells by UCSB (Stillwater, 2021b)*". CDFW appreciates the efforts the GSA undertook to analyze the Basin in terms of geologic and hydrogeologic characterization. CDFW also appreciates FBGSA's proposed plans to utilize the updated HCM to fill in the data gaps and deficiencies identified in the Draft GSP. However, there is a need for a better understanding of the interactions between interconnected surface water and groundwater particularly in the GDE areas (Cienega Riparian Complex Area, East Grove, Fillmore Basin Santa Clara River Riparian Shrubland, Sespe Creek, Fillmore Basin Tributary Riparian). Additional clarification is needed in the final GSP along with a description of future assessments on how this data gap will be addressed. Recommendation #1(a): Accurate hydrogeologic modeling requires an accurate and complete data set. CDFW recommends the installation of shallow groundwater monitoring wells near potential GDEs and interconnected surface waters. Recommendation #1(b): CDFW also recommends pairing multiple-completion wells with additional streamflow gages to facilitate an improved understanding of surface water- groundwater interconnectivity and subsurface recharge channels. CDFW agrees with the FBGA proposal to install more multiple-well monitoring facilities across the basin. The Draft GSP states that "*Construction of twenty of these facilities equally spaced across the Basins would greatly decrease GSP analysis uncertainty and would be consistent with the DWR's data quality recommendations but would likely be cost prohibitive for FPBGSA rate payers in the Fillmore and Piru Basins.*" (Page 3-33, Lines 22-25, Draft Text). CDFW recommends the FBGA commit to a more modest number of strategically placed well monitoring facilities in the Project and Management Actions.	- Surface water occurs at limited areas during various time periods. The only perennial surface water areas are the East Grove, followed by Cienega Riparian Complex (which goes dry during drought periods). The other GDE areas depend on groundwater and occasionally have surface water present nearby. - RE: Recommendation #1(a) - the GSA plans to install shallow GW monitoring wells near the GDEs - RE: Recommendation #1(b) - streamflow gages have been considered infeasible (UWCD, 2006, 2016b) in the SCR and lower Sespe Creek channels by USGS, Ventura County and United. Multi-completion wells are not necessary (only clustered, single-completion wells are necessary) for understanding shallow GW levels near/beneath GDEs. The difficulty of maintaining streamflow gages within the basin prevents characterization of potential interconnected SW, with the limited exception of identifying surface water with aerial imagery and/or field mapping.

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Fillmore	3, A	3,A-2	California Department of Fish and Wildlife (CDFW)	10/8/2021	Appendix D, Section 6.4.3	Appendix D page 111	NS	Groundwater Dependent Ecosystems	Monitoring of groundwater levels and vegetative health is only considered for two of the five riparian GDE units. Page 111 of Appendix D states, "The evaluations of the GDE units in the Fillmore and Piru basins suggests that the following units are the most important for inclusion in the GSP analyses and the development of Sustainable Management Criteria: Del Valle, Cienega, and East Grove". Since the Del Valle GDE is located in the Piru Basin CDFW will focus on the Cienega and East Grove GDE located in the Fillmore Basin in this letter. The Draft GSP has done a thorough analysis of identifying ecosystems that potentially rely on groundwater known as "indicators of groundwater dependent ecosystems" (iGDEs). CDFW is concerned with the Draft GSP's wording of "inclusion" of GDEs in the Basin. Five areas within the Basin were mapped as containing iGDEs (Appendix D, Section 6.2.2, Fillmore Groundwater Basin, Page 88). They are as follows: • Area 1 – Cienega Riparian Complex Area: 133.6 acres with mulefat and giant reed; • Area 2 – East Grove: 1,101.9 acres with dense riparian forest with mulefat, black cottonwood, and red willow; • Area 3 – Fillmore Basin Santa Clara River Riparian Shrubland: 1,046.0 acres with lower density and low- stature shrubs and is dominated by mulefat; • Area 4 – Sespe Creek: 103.4 acres with mixed hardwood and low-stature willows; and, • Area 5 – Fillmore Basin Tributary Riparian: 196.6 acres with coast live oaks and hardwoods. The FBGA utilized three categories when evaluating groundwater dependence of iGDEs: unlikely, possible, and certain. The FBGA determined that only the Cienega Riparian Complex Area and East Grove Area are certain to be groundwater dependent. The Santa Clara Riparian Shrubland GDE and Sespe Creek Riparian GDE were categorized as having possible groundwater dependence. The Fillmore Basin Tributary Riparian GDE Unit was categorized as unlikely to be groundwater dependent. The FBGA indicated that the Santa Clara Riparian Shrubland GDE was located where "Intermittent surface water flows are likely not interconnected with groundwater" (Appendix D, Page 110). The FBGA indicated that the Sespe Creek Riparian GDE was located where "Surface water flows are perennial for the upper portions of the reach and intermittent downstream. The connection to groundwater in the upper portion is unknown but unlikely" (Appendix D, Page 110).	- Shallow GW monitoring wells are proposed near the other GDEs and the significance of GW depth on GDE health (measured using NDVI) can be evaluated in the future.
		3,A-2 (cont'd)							The Draft GSP is using words such as "likely not connected" and "unknown but unlikely" to rule out GDEs from further monitoring because there are data gaps in the monitoring system. The elevation and movement of subsurface flow is uncertain as is the interconnectivity of surface water relative to shallow aquifers and the main aquifers. CDFW believes the shallow perched groundwater, shallow alluvium, and surface water can still be connected to groundwater and hydrologic connectivity cannot be ruled out. These sources of water could be impacted in the future by new production wells that would adversely affect these GDEs. Water Code § 10721 (x)(6) requires GSPs avoid significant and unreasonable adverse impacts to beneficial uses of surface water including aquatic ecosystems reliant on interconnected surface water. If hydrologic-connectivity exists between a terrestrial or aquatic ecosystem and groundwater, then that ecosystem is a potential GDE and must be identified in a GSP. [23 CCR§354.16 (g).] Hydrologic-connectivity between surface water and groundwater, as well as groundwater-accessibility to terrestrial vegetation, must, therefore, be evaluated carefully, and conclusions should be well-supported. Hydrologic-connectivity considerations include connected surface waters, disconnected surface waters and transition surface waters. According to The Nature Conservancy (TNC), "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" (TNC 2019). CDFW believes shallow perched aquifers, intermittent surface flows and shallow alluvial aquifers, although rarely used for a water supply, are extremely important to the ecological communities or species that depend on groundwater emerging from all aquifers or from groundwater occurring near the surface within the Basin.	

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Fillmore		3,A-2 (cont'd)							Recommendation 2(a): CDFW recommends the five areas within the Basin that were mapped as containing potential GDEs be included in the Final GSP as GDEs because these areas rely on the shallow perched groundwater, bedrock groundwater and/or surface water within the Basin. The FBGA has not provided enough data to make the assertion that the groundwater interaction with these GDEs should remain omitted. Water in the shallow alluvial aquifer can also percolate to the main aquifer below. As groundwater pumping occurs from the principal aquifer, water from the shallow alluvial aquifer can become depleted as it recharges the principal aquifer. These are important contributions to sustaining these habitats and Areas 3, 4, and 5 should be reinstated in the Final GSP as GDEs. This shallow alluvial "aquifer" needs to be protected under SGMA. If these GDEs are adversely impacted, groundwater plans should be in place to facilitate appropriate and timely monitoring and management response actions. Recommendation 2(b): CDFW recommends that the best scientific data on depth to groundwater be included in the analysis of interconnected surface waters before any data is excluded. USGS mapped springs/seeps and comparisons of recent groundwater level contours to vegetation root zones should also be included in the analysis. Mapping GDEs and other beneficial uses is an essential component in the consideration, development, and implementation of GSPs (Water Code §10723.2) and in assessing the potential effects on groundwater beneficial uses. GSAs must also include sustainable management criteria and monitoring to detect adverse impacts on all groundwater beneficial users. Recommendation 2(c): CDFW recommends using Normalized Difference Vegetation Index (NDVI) and Normalized Difference Moisture Index (NDMI) to assess habitat health for all five areas on an annual basis and should inform the revision of both the planning and minimum thresholds for the representative wells to within or near the historic baseline. CDFW does not recommend relying solely on soils information. For example, the presence of sandy, dry, and friable soils, does not mean that existing plant species do not rely on groundwater for some portion of their life cycle. Capillary fringe associated with root networks from native plants could be accessing groundwater from deeper depths.	A)There isn't any evidence that potential GDEs rely on perched groundwater or groundwater from the bedrock. The Riparian Shrubland GDEs are mostly comprised of mulefat and other plants that combine shallow roots (< 2 ft) with low water requirements. These plants are generally located where groundwater is 5-10 ft at its shallowest, and generally deeper , based on the new depth to water map in Fall 2011 (ie., the roots are located above the groundwater elevation and the capillary fringe). They are outside the area of mapped rising groundwater and typically do not support surface flow. The plants that make up this GDE may use groundwater during wet years given some uncertainty in the elevation of groundwater, but if groundwater were typically within the rooting zone, the dominant vegetation likely be cottonwoods and willows. B)The depth to groundwater map has been updated using Fall 2011 groundwater contours provided by United Water, based on the assumption that this wet year represents the highest summer groundwater levels in the basin. A discussion of the depth relative to rooting zones has been added to the GSP. C)NDVI and NDMI monitoring of the potential GDE sites has been included in the monitoring program.
Fillmore	3, A	3,A-4	California Department of Fish and Wildlife (CDFW)	10/8/2021	Appendix K, Section 6.2.1	Appendix K page 136		Fish Hatchery pumping	CDFW is concerned that the Fillmore Fish Hatchery pumping is overquantified. The FBGA states on page 136 that "…there is potential that Fish Hatchery groundwater pumping which constitutes the largest pumping by a single entity in the basins for some years may complicate interpretation of water level data gathered from a new monitor well facility (i.e., measured water levels may not be representative static water levels if they are significantly influenced by the nearby pumping)." Although the Draft GSP identifies the Fish Hatchery as the largest pumping entity (pg. 136), impacts to groundwater levels are substantially minimized by returning pumped water to the main aquifer for recharge. Most of the water pumped from CDFW groundwater wells enter the fish hatchery raceway to sustain young fish. Although some water is lost from evaporation after entering the raceway, the majority of pumped well water is returned to the groundwater system via soil saturation and percolation. CDFW agrees with the FBGA's concern (pg. 136) that the Fish Hatchery production well has the potential to interfere with the accuracy of data collected from the shallow monitoring wells. The Fish Hatchery well is screened at the 300-foot-level whereas the shallow monitoring wells have been proposed at the 100-foot-level. The cone of depression from the Fish Hatchery production well has the potential to skew data as the surrounding areas of the production well in aquifer are slowly replenished. Recommendation #3(a): CDFW recommends the final GSP accurately quantify pumping activities at the Fillmore Fish Hatchery using both pumping and return flow quantities that recharge the aquifer when evaluating impacts to the groundwater. The rising groundwater area around the Fish Hatchery should retain sufficient water levels to protect both the pumping of water and key GDEs as suggested on page ES-1 of the Draft GSP. Recommendation #3(b): CDFW recommends the FBGA investigate adding additional shallow aquifer monitoring wells away from the vicinity of the Fish Hatchery production well to generate additional monitoring data that will accurately identify groundwater pumping trends, interactions, or interferences.	The Fish Hatchery pumping is self reported and quantified in a consistent manner as other wells in the Basin. - RE: Recommendation #3(a) - pumping is accurately measured; return flows are not measured by CDFW, UWCD, or VCWPD, however return flows were included in the groundwater flow model. measured and commonly quantified/estimated based on GW model calibration - RE: Recommendation #3(b) - The GSA can consider additional monitoring wells at locations that assist in the managment of the groundwater resources and are included in Section 4 of the GSP.

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Fillmore	3, A	3,A-5	California Department of Fish and Wildlife (CDFW)	10/8/2021	4.1	4-2	23-27	Mitigation	CDFW has not engaged in meaningful discussions of Basin overdraft mitigation with FBGA regarding SGMA project and management actions at the Cienega Springs Ecological Reserve. Page 4-2 of the Draft GSP states, "The FPBGSA desires to dampen the impacts of groundwater extraction by supporting the restoration efforts at the Cienega Restoration Project. The primary action being considered by the FPBGSA is to provide supplemental groundwater to the restoration program during multiyear droughts when the shallow groundwater levels decline to below the Critical Water Level" (Draft Text, Page 4-2). Page 4-2 of the Draft GSP also states, "FPBGSA staff have engaged with CDFW representatives about this project and the conversations are continuing. A detailed Mitigation Plan will be developed after the GSP has been adopted by the FPBGSA and the GSP submitted to DWR for their review (Jan 2022)" (Draft Text, Page 4-2). CDFW had a meeting on July 12, 2021 to talk about the Cienega Riparian Complex Area with members of TNC and FBGA. Beyond any initial discussions, CDFW has not received detailed information on FBGA's mitigation proposal. CDFW is open to discussing FBGA's potential mitigation projects or management actions that may include the construction of a production well on CDFW property. CDFW believes the Cienega Riparian Complex is situated in an area of rising groundwater. This Cienega Riparian Complex should retain sufficient water levels to protect key GDEs as suggested on page ES-1 of the Draft GSP except during "below normal years of precipitation". During instances of "below normal years of precipitation," the Cienega Riparian Complex has the potential to remain resilient through project and adaptive management actions. Recommendation #4(a): CDFW recommends the installation of additional shallow monitoring wells to inform specific trigger levels and thresholds requiring adaptive management actions. Recommendation #4(b): CDFW recommends the FBGA consider alternate project and management actions as opposed to a production well on CDFW property such as: i) reduced groundwater pumping; ii) implement groundwater pumping allocations; iii) implement Arundo donax removal; and iv) increase the quantity of imported water. CDFW looks forward to discussing these project and management actions to achieve groundwater sustainability within the Basin. Recommendation #4(c): CDFW proposes the final GSP incorporate Recommendation #3(b).	The Basin is not in overdraft. CDFW representative(s) are aware of and have attended FPBGSA Board meetings, where discussion among Board members and stakeholders has occurred regarding potential mitigative actions at the Cienega Springs Restoration Project area. The Board, in consultation with stakeholders, determined that a mitigation project of supplemental water for GDE support during droughts is the best solution for all beneficial users and uses of groundwater. GSA staff have met with CDFW representatives on at least two occassions to outline the proposed mitigative program. The current high-level mitigation plan is to provide supplemental water (from an existing deep well) to restoration experts (i.e., CDFW, TNC) who already have invested time and money in formal plans to make GDEs more resiliant and have jurisdiction over and expert knowledge regarding the best use of water for GDEs. - Recommendation #4(a) - shallow MWs are proposed and planned to be installed at the CSRP area. - Recommendation #4(b) - (i) pumping reductions have been shown to be ineffective at providing total mitigation of declining water levels in prolonged droughts and functionally shift the total impact of drought-induced water level declines to groundwater pumper (including the Fish Hatchery operations). Pumpers have no control over drought-induced groundwater declines, (ii) pumping allocations are not considered reasonable by the Board and merely shift the undesirable impacts from one beneficial user group to others. An allocation program could mean that the Fish Hatchery operations would be subject to a reduction in its groundwater extractions, also. Allocations would also impact the DACs in the basin. Allocations are not favored given the ability to use supplementabl water to mitigate GDE dieoff and reduce undesirable results on GW pumpers (i.e., the economy); (iii) and (iv) are being considered by the Board following GSP adoption. - Recommendation #4(c) - see response to comment 3,A-4
Fillmore	3, A	3,A-6	California Department of Fish and Wildlife (CDFW)	10/8/2021	3.2.5	3-7	3-13	SMC - southern California steelhead	CDFW is concerned the depletion of interconnected surface waters will have undesirable impacts on the Federal Endangered Species Act (ESA)-listed southern California steelhead (Oncorhynchus mykiss or steelhead). The FBGA states on page 3-7, lines 3-13 "The Agency deliberated extensively to determine if undesirable results related to the depletion of interconnected surface water, namely loss of Steelhead rearing and spawning habitat along the Santa Clara River as a sustainability indicator, is a significant and unreasonable effect of groundwater conditions. Ultimately, the Agency does not consider this a significant and unreasonable effect related to depletions of interconnected surface water because: (1) there is no designated existing or potential beneficial use for spawning and rearing along the Santa Clara River in the Basin per the LARWQCB Basin Plan (LARWQCB, 1994); (2) there is no evidence of these fish using the surface water (except during major flood events when the Santa Clara River is fully connected with runoff); and (3) even severe (i.e., 50%) pumping reductions would not prevent the surface water at Cienega Riparian Complex from going dry during severe droughts". The Santa Clara River is designated as critical habitat for the survival of steelhead and contains important steelhead spawning and rearing habitat in Southern California (NMFS 2021). The Southern California Steelhead Recovery Plan published in January 2012 by the National Marine Fisheries Service (NMFS) identified the Santa Clara River as one of the highest priority sites for recovery actions, as one of the most likely to sustain independently viable populations, and as critical for ensuring viability of the species as a whole (NMFS, 2012). Threats to steelhead, such as excessively high-water temperatures in the spring, summer, and early fall, reduce available juvenile rearing habitat. Low flows in the fall and winter can delay adult passage to critical spawning areas. CDFW is concerned that groundwater overdraft will lead to losing streams, temperature increases, diminishing refugia pools, and a lack of connectivity flows needed for steelhead migration. Recommendation #5: CDFW believes the Sustainable Management Criteria (SMC) needs to be revised to implement measures that will protect against significant and unreasonable effects related to depletions of interconnected surface water that have been identified in the Basin. Minimum thresholds and measurable objectives for the SCR are important tools that SGMA has provided to quantify groundwater conditions and ensure groundwater sustainability. Monitoring the temperature of the Santa Clara River, which is critical to steelhead survival, is a much-needed component in the Final GSP.	- Depletion of ISW is considered not unreasonable per SWRCB designations of beneficial uses/users (which are specifically referred to in SGMA) and the lack of evidence of spawning/rearing of Steelhead to support the significance of NMFS defined critical habitat. Beneficial use related to fish is limited to migration activities, which are conceptualized to occur when large surface water flows occur along the SCR and tributaries during storm events and wet periods, rather than during dry periods when surface water flow is limited to areas of rising groundwater (i.e., the basin boundaries). The GSA hosted multiple discussions with stakeholders on the merit of including surface water temperature monitoring in the ISW MT. It is not evident how the GSA would alter the GSP if the temperature data were available. Groundwater extraction reductions during prolonged droughts have been shown to not mitigate groundwater declines and shift undesirable impacts to other beneficial uses/users (e.g., DACs, agricultural operations, municipal water supplies).
Fillmore	3, A	3,A-7	California Department of Fish and Wildlife (CDFW)	10/8/2021	2.1	2-4	15-17	Editorial	This Draft GSP, the supporting documents and appendices are not user-friendly for public review. There are several instances where a corresponding Appendix is missing in the document labelled "FPBGSA Fillmore Basin GSP Public Review Draft Text With Figures No Appendices". For example, this sentence is missing the appendix letter at the end: "More information for the VCWPD water16 resources monitoring program can be found in the Monitoring Program and Data Gaps TM (Appendix #)" (Section 2.1.2.1 Watershed Protection District of Ventura County, Page 2-4, Lines 15-17). Recommendation #6(a): CDFW recommends streamlining the Final GSP Package to ensure there are no missing documents. Recommendation #6(b): CDFW recommends the FBGA provide a red-lined version of the Final GSP to understand the changes made between the Draft GSP and Final GSP.	We have updated the list of appendices to assist the reader.

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Fillmore	3, A	3,A-8	California Department of Fish and Wildlife (CDFW)	10/8/2021	NS	NS	NS	Sensitive species and habitats	Three of the five GDEs identified in the draft GSP as wetland, and riverine features, excluded by the FPBGSA are utilized by ESA-listed Steelhead; the FESA-and California Endangered Species Act (CESA)-listed least Bell's vireo (Vireo bellii pusillus), and the FESA-CESA-listed southwestern willow flycatcher (Empidonax traillii extimus). Southwestern pond turtle (Actinemys pallida) was designated as a California Species of Special Concern (SSC) in 1994 and is known to occur throughout the Santa Clara River watershed in four of the five GDEs specified in the Draft GSP. Southwestern pond turtle preferred habitat is permanent ponds, lakes, streams, or permanent pools along intermittent streams associated with standing and slow-moving water. A potentially important limiting factor for the southwestern pond turtle is the relationship between water level and flow in off-channel water bodies (groundwater dependent), which can both be affected by groundwater pumping. Other wildlife resources that could be substantially adversely affected based on declining water levels designated as SSC include coast horned lizard (Phrynosoma blainvillii); coast patch-nosed snake (Salvadora hexalepis virgultea); California legless lizard (Anniella spp.); two-striped garter snake (Thamnophis hammondii); and burrowing owl (Athene cunicularia). If groundwater depletion results in reduced streamflow due to interconnected surface waters, the nesting and foraging success of the SSC yellow warbler (Dendroica petechia), the SSC yellow breasted chat (Icteria virens), least Bell's vireo, southwestern willow flycatcher and other bird species may be diminished due to the reduced nesting habitat and food availability. Proper management of both shallow and deep groundwater pumping combined with reduced surface water pumping and diverting such as that from the would ensure that the Basin is not negatively impacted. Unsustainable use of groundwater can impact the shallow aquifers and interconnected surface waters on which these species and GDEs reply on for survival. This may lead to adverse impacts on fish and wildlife and the habitat they need to survive. Determining the effects groundwater levels have on surface water flows in the Basin will inform how the groundwater levels may be associated with the health and abundance of riparian vegetation. Poorly managed groundwater pumping, and surface water flows have the potential to reduce the abundance and quality of riparian vegetation, reducing the amount of shade provided by the vegetation, and ultimately leading to increased water temperatures in the Basin. Additionally, shallow groundwater levels near ISWs should be monitored to ensure that groundwater use is not depleting surface water and adversely affecting fish and wildlife resources in the Basin.	There is no recorded surface water pumping in this basin. The surface water diversions in this basin average less than 100 AF/year. The GSP provides a rationale for managing groundwater extractions in the basin within sustainable parameters. The GSP increases groundwater monitoring in the areas of rising groundwater in the Fillmore Basin, particularly near the Cienega and East Grove, where rising groundwater connects to interconnected surface water (discharges to the surface, generating surface water).
Fillmore	3, A	3,A-9	California Department of Fish and Wildlife (CDFW)	10/8/2021	NS	NS	NS	CDFW - environmental conclusions	CDFW has significant concerns about data gaps in the Hydrologic Conceptual Model (HCM), Riparian Groundwater Dependent Ecosystems being eliminated, the description of the CDFW Fillmore Fish Hatchery and listing the proposed Mitigation Plan Project as a SGMA project. CDFW urges the GSA to plan for and engage in responsible groundwater management that minimizes or avoids these impacts to the maximum extent feasible as required under applicable provisions of SGMA and the Public Trust Doctrine. In conclusion, the Draft GSP does not comply with all aspects of SGMA statute and regulations, and CDFW deems the Draft GSP inadequate to protect fish and wildlife beneficial users of groundwater for the following reasons: 1. The assumptions, criteria, findings, and objectives, including the sustainability goal, undesirable results, minimum thresholds, measurable objectives, and interim milestones are not reasonable and/or not supported by the best available information and best available science. [CCR § 355.4(b)(1)] (See Comments 3,A-1, 3.A-2, and 3.A-5); 2. The Draft GSP does not identify reasonable measures and schedules to eliminate data gaps. [CCR § 355.4(b)(2)] (See Comments 3,A-1, 3,A-2, 3,A-3, 3,A-4 and 3,A-5); 3. The sustainable management criteria and projects and management actions are not commensurate with the level of understanding of the basin setting, based on the level of uncertainty, as reflected in the Draft GSP. [CCR § 355.4(b)(3)] (See Comments 3,A-2, 3,A-3, 3,A-4 and 3,A-5); and, 4. The interests of the beneficial uses that are potentially affected by the use of groundwater in the basin, have not been considered. [CCR § 355.4(b)(4)] (See Comments 3,A-1, 3,A-2, 3,A-3, 3,A-4, 3,A-5 and 3,A-9).	See responses to comments 3, A-1, -2, -3, -4, and -5.

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Fillmore	4	4-1	California Trout Inc.	10/8/2021	NS	NS	NS	Southern California steelhead	Within the FPBGSA jurisdictional area, there is federally designated critical habitat for the endangered Southern California Steelhead (Southern steelhead) in the mainstem Santa Clara River (SCR), Sespe Creek, and other smaller tributaries. Southern steelhead serve as an indicator of total watershed health and integrity. To maintain the landscape level ecosystem function and service on which we all depend, is imperative that we conserve and restore theses habitats and the processes that are needed to maintain them. Sustainable groundwater use is directly related and inseparable from the status of Southern steelhead. The Santa Clara River, while maintaining more natural character in comparison to other river systems in Southern California, has seen significant loss of habitat for Southern steelhead and other native species. This has been through extensive modification, simplification and degradation of aquatic habitats including GDEs and depletion of instreams flows due to over utilization through groundwater extractions and surface diversions. Depletion of groundwater has been shown to shrink or degrade available habitat for all development stages of southern steelhead by reducing baseflows, increasing surface water types, reducing habitat complexity, and impacting native riparian vegetation and wetland habitats (Barlow and Leake 2012, Glasser et al. 2007, Hayes et al. 2008). The value of habitat remaining in this basin was central to NMFS's Southern Steelhead Recovery Plan (NMFS 2012) assessment that the SCR should be prioritized for recovery actions. FPGSA's management area contains multiple listed riparian and aquatic species, and is central to the long- term success of Ventura and Oxnard communities. The Sustainable Groundwater Management Act (SGMA) clearly specifics the requirement to identify and consider significant and unreasonable adverse impacts to GDEs and for all recognized beneficial uses and users of groundwater including aquatic ecosystems and species dependent on interconnected waters. Unfortunately, this plan does not accomplish that task. It is California Trout Inc.'s (CalTrout) judgement that this plan does not sufficiently characterize the relationship between groundwater and GDEs or interconnected surface waters within their jurisdictional area. It has been repeated shown that groundwater management decisions in the SCR basin within the FPGSA management area have impacts on surface flow conditions and GDEs (Stillwater Sciences 2007a, 2007b).	Stillwater Sciences 2007b does not address groundwater pumping. Stillwater Sciences 2007a largely infers an effect of groundwater pumping but does not show that it has impacted surface flow and GDEs in the Santa Clara Basin. As Stillwater Sciences (2007a) states, there have been numerous pressures on vegetation including water diversions, groundwater pumping, land clearing, urbanization, and invasive species. Pumping reduces groundwater elevation, but the effect of pumping (versus inflows to the basin) on GDEs is not clear. Model results presented in the GSP show that there is an impact of groundwater management on surface flow. Reducing pumping by 50% in the model caused surface flows to decrease by an average of 4 cfs near Cienega and about 5 cfs near Willard Road in the East Grove. The effect of groundwater pumping on surface flows in Sespe Creek area is unknown. The relative influence of pumping versus water inflows to the basin on groundwater levels supporting GDEs is not well constrained. NDVI is relatively consistent during wetter periods, but it declines during droughts at the Cienega and East Grove. The widespread mortality during the most recent drought at Cienega reflects a deepening of groundwater conditions and the degree to which these are due to drought versus pumping is discussed in Appendix J Section 3.6.2.1. It is clear that pumping is not the only factor contributing to the decline in water levels during prolonged droughts (i.e., lack of precipitation). This basin displays a strong cyclic pattern of water levels declining during prolonged droughts and recover during wetter periods (even with a 50% hypothetical reduction in pumping). Additional groundwater monitoring near the GDEs will help to better constrain changes to groundwater levels and infer the influence of pumping on GDEs.
Fillmore	4	4-2	California Trout Inc.	10/8/2021	NS	NS	NS	GDE, southern California steelhead	The draft GSP shows near complete disregard for core SGMA requirements to ensure no adverse impacts to beneficial uses or users of groundwater in the GSA when they determined that the SCR Riparian Shrubland GDE has "low vulnerability to groundwater reduction" and simply serves as an upstream migration corridor during high flows. This assessment takes the narrowest vantage point possible in determining how Southern steelhead utilize different habitat types to make long-term groundwater management decisions. It also appears to be justified by incomplete or little no to data at all, a fact acknowledged by the GSP. Without robust data to support this decision, the FPGSP cannot ensure that there are not adverse impacts as a result of their future pumping allocations to this GDE.	The best available science supports our assessment of the streams in the Fillmore Basin as primarily a migration corridor for steelhead (Kelley 2004, Stoecker and Kelley 2005). Rearing is unlikely due to poor habitat and temperature conditions (Stoecker and Kelley 2005). We have added a discussion of outmigration for smolts to the technical appendix. Modeling suggests that reducing the pumping by 50% reduces instream flows by an average of 4 cfs. As outlined in the GDE Appendix, this is unlikely to affect spawning or rearing, particularly given the lack of evidence of rearing in the system. The lack of historical connection to groundwater in the Riparian Shrubland reach is supported by the absence of historical riparian forests outside of the East Grove, Cienga, and Del Valle as documented in the historical ecology assessment (Beller et al. 2011). We have revised the groundwater depth map to use 2011 groundwater levels, which shows that groundwater is generally 10 ft below the ground surface and unlikely to be connected even during wet years. Moreover, the Riparian Shrubland GDE in the Fillmore basin is comprised of plants (mostly mulefat) that are typical of higher relative elevation in the East Grove and Cienega GDEs. In these GDEs that are otherwise connected, the shallow-rooted mulefat (~ 2 ft rooting depth) typically occurs in areas where the groundwater is too deep for willow and cottonwood roots to connect with. Taken together, the historical lack of a riparian forest, groundwater data, vegetation along the channel, and observed dry conditions suggests that the riparian shrubland is not connected to groundwater.

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Fillmore	4	4-3	California Trout Inc.	10/8/2021	NS	NS	NS	GDE, southern California steelhead	The plan is particularly deficient when it comes to the relationship between groundwater quantity and the seasonality of instream flow conditions and interconnected surface waters. These habitats and biotic conditions play and critical role in southern steelhead migration to and from major tributaries that have confluences within the GSA. Sespe Creek is vital to the long-term survival of several listed species. This plan, while acknowledging that immediately upstream is perennial, then decides that connection to groundwater in the GDE is "unknown but unlikely." The plan offers not data to support this decision or any monitoring plans to determine if it is an accurate assumption.	A map of interconnected reaches has been included in the revised GSP. The lower reach of Sespe Creek is mapped as uncertain. Figure 2-2 in the revised GDE appendix shows that groundwater is relatively deep (>30 ft) upstream of Highway 126 along Sespe Creek. This is based on limited well data, but planned monitoring wells within the Sespe Creek reach will help to re-evaluate the connection to surface water for subsequent updates to the GSP. The transition from the upstream perennial section occurs where the alluvial sediment below the creek thickens toward the Santa Clara River. Limited measurements of Sespe flow near Highway 126 shown on Figure 4-7 suggest that Sespe Creek is a losing reach between the USGS gage (near the basin boundary) and Highway 126 where flows are generally a few cfs lower. Taken together it is likely that at least parts of Sespe Creek are disconnected from groundwater, but the extent of connected groundwater is somewhat uncertain.
Fillmore	4	4-4	California Trout Inc.	10/8/2021	2.1.5.2	2-15	NS	Environmental stakeholder organizations	On page 2-15, the GSP identifies Environmental Stakeholder Director for this GSA as representing the interests of the Santa Clara River Environmental Groundwater Committee. It further elaborates that this committee is under the direction of CalTrout and is comprised of the Santa Clara River Steelhead Coalition (SCRSC). This is a mischaracterization of CalTrout's role in the on-going SMGA process for this basin and of the intended purpose of the SCRSC. The SCRSC is a California Department of Fish and Wildlife (CDFW) grant funded program to advance watershed restoration project in that Santa Clara Basin that conserve and protect southern steelhead and their required habitat. There is no named or established Santa Clara River Environmental Groundwater Committee within the SCRSC. We have discussed as a group the importance of groundwater and the relationship it has on mediating fluvial ecosystem processes, but this is not our singular focus. The SCRSC supports processed-based watershed restoration that represent community developed resource management solutions. The appointed Environmental Director of this GSA does not serve at the direction of CalTrout or the SCRSC. Edit this and any other section that implies this to better reflect the representation of environmental interests in this SGMA process.	The referenced text has been corrected.
Fillmore	4	4-5	California Trout Inc.	10/8/2021	NS	NS	NS	Groundwater Dependent Ecosystems	Ultimately this plan does very little to address the adverse impact groundwater pumping has on the depletion of interconnected surface waters and GDEs. This is evident in how the plan repeatedly dismisses any relationship between groundwater pumping and GDEs or interconnected surfaces waters but routinely acknowledges that limited data was used to draw these conclusions. For the SGMA requirements of sustainability to be meet, the GSA must provide sufficient data describing the relationship between interconnected surface waters and GDEs to current and future groundwater pumping levels. This data should specifically address shallow aquifer conditions for the entire GSA planning area in the same manner and intensity that the principal aquifer is analyzed. It is only with this data collected and analyzed can we determine what sustainability indicators describe these relationships and how anticipated undesirable results will be mitigated or managed to meet the sustainability criteria set out by SGMA.	The analysis of the effects of pumping on GDEs outlined in the technical memorandum relied on trends in groundwater data through time, the groundwater model in Appendix E, our understanding of the patterns of interconnected surface water, vegetation types present along the river, and links between relative elevation of the ground surface and vegetation occurrence in forested wetlands along the Santa Clara. Individual wells show that groundwater typically declines during droughts and recovers during wetter periods. A similar trend was seen for GDEs prior to the recent drought which was long enough and severe enough to cause mortality of willows and cottonwoods in the Cienega GDE Unit. The degree to which the groundwater decline was exacerbated by pumping in this reach is not clear. The model predicted that the lack of surface flow in the Cienega shown in Figure 4-7 of the GDE Technical Appendix was exacerbated by pumping for a few months over the 3 years where surface flow was absent.
Fillmore	5	5-1	National Marine Fisheries Service	9/22/2021	NS	NS	NS	Southern California steelhead	The Draft GSP does not adequately address the recognized instream beneficial uses of the Santa Clara River or the principal tributaries within the boundaries of the Fillmore Groundwater Basin, or other GDE, potentially affected by the management of groundwater within the Fillmore Basin. In particular, Draft GSP does not adequately recognize or analyze the groundwater recharge program associated with the Fillmore Basin (and the interrelated upstream surface diversions), and its potential adverse effects on the federally endangered southern California steelhead (*Oncorhynchus mykiss*).	The GSP describes the groundwater recharge quantities and frequencies in Section 2.2.3.3 and Table 2.2-8 that are associated with water releases from Santa Felicia Dam and Castaic Lake. The GSP does not propose SMC for surface water flows in the SCR or its primary tributaries because: (1) it flows intermittently, (2) the SWRCB only designates beneficial uses related to migration (i.e., when the river flows substantially more due to storm events than groundwater contributions) and does not designate beneficial uses related to spawning or rearing, and (3) there is no evidence or documentation of O mykiss using the SCR or its tributaries within the basin (where they occur within the Basin) for spawning or rearing to support the NMFS critical habitat as a significant beneficial use. See Section 3.2.1 for updates.

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Fillmore	5	5-2	National Marine Fisheries Service	9/22/2021	NS	NS	NS	Southern California steelhead	The Draft GSP does not adequately address the depletion of interconnected shallow groundwater basins and the pattern of groundwater extraction and surface water diversions that have occurred historically, currently, and are likely to occur in the future. Of particular concern is the potential adverse effects on designated critical habitat for southern California steelhead within the Santa Clara River, and tributaries that are essential for the recovery of endangered steelhead, including Sespe Creek within the boundaries of the Fillmore Basin. The surface flows at the confluence of Sespe Creek, for example, are important for maintaining surface hydrologic connectivity for steelhead (and other native aquatic-dependent species) attempting to migrate between these major tributaries and the middle reaches of the Santa Clara River.	The GDE Appendix has an extensive discussion of steelhead in the basin focusing on fish passage and the likely lack or rearing habitat within the Fillmore and Piru basins. We have added information about outmigrating smolts to the GDE technical memorandum. The effect of groundwater pumping on flows in Sespe Creek is unknown. As shown in Figure 2-2, the groundwater is quite deep even during wet years. Additional groundwater monitoring data from Sespe Creek as described in the monitoring section will help to better understand interconnected surface water in this reach.
Fillmore	5	5-3	National Marine Fisheries Service	9/22/2021	NS	NS	NS	Southern California steelhead	National Marine Fisheries Service has previously provided extensive comments related to southern California steelhead (letter of April 01, 2021 regarding the "Draft Technical Memorandum-Assessment of Groundwater Dependent Ecosystems for the Fillmore and Piru Basins Groundwater's Sustainability Plan"), which remain largely unaddressed in the Draft GSP.	The Draft GSP provided responses to each comment in the April 01, 2021 NMFS letter on the Draft GDE Technical Memorandum. See Draft GSP Appendix C3, responses to comments numbered GDE_041 through GDE_096. As indicated in these responses, a number of changes were made to the Technical Memorandum in response to NMFS' comments. In particular, text describing the role of specific tributaries for steelhead rearing and their connection to groundwater and the principal aquifer was added to the GDE memorandum. In addition, the connection of surface water flows to groundwater in intermittent reaches was discussed in the response to comments and in the memorandum.
Fillmore	6	6-1	State University of New York College of Environmental Science, University of California Santa Barbara, and Cardiff University	10/9/2021	NS	NS	NS	Groundwater Dependent Ecosystems	Commentors shared research findings to help improve the identification and consideration of GDEs in the Fillmore Basin. These include: 1. Riparian vegetation die-off during the 2012-2016 drought is linked to groundwater decline. 2. The groundwater decline causes more water stress to riparian vegetation than climatic variables. 3. Native cottonwood and willow trees are groundwater-dependent species that rely on constant root access to groundwater for survival and growth, especially during dry summer months and in drought years. 4. The rate of groundwater level decline is as important to riparian vegetation as the absolute depth below which their roots completely lose access to the water table ("critical water depth"). 5. The installation of more shallow monitoring wells is needed to support ongoing efforts to understand the ecohydrological links between groundwater and riparian forests along the SCR. See comment letter for further discussion of these findings.	Additional monitoring wells are planned following the adoption of the GSP. We have added text about the importance of the rate of groundwater decline to the text of the GDE memo and added a reference to Kibler 2021.
Fillmore	7	7-1	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/9/2021	NS	NS	NS	Disadvantaged Communities and Drinking Water Users	The identification of Disadvantaged Communities (DACs) and drinking water users is insufficient. The GSP provides a map of DACs by block group (Figure 2-1.4). However, the plan does not document the population for each DAC. The GSP also failed to include the population dependent on groundwater as their source of drinking water in the basin. The GSP provides a density map of domestic wells in the basin. However, the plan fails to provide depth of these wells (such as minimum well depth, average well depth, or depth range) within the basin. These missing elements are required for the GSA to fully understand the specific interests and water demands of these beneficial users, and to support the consideration of beneficial users in the development of sustainable management criteria and selection of projects and management actions. Recommendations: 1. Include a map showing domestic well locations and average well depth across the basin. 2. Provide the population of each identified DAC. 3. Identify the sources of drinking water for DAC members, including an estimate of how many people rely on groundwater (e.g., domestic wells, state small water systems, and public water systems).	Figure 2.1.4 provides information on domestic well locations (with bottom of screen depths), DAC populations (with bottom of screen depth) and water sytems.

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Fillmore	7	7-2	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/9/2021	NS	NS	NS	Interconnected Surface Waters	The identification of Interconnected Surface Waters (ISWs) is insufficient, due to lack of supporting information provided for the ISW analysis. To assess ISWs, the plan refers to a previous report by United Water Conservation District, included in the GSP as Appendix E. This Appendix describes a numerical model developed for a regional area that includes the Fillmore Basin. The main text of the GSP presents a summary of annual depletions of ISW in the Fillmore Basin at two locations of the Santa Clara River. The ISW section of the GSP concludes with the statement (p. 2-59): "*Data gaps remain regarding identifying the extent and timing of interconnectedness of other stream channel areas (e.g., Sespe Creek and central portions of the Santa Clara River), due to a lack of paired groundwater level and surface water level monitoring sites. Stream conditions here are considered to vary between all three stream conditions depicted on Figure 2.2-29. The significance of interconnected surface water and groundwater conditions at these areas is less than that of the two primary areas of rising groundwater, because surface water exists in these reaches much less often (Figure 2.2-12), and therefore, provides less opportunity for beneficial uses related to aquatic habitat or surface water diversions*." However, no map is provided to show the stream reaches to which this statement refers. Without a map of labeled stream reaches in the basin, it is difficult to understand the location of these reaches, and whether the GSP has included them as potential ISWs in the GSP. In addition, it is unclear whether the GSP is only considering ISWs in areas with "rising groundwater" (gaining conditions). Under SGMA's ISW definition, they must also include losing reaches that maintain a connection with the saturated zone at any point in time and space.	
		7-2 (cont'd)							Recommendations: 1. Provide a map showing all the stream reaches in the basin, with reaches clearly labeled with stream name and interconnected or disconnected. 2. Provide more discussion in the GSP about the groundwater elevation data and streambed elevation data used to verify interconnected reaches. Include a map of the interpolated groundwater elevations and spatial extent of groundwater monitoring wells used to produce the map. Discuss screening depth of monitoring wells and ensure they are monitoring the shallow principal aquifer. 3. 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 D of the comment letter. 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. 4. On the ISW map, clearly label the areas with data gaps. While the GSP clearly identifies data gaps and their locations 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.	1. A map of the reaches has been added to the GDE memo and the discussion and Figure 2.2-27 in the GSP. 2. Water level data from the shallow aquifer zone has limited spatial distribution. The ability to generate water table contour surfaces is therefore limited. New shallow monitoring wells are planned for construction and select appropriately screen existing well are planned to be added to the monitoring network. 3. These are included in updated Stillwater GDE tech memo (Appendix E).
Fillmore	7	7-3	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/9/2021	NS	NS	NS	Groundwater Dependent Ecosystems	The identification of GDEs is incomplete. We commend the GSA for their comprehensive evaluation of GDEs in the basin, as presented in the GDE Technical Memorandum (Appendix D). The GSP mapped GDEs and potential GDEs using multiple sources, including the NC Dataset (also referred to in the GSP as the iGDE database), California Department of Fish and Wildlife (CDFW) VegCAMP, US Department of Agriculture (USDA) CalVeg, and National Wetlands Inventory data. Table 2.2-5 describes the type of GDEs in the basin with dominant flora species and acreage within the basin. Table 2.2-7 presents the critical habitat and special status species in the basin. The Appendix states (p. 21): "*In light of the limitations of the monitoring well data, the groundwater elevation data presented in this section are intended to illustrate general trends within GDE units. The spring 2019 depth to water surface (Section 2.1.2), as opposed to monitoring well data, is used to establish GDE connectivity with shallow groundwater.*" The Appendix describes the challenges with using groundwater monitoring well data for some of the GDE units and explains that 2019 groundwater levels are conservative for GDE mapping. However, we would like to see additional discussion and use of groundwater data from the pre-SGMA benchmark date of 2015 where available (e.g., pre-drought 2011 water levels) to determine which GDE units are connected to groundwater. Furthermore, we found that some mapped features in the NC dataset were improperly disregarded (i.e., coastal live oak (Quercus agrifolia) on slopes). NC dataset polygons were incorrectly excluded for mapped vegetation growing on a clear slope, based on landscape position and improbable connection to groundwater. However, without groundwater data, there is no way to confirm that these NC dataset polygons are not GDEs. If no data are available, then these polygons should be retained as potential GDEs. Recommendations: 1. For GDE units where groundwater elevation data are available, we recommend the pre-SGMA period of 2005-2015 be used to verify a connection to groundwater. If complete data from this period are not available, consider the use of data from 2011 (a wet year) since it is before the SGMA benchmark date of 2015. 2. Re-evaluate the NC dataset polygons that were removed based on their location on a slope. If groundwater elevation data are not available to verify connection to groundwater, retain these polygons as potential GDEs in the GSP.	The 30 ft depth to water was altered based on Fall 2011 water surface data. This increased the extent of GDEs in the Piru Basin, but had little influence on GDEs in the Fillmore Basin. The justification of removal of coast live oak was expanded in the text of the Section 2.1.3 GDE Appendix "These stands typically occur on the fringes of the basin, where the non-water bearing Pico Formation bedrock outcrops (Figure 2.2-3) and average slopes exceed 20%. It is therefore extremely unlikely that oaks in these areas are connected to groundwater-bearing alluvial or fluvial sedimentary formations."

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Fillmore	7	7-4	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/9/2021	NS	NS	NS	Native vegetation and managed wetlands	Native vegetation and managed wetlands are water use sectors that are required to be included in the water budget. The integration of native vegetation into the water budget is sufficient. We commend the GSA for including the groundwater demands of this ecosystem in the historical, current and projected water budgets. Managed wetlands are not mentioned in the GSP, so it is not known whether or not they are present in the basin. Recommendation: 1. State whether or not there are managed wetlands in the basin. If there are, ensure that their groundwater demands are included as separate line items in the historical, current, and projected water budgets.	There are no managed wetlands in the Basin and the water budget includes evapotranspiration values for the various land use or vegetative categories.
Fillmore	7	7-5	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/9/2021	NS	NS	NS	Stakeholder engagement	Stakeholder engagement during GSP development is insufficient. SGMA's requirement for public notice and engagement of stakeholders is not fully met by the description in the Communication and Engagement Plan (Appendix B). We note the following deficiencies with the overall stakeholder engagement process: 1. The opportunities for public involvement and engagement are described in very general terms. They include attendance at public meetings, a stakeholder email list, updates to the GSP website and social media, and information shared at meetings held by other local agencies and organizations. There is no specific outreach during the GSP development process described for environmental stakeholders and domestic well owners. 2. The Communication and Engagement Plan does not include a detailed plan for continual opportunities for engagement through the implementation phase of the GSP that is specifically directed to environmental stakeholders. Recommendations: 1. Include a more detailed and robust Communication and Engagement Plan that describes active and targeted outreach to engage DAC members, domestic well owners, and environmental stakeholders during the remainder of the GSP development process and throughout the GSP implementation phase. Refer to Attachment B of the comment letter for specific recommendations on how to actively engage stakeholders during all phases of the GSP process.	The FPBGSA conducts extensive outreach to actively engage all stakeholder interests within the basin. Additional text has been added to GSP Section 2.1.5 Notice and Communication that further describes stakeholder outreach and engagement that occured during GSP preparation, including targeted outreach to domestic well owners, including those within DACs. DACs and well owners within those communities are represented on the Board by the Ventura County, City of Fillmore, and Pumpers Association Directors. In addition, among the organizations represented by the Environmental Stakeholder Director is Central Coast Alliance United for a Sustainable Economy (CAUSE), which protects environmental and DAC interest. Outreach to DACs includes numerous mailings and communications to well owners by the Pumpers Associations and FBGSA participation at targeted stakeholder outreach and education meetings ("WaterTalks") sponsored by the Watersheds Coalition of Ventura County Integrated Regional Water Management (IRWM). Environmental interests are represented on the FPBGSA Board by the Environmental Stakeholder Director. A number of local environmental organizations nominate the Environmental Director and she regularly reaches out and coordinates with numerous local environmental organizations as described in Section 2.1.5. The Ventura County Director provides information and updates to IRWM and Santa Clara River Watershed Committee. The FPBGSA will use the Communications and Engagement Plan and continue GSP development outreach methods to engage a diversity of stakeholders through GSPimplementation.
Fillmore	7	7-6	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/9/2021	NS	NS	NS	Disadvantaged Communities and drinking water users - groundwater levels	For chronic lowering of groundwater levels, the GSP mentions impacts to DACs and domestic drinking water wells when defining undesirable results. The GSP states (p. 3-3): "Groundwater levels below the base of well perforations (or screen intervals) prevents beneficial uses (i.e., domestic) and users (i.e., DACs) from benefiting from the California Human Right to Water due to dry well conditions." However, the GSP does not sufficiently describe how the existing minimum threshold groundwater levels are consistent with avoiding undesirable results in the basin. The measurable objectives set for groundwater elevations do not consider DACs and drinking water users. Recommendations: 1. Describe further the direct and indirect impacts on DACs and drinking water users when defining undesirable results for chronic lowering of groundwater levels. 2. Consider and evaluate the impacts of selected minimum thresholds and measurable objectives on DACs and drinking water users within the basin. Further describe the impact of passing the minimum threshold for drinking water users. For example, provide the number of domestic wells that would be de-watered at the minimum threshold.	The reviewers comments suggest that DACs in the Fillmore basin are a separate group of stakeholders that are not included within other stakeholder categories. The DACs in the Fillmore basin are served by a combination of the City of Fillmore's water system, various mutual water companies, or by their own domestic wells. The GSP addresses impacts to DACs when discussing how projected future groundwater conditions will effect municipal and industrial, domestic well owners, and agricultural users. It is not correct in this basin to equate all DACs to domestic well users nor are all domestic well operators DACs. The MT for the Declining Water Level sustainability indicator was set by the FPBGSA Board of Directors at when the water levels in 25% of the representative wells (there are 11 in the Fillmore basin) decline to depths below the bottom of the well perforations (functionally a dry well). The representative wells are spatially distributed throughout the basin and complete at a variety of depths. So, the number of domestic wells that would be impacted by a MT violation would depend on which suite of the representative wells had water levels fall below the bottom of the well screen. There are several possible permutations. Qualitatively, if the deepest 25% of the representative wells exceed the MT, then several shallow domestic wells would be impacted, however if the shallowest 25% of the representative wells exceeded the MT, the number of shallow domestic wells that would be impacted will be less. Based on the forward groundwater modeling analyses that included climate change, it is considered unlikely that the MT will be exceeded. Future water levels are expected to be similar to historic levels.

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GSP	Letter No.	Comment No.	Commenter(s)	Date	Section	Page No.	Line No.	Topic	Comment	Response
Fillmore	7	7-7	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/9/2021	NS	NS	NS	Disadvantaged Communities and drinking water users - water quality	The GSP states (2-43): "*Historically water quality chemicals (analytes or constituents) of concern (COCs) in the Fillmore and Piru basins have generally included, but are not necessarily limited to, the following analytes: Total Dissolved Solids (TDS), Sulfate, Chloride, Nitrate, and Boron.*" The GSP further states (2-52): "*Additional potential COCs in the Fillmore Basin were identified [as] Radiochemistry (gross alpha and uranium), Selenium, Lead, Iron, and Manganese*." The GSP states that the minimum thresholds for degraded water quality correspond with water quality objectives (WQOs) and maximum contaminant levels (MCLs) established by the Los Angeles Regional Water Quality Control Board (LARWQCB) Basin Plan and California Division of Drinking Water (DDW), respectively. However, they are not specifically provided in Section 3 (Sustainable Management Criteria) of the GSP. For degraded water quality, the GSP does not discuss direct and indirect impacts on DACs or drinking water users when defining undesirable results for degraded water quality, nor does it evaluate the cumulative or indirect impacts of proposed minimum thresholds on these stakeholders. The GSP does not set any measurable objectives for the degraded water quality sustainability indicator. Recommendations: 1. Describe direct and indirect impacts on DACs and drinking water users 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." 2. Evaluate the cumulative or indirect impacts of proposed minimum thresholds for degraded water quality on DACs and drinking water users. 3. Include the minimum thresholds established for the identified COCs in Section 3 (Sustainable Management Criteria) of the GSP, instead of just stating that they align with drinking water standards. 3. Set measurable objectives for the degraded water quality sustainability indicator.	Evaluations of impacts to DACs are included in the evaluations for municipal, domestic, and agricultural water uses. DACS are not a separate beneficial user that is not already considered (See response to comment 7-6) The water quality MTs are the currently existing water quality objectives (WQOs) or maximum contaminant levels (MCLs) contained in a variety of regulations. All beneficial water uses are already subject to these values. The GSP is not proposing any new water quality objectives and the GSA does not have regulatory authority over water quality. The GSA is responsible for analyzing water quality changes associated with implementation of the GSP, however, the GSP does not contain any changes to the pumping regime and therefore no material water quality changes are anticipated.
Fillmore	7	7-8	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/9/2021	NS	NS	NS	Sustainable Management Criteria - Groundwater Dependent Ecosystems	We commend the GSA for their comprehensive analysis of undesirable results for GDEs and ISWs. The GSP analyzes the impacts on GDEs when defining undesirable results for three sustainability indicators (i.e., chronic lowering of groundwater levels, degraded water quality, and depletions of interconnected surface waters). For minimum thresholds, the GSP states (p. 3-9): "*The MT for groundwater levels in the Cienega Restoration / Fish Hatchery area is set at the critical water level (Kibler, 2021 and Kibler et al., 2021), 10 ft below 2011 low groundwater levels (i.e., the MO). If/when this MT is exceeded, mitigation (Section 4) will be implemented to offset the undesirable result that would occur without adequate soil moisture.*" The GSP does not, however, assess the impacts of minimum thresholds on the other GDEs in the basin. The GSP notes that the Cienega Riparian Complex has historically shown the greatest degradation due to groundwater levels (p. 2-80). It also describes this impact as an undesirable result due to groundwater levels declining, resulting in (p. 3-4) "*die off of riparian vegetation (e.g., cottonwood or willow species in the Cienega Riparian Complex GDE unit), due to groundwater level declines below the critical water level, that are attributable to groundwater pumping.* " If the minimum threshold is exceeded, the referenced mitigation action will require months or years to implement. However, there is no discussion of interim pumping reductions or other actions that could have an immediate positive impact on the undesirable result. Recommendations: 1. Provide explicit discussion of how the minimum threshold (10 feet below 2011 groundwater levels) will prevent undesirable results specifically for all GDEs in the basin, not just those in the Cienega Restoration / Fish Hatchery area. 2. State directly what the depth to groundwater corresponds to under the GDEs for the proposed minimum threshold (10 feet below 2011 groundwater levels). 3. Consider GDEs when establishing measurable objectives and evaluate the measurable objectives based on GDE water needs.	We used Kibler 2021 as the source for definig a critical water level. Kibler's analyses indicated that a 10 ft decline in the water level was an important threshold below which vegetation can die off. This relationship was presumed to be applicable to other the other GDEs. Based on Stillwater 2021a, the only GDE area to experience material die off was the Cienega/Fish Hatchery area. The explicit MT is shown at Figure 3.5-4. The MO for GDEs is the 2011 low water level which functionally represents "a full basin condition".

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GSP	Letter No.	Comment No.	Commenter(s)	Date	Section	Page No.	Line No.	Topic	Comment	Response
Fillmore	7	7-9	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/9/2021	NS	NS	NS	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 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 does 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. We acknowledge and commend the inclusion of climate change into key inputs (e.g., precipitation, evaporation, and surface water flow) of the projected water budget. Additionally, 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, 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: 1. Integrate climate change, including extreme 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. 2. Incorporate climate change scenarios into projects and management actions.	Use of the 2070CT climate change factors in the forward groundwater modeling effort indicated that the basin was in a functionally sustainable condition. Analysis of the extreme wet future climate scenario, would have resulted in the basin being "more sustainable." The 2070CT extremely dry scenario was not considered likely based on independent analyses provided by Oakley et al 2019. The 2070CT climate change factors are considered sufficient in other approved GSPs. Climate change factors were incorporated into the projected water budgets. When the GSA is prepared to consider their projects and management actions, they will likely conduct further analyses on the cost-benefit relationship under future climate scenarios.
Fillmore	7	7-10	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/9/2021	NS	NS	NS	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 basin. Figure 2.1-8 (Existing Groundwater Elevation Monitoring Programs Map) and Figure 2.1-9 (Existing Groundwater Quality Monitoring Programs Map) show that no monitoring wells are located across portions of the basin 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. The GSP provides comprehensive discussion of data gaps for GDEs and ISWs. Section 3.5.4.4.2 (Potential New Monitor Wells) discusses plans to include installation of new shallow monitoring wells to provide water level data around GDEs and ISWs, which is further described in Appendix D (Assessment of Groundwater Dependent Ecosystems for the Fillmore and Piru Basins Groundwater Sustainability Agency) and Appendix K (Monitoring Network and Data Gaps). However, this information is scattered across several locations in the GSP without a comprehensive set of maps provided. Recommendations: 1. Provide maps that overlay monitoring well locations with the locations of DACs and domestic wells to clearly identify potentially impacted areas. Increase the number of representative monitoring points (RMPs) in the shallow aquifer across the basin for the groundwater elevation and water quality groundwater condition indicators. Prioritize proximity to DACs and drinking water users when identifying new RMPs. 2. Provide maps that overlay existing and proposed monitoring well locations with the locations of GDEs and ISWs to clearly identify potentially impacted areas. 3. Describe further 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 basin. Appendix D discusses remote sensing of GDEs using NDVI or other data to monitor the health of GDEs through time, but few details are provided.	1. Additional monitoring wells are being installed with DWR Grant Funding; Figure 3.5-1 shows the locations of the proposed new wells to be added to the monitoring network. The GSA can consider adding some of the new monitoring wells to the RMP list if is assists with water resource management strategies. the data gap figure can be updated with domestic wells to demonstrate sufficient data coverage 2. Section 3 contains a figure (3.5-1) showing GDEs, ISW and proposed monitoring points. 3. The biological monitoring will be focused on the use of NDVI analyses from the Fall of each year and will be evaluated and summarized in each 5-year GSP update.

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GSP	Letter No.	Comment No.	Commenter(s)	Date	Section	Page No.	Line No.	Topic	Comment	Response
Fillmore	7	7-11	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/9/2021	NS	NS	NS	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 beneficial users of groundwater such as DACs and drinking water users. We commend the GSA for including several projects and management actions with explicit benefits to the environment. However, the GSP does not discuss the manner in which DACs and drinking water users may be benefitted or impacted by projects and management actions identified in the GSP. 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. The plan's commitment to mitigate the undesirable result on the Cienega Riparian Complex GDE is insufficient. The plan is confusing in that the mitigation refers only to the Cienega Springs Restoration project and does not seem to propose any mitigation for the Cienega Riparian Complex GDE. Furthermore, it is not clear how proposed projects 1 & 2 would mitigate impacts to the Cienega Riparian Complex GDE even if it is part of the Cienega Springs Restoration project area. Recommendations: 1. 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 of comment letter for specific recommendations on how to implement a drinking water well mitigation program. 2. 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. 3. For GDEs, include the following: 1) Add a map showing the locations of the Cienega Riparian Complex GDE and the Cienega Springs Restoration project, 2) Explain how the proposed management actions will mitigate the undesirable result occurring at the Cienega Riparian Complex GDE, 3) Develop immediate and longer term management actions to address the undesirable result occurring at the Cienega Riparian Complex (e.g., immediate pumping reductions when the minimum threshold is reached, non-native vegetation removal should die-off occur).	1. We refer to the Statewide Dry Well Reporting system for collecting information on dry well conditions (known have been reported in this system, nor at Board meetings by representatives). Domestic well users frequently fall into the de minimus category and the GSA cannot mandate that de minimus users report their groundwater extractions or water levels. The GSA can, with the approval of the de minimus user, record water levels. The GSP does not explicitedly follow the system offered in the Drinking Water Well Impact Mitigation Framework, however, many of its element have been incorporated into the GSP. For example, no "Yellow Light" or "Red Light" triggers (as presented in the DWWIMF) exist for the Fillmore basin. 2. See response to comment 7-7. The Mitigation Plan for the Cienega Springs Restoration Project has yet to be developed. The details of that plan will include a consideration of how the mitigative actions will effect both the CSRP and CRC GDEs. (3) Pumping reductions near the Santa Clara River have been shown to be ineffective at totally mitigating declining water levels during a drought. Pumping reductions likely create undesirable impacts to groundwater users such as DACs, municipalities, and agriculture. The GSP includes a potential Project and Management Action regardin non-native vegetation removal that will be considered by the GSA in the future.
		7-11 (cont'd)							4. Recharge ponds, reservoirs, and facilities for managed stormwater recharge can be designed as multiple-benefit projects to include elements that act functionally as 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" 5. Develop management actions that incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results.	Ample recharge capacity is available via the existing streams (e.g., Santa Clara River) in the Basin. The groundwater flow model (UWCD 2021b) incorporates these variables.
Fillmore	8	8-1	United Water Conservation District	10/8/2021	1.0	NS	NS	Introduction	The Fillmore basin GSP is well organized and well written. The purpose and sustainability goals of the Fillmore basin GSP are clearly defined, and the background agency information presented is consistent with United's understanding.	Comment noted
Fillmore	8	8-2	United Water Conservation District	10/8/2021	2.0	NS	NS	Plan Area and Basin Setting	United appreciated the opportunity to contribute to the Fillmore basin GSP through the development of the recent updates for the hydrogeologic conceptual model and the numerical surface water and groundwater flow modeling that were referenced and used throughout much of Section 2.0. As new data become available in the future, we look forward to collaborating with the FPBGSA to continually improving our understanding of surface water and groundwater conditions, refine the hydrogeologic conceptual model for the basin, if necessary, and refine and update the numerical surface water and groundwater models, as needed.	Comment noted
Fillmore	8	8-3	United Water Conservation District	10/8/2021	3.0	NS	NS	Sustainable Management Criteria	United believes the sustainable management criteria described in the GSP and supporting documents, including measurable objectives and minimum thresholds, are defined appropriately and are reasonable. However, we suggest that more content from Appendix J (Technical Memorandum relating to the Sustainable Management Criteria) be included within the relevant portions of the GSP document and be referenced more clearly, especially in Section 3.4 where measurable objectives are addressed. United agrees that the current understanding of present-day and future groundwater uses in Fillmore basin does not suggest that significant and unreasonable impacts should be expected for the six SGMA sustainability indicators. United agrees that undesirable results related to seawater intrusion are not applicable sustainable management criteria in Fillmore basin as described in Section 2.2.2.4 of the draft GSP. Additionally, United agrees that the potential future depletion of interconnected surface water as presented in the Fillmore basin GSP in the context of temporary habitat loss is reasonable and should not be considered a significant and unreasonable effect, as supported by the explanations mentioned in Section 3.2.5 of the draft GSP. Related to the monitoring network background, analysis, and proposed expansion, United agrees with the information provided in Section 3 of Fillmore basin's draft GSP and looks forward to supporting efforts to collect additional data related to the current and proposed expansion of the monitoring network for the sustainable management criteria for which sustainable management criteria have been developed.	See updated Section 3.4
Fillmore	8	8-4	United Water Conservation District	10/8/2021	4.0	NS	NS	Projects and Management Actions	United agrees with the proposed projects and management actions that support the five sustainable management criteria for which sustainable management criteria have been developed. We agree that these projects and management actions have the potential to enhance the water resources of the Fillmore basin and aid in keeping the basin closer to the desired future conditions. United looks forward to supporting efforts related to ongoing project planning and implementation in the near future.	Comment noted

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GSP	Letter No.	Comment No.	Commenter(s)	Date	Section	Page No.	Line No.	Topic	Comment	Response
Fillmore	8	8-5	United Water Conservation District	10/8/2021	5.0	NS	NS	Implementation	United is committed to supporting efforts related to ongoing project planning and implementation in the future.	Comment noted
Fillmore	9	9-1	Ventura County Public Works Agency	10/8/2021	Executive Summary	ES-1	NS	Editorial - SMC terminology	On page ES-1, it is recommended that the sustainability criteria be renamed to match the terminology used in the regulations: 1. Chronic Lowering of Groundwater Levels 2. Reduction of Groundwater Storage 3. Seawater Intrusion 4. Degraded Water Quality 5. Land Subsidence 6. Depletions of Interconnected Surface Water	See updated ES-1.
Fillmore	9	9-2	Ventura County Public Works Agency	10/8/2021	Executive Summary	ES-1	NS	Sustainable Management Criteria, Groundwater Dependent Ecosystems and Interconnected Surface Waters	On page ES-1, the rationale for exclusion of the sustainable management criteria (SMC) for Interconnected Surface Water because it is "not applicable due to significant effect of droughts that deplete rising groundwater areas" should be explained in more detail. There is interconnected surface water as well as GDEs supported by rising groundwater, all of which are influenced by the hydrology, including groundwater pumping. This comment applies to all portions of the Draft where interconnected surface water and GDEs are discussed and the SMC is excluded, particularly in Section 3 (SMC).	See Sections 2.2.1.5.6, 2.2.2.7 and 3.2.1 in the GSP, as well as additional technical details in Appendix J.
Fillmore	9	9-3	Ventura County Public Works Agency	10/8/2021	NS	NS	NS	Editorial, groundwater model	There are references to the groundwater model in Appendix E throughout the text body. It would be helpful to include a summary discussion on the model in the GSP text rather than requiring the reader to review the detailed modeling appendix.	Comment noted
Fillmore	9	9-4	Ventura County Public Works Agency	10/8/2021	2.1.3	2-8	11-16	Water demand changes	On page 2-8, section 2.1.3, lines 11-16, there should be a description of the assumptions/estimate of demand changes or reasons for why demand changes that are not going to occur.	See updated Section 2.1.3 (reference to land use zoning and General Plan CURB zones)
Fillmore	9	9-5	Ventura County Public Works Agency	10/8/2021	2.2.1.4	NS	NS	Editorial - aquifer descriptions	Section 2.2.1.4 lists the two principal aquifers in the Subbasin (unconfined Main Aquifer and the semi-confined Deep Aquifer). There are subsequent references to Aquifer Zones A, B and C per United (2021a). Discussion of the relationship between the principal aquifers and the Aquifer Zones is not introduced until Section 3.5.4.2. It would be helpful to the reader to introduce this relationship in Section 2.2.1.4 and when discussing Aquifer Zones in other parts of the text. Further, it would be helpful to include the relative depths (and thickness) of these aquifers and the aquitard separating them found in Section 2.2.1.4.2 to better support Section 2.2.1.3.	See responses to comments 1-1, 1-2, and 1-3. See updated Section 2.2.1.4.
Fillmore	9	9-6	Ventura County Public Works Agency	10/8/2021	2.2.2.5.2	NS	NS	Nitrate concentration	Section 2.2.2.5.2 reports that elevated nitrate concentrations in the Fillmore area may be related to agricultural practices. Septic and wastewater treatment systems may also contribute to the higher concentrations of nitrates.	See updated Section 2.2.2.5.2.
Fillmore	9	9-7	Ventura County Public Works Agency	10/8/2021	NS	2-46, 2-56	NS	Editorial - constituents of concern	On pages 2-46 and 2-56, a summary table of constituents of concern (COCs) would be helpful by showing the maximum and minimum regulatory COC thresholds.	Comment noted. The GSP is purposely generic on this topic so that all future changes to water quality regulatory threshold are incorporated by reference.
Fillmore	9	9-8	Ventura County Public Works Agency	10/8/2021	Figures	Figure 2.2-19	NA	Editorial - graphic legend	A legend should be provided on Figure 2.2–19 clarifying what the different color dots represent.	See updated figure
Fillmore	9	9-9	Ventura County Public Works Agency	10/8/2021	NS	NS	NS	Editorial - fugure numbers	The water budget graphic is incorrectly identified as Figure 2.2-30 in the text. It should be identified as Figure 2.2-33.	The text has been adjusted.
Fillmore	9	9-10	Ventura County Public Works Agency	10/8/2021	2.2.2.7	NS	NS	Surface water diversions	It would be informative to list surface water diversions for the tributaries of the Santa Clara River within the Subbasin and estimated annual quantity of diverted water for each (Section 2.2.2.7). Is this represented as the "Unaccounted Flows" value in Table 2.2-11?	See updated Sections 2.2.2.7 and 2.2.3.1.2
Fillmore	9	9-11	Ventura County Public Works Agency	10/8/2021	2.2.3.3.2	2-72	3-6	Pumping levels	On page 2-72, lines 3-6, the apparent reduction in average pumping demand during the current drought is inferred, as metered pumping data are not available. The lower recent pumping could be an artifact of the water budget calculations and not supported by evidence (pumping data and/or groundwater levels).	This is based on estimates from production data reported to United (i.e., Fish Hatchery reduced pumping significantly).
Fillmore	9	9-12	Ventura County Public Works Agency	10/8/2021	3.0	3-1	22-25	Stakeholder engagement	On page 3-1, lines 22–25, were disadvantaged communities (DACs) and private well owners actively involved in the stakeholder process? It would be beneficial to add this information to the text.	See response to Comment 7-5, above.
Fillmore	9	9-13	Ventura County Public Works Agency	10/8/2021	3.2.4	3-6	22-24	Editorial - monitoring sites	On page 3-6, lines 22 – 24, it is unclear if the representative monitoring sites are included in the network at this time. Summary tables in the text would be helpful.	The Rep. Monitoring Sites are currently in the monitoring network. Summary table is added
Fillmore	9	9-14	Ventura County Public Works Agency	10/8/2021	3.3.5	3-11	NS	Subsidence minimum threshold	On page 3-11, section 3.3.5, the text should provide the rationale for establishment of the subsidence MT by the FPBGSA Board of Directors.	The subsidence MT is established based on tech memo from Pumper's Association / Bryan Bondy.
Fillmore	9	9-15	Ventura County Public Works Agency	10/8/2021	4	NS	NS	Projects	It could be beneficial to include a project in Section 4 to survey existing wells within the Subbasin for well status and annual extractions.	UWCD compiles the groundwater extraction data from known active wells in the basin. Should the basin begin to approach the sustainable yield value, then updating the well status might identify previously unknown extractors.

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Fillmore	9	9-16	Ventura County Public Works Agency	10/8/2021	4.2, 4.3	4-3	NS	Projects	On page 4-3, the narrative should be revised to indicate the difference between Projects 2 and 3 for shallow monitoring wells. Where are the wells in Project 3 likely to be needed?	Project 2 includes wells in the Cienega Springs Restoration Project area. Project 3 is for locations outside of the CSRP. Additional monitoring wells might be appropriate, if they assist the GSA in managing the basin, near the Sespe Creek and Santa Clara River confluence, for example. Other locations could be added as the GSA identifies the need to augment the current monitoring program network.

APPENDIX C-2. RESPONSE TO COMMENTS ON THE PIRU BASIN DRAFT GSP

The Fillmore and Piru Basin Groundwater Sustainability Agency (FPBGSA) received the following comment letters and comments via its website. Each of the comments is included in and responded to on the following Response to Comments table. The full comment letters are available at the FPBGSA website at https://www.fpbgsa.org/comments-received-for-fillmore-basin/.

Letters:

1. Bondy Groundwater Consulting, Inc., September 29, 2021 (Same comment letter as for Fillmore)
2. California Department of Fish and Wildlife, October 20, 2021
3. Los Angeles County Sanitation Districts, October 22, 2021
4. State University of New York College of Environmental Science and Forestry, University of California Santa Barbara, and Cardiff University, October 22, 2021
5. The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund, October 20, 2021
6. United Water Conservation District, October 22, 2021
7. Ventura County Public Works Agency, Watershed Protection, October 21, 2021

Comments Submitted Via Website:

A. California Department of Fish and Wildlife, October 21, 2021 (Same as letter)
B. State University of New York College of Environmental Science and Forestry, October 22, 2021 (same as letter)

RESPONSE TO PUBLIC COMMENTS - PIRU GSP

GSP	Letter No.	Comment No.	Commenter(s)	Date	Section	Page No.	Line No.	Topic	Comment	Response
Piru	1	1-1	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Principal aquifers	Two principal aquifers are proposed in the GSPs. The proposed "Main Aquifer" consists of "Aquifer Systems" A & B. The proposed "Deep Aquifer" consists of "Aquifer System" C. The terminology used in the GSP may not be appropriate and may create confusion for some readers. Specifically, how can an "aquifer" consist of one or more "aquifer systems"? It is recommended that the A, B, and C "Aquifer Systems" be referred to as zones or horizons instead to avoid confusion.	We concur that the usage of Aquifer, Aquifer System, and Aquifer Zone was potentially confusing. Upon consultation with the commenter, UWCD, and DWR, we have adjusted the language in the GSP to a single Principal Aquifer composed of Aquifer Zones A and B. Zone C is designated as a non-Principal Aquifer. References to Aquifer System(s) have been removed.
Piru	1	1-2	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Principal aquifers	The identification of multiple principal aquifers appears to be based exclusively on technical criteria without consideration of the management and cost implication. The technical reasons provided include: (1) "the distribution and extent of hydraulic properties (i.e., hydraulic conductivity) in the United (2021a) VRGWFM", (2) unconfined vs. semi-confined conditions, and (3) an aquitard between the B and C "Aquifer Systems". Given that there is only one "Aquifer System" C groundwater elevation monitoring well in each basin, it does not appear that sufficient data are available to evaluate the degree of confinement of "Aquifer System" C. Similarly, there are insufficient borehole data to conclude that the aquitard between "Aquifer Systems" B and C is continuous across the Basins. This is indicated by the GSP cross-sections, which do not depict geologic strata beneath "Aquifer System" B over large portions of the Basins due to a lack of data at depth.	"See previous comment" We concur that the usage of Aquifer, Aquifer System, and Aquifer Zone was potentially confusing. Upon consultation with the commenter, UWCD, and DWR, we have adjusted the language in the GSP to a single Principal Aquifer composed of Aquifer Zones A and B. Zone C is designated as a non-Principal Aquifer. References to Aquifer System(s) have been removed.
Piru	1	1-3	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Principal aquifers	It is unclear whether identification of the "Deep Aquifer" is consistent with the definition of the term "principal aquifer". (GSP Emergency Regulations § 351 (aa) defines "Principal aquifers" as aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems.) Specifically, it is unclear whether the "Deep Aquifer" transmits significant or economic quantities of groundwater to wells. The GSPs indicate that only 1 to 4% of verifiable pumping in the basins occurs from this zone. Furthermore, the GSPs refer to "Deep Aquifer" pumping as "minor" when discounting "Deep Aquifer" data gaps. At a minimum, the designation of the "Deep Aquifer" as a Principal Aquifer contradicts the statements about the "minor" pumping from the "Deep Aquifer".	Aquifer Zone C is no longer referred to as a Principal Aquifer. Although there are a few wells extracting from this zone, the quantity of water being pumped is not a predominant source in the basin.
Piru	1	1-4	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Principal aquifers	The most significant concern is the apparent lack of consideration of the management and cost implications of the decision to identify the "Deep Aquifer" as a separate principal aquifer. The GSP does not communicate what management objective(s) would be met by identifying the "Deep Aquifer" as a principal aquifer. Rather, the GSP argues the opposite - that there is little concern about the "Deep Aquifer" because there is only a minor amount of pumping sourced from it. It is unclear why this small amount of pumping requires special consideration in the GSPs and how identifying separate principal aquifers furthers management of the basins. Moreover, the GSP does not consider the costs for complying with the additional self-imposed requirements that come with this decision. Specifically, the GSP Emergency Regulations require the following for each Principal Aquifer: 1. Hydrogeologic Conceptual Model GSP Section: a. General water quality b. Vertical and lateral extent 2. Groundwater Conditions GSP Section: a. Groundwater elevation contour maps b. Groundwater elevation hydrographs c. Hydraulic gradients between the Principal Aquifers 3. Monitoring Network: a. Sufficient density of monitoring wells to collect representative measurements in each Principal Aquifer to: i. Demonstrate groundwater flow directions ii. Demonstrate water quality iii. Calculate hydraulic gradients between Principal Aquifers 4. Annual Reports: a. Change in storage for each Principal Aquifer	See responses to comments 1-1, 1-2, and 1-3.
Piru	1	1-5	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Sustainable yield	The sustainable yields presented in the GSPs are based on the "pumping minus change in storage" approach applied to the water budget data. This approach underestimates the sustainable yield because it ignores the fact that the basins refill completely periodically and reject potential recharge during such periods. Simply stated, the basins could recover with higher pumping rates than used in the water budgets. Modeling results presented during various meetings have demonstrated this fact very clearly. Moreover, the basins experienced deeper groundwater levels prior to the historical water budget period without reported undesirable results, further suggesting that the sustainable yield is greater than that which results from a strict application of the "pumping minus change in storage" mathematics. Ideally, the sustainable yield would be estimated using numerical model simulations designed to estimate the true potential and resiliency of the basins. If this is not feasible in the time remaining for GSP completion, then it is recommended that the GSPs be updated to caveat the sustainable yield values as noted above.	- The "pumping minus change in storage" calculation is considered a minimum sustainable yield estimate (based on 50 year historical record adjusted for 2070CT climate change and associated increased pumping demand. The change in storage SMC will be updated to reflect using GW levels as a proxy.
Piru	1	1-6	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Data gaps	GSP Emergency Regulations § 351(l) defines "data gaps" as a "lack of information that significantly affects the understanding of the basin setting or evaluation of the efficacy of Plan implementation and could limit the ability to assess whether a basin is being sustainably managed." A potential interpretation of this definition is that anything identified as a "data gap" would need to be addressed during GSP implementation. The GSP Emergency Regulations make this clear for the monitoring network - "data gaps" must be addressed within five years following GSP adoption (GSP Emergency Regulations § 354.38(d)). A concern is that the term "data gap" is used in the GSP to describe data limitations that are not necessary to address to sustainably manage the Basins and for which the GSA has no plan to address. It is recommended that each use of the term "data gap" be carefully reconsidered to determine if the item in question is really a data gap as defined by the GSP Emergency Regulations. It is recommended that any items that are not truly data gaps (as defined by the GSP Emergency Regulations) and/or that the GSA is not committed to addressing be characterized using a different term, such as "data limitation" or "potential data gap."	"Data gaps" usage will be revised to only reflect HCM and SMC items that limit implementation of the GSP and assessment of sustainability. References to "data gaps" altered to "potential data gaps", where appropriate.

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Piru	1	1-7	Bondy Groundwater Consulting, Inc.	9/29/2021	2.2.2.7, 3.2.5	NS	NS	Depletions of interconnected surface water - calculations	Calculations of interconnected surface water depletion are presented in Section 2.2.2.7 and referred to in Section 3.2.5. These calculations were developed by running the VRGWFM with historical pumping rates and comparing to a second simulation which employed a hypothetical 50% reduction in basin wide pumping. Appendix J discussed changes in streamflow using a similar analysis that eliminated pumping within 1 mile of the Santa Clara River. Both approaches do not calculate the full amount of depletion, as seems to be required by the GSP Emergency Regulations. In particular, indirect depletion2 is being underestimated. It is recommended that the analysis be revised to include removal of all pumping to fully estimate depletions. Doing so will ensure compliance with the GSP Emergency Regulations and provide a more robust technical basis and transparency for the decision to screen out the depletions of interconnected surface water sustainability indicator.	Our interpretation of the Emergency Regulations are a bit more pragmatic. The goal is to quantify the amount of surface water depletion due to groundwater extractions, which for this basin is possible at the East Grove and Fish Hatchery areas. The relationship between surface water flow (i.e., rising groundwater) is approximated by the empirical relationships between water levels in key wells and manual surface water flow measurements. The manual measurements are constrained to some upper limit that incorporates consideration of personnel safety while gathering the flow data. Hence the data in Figures 2-4 and 3-16 in Appendix J have upper flow rates at or near 50 cfs. The empirical relationship does not extend beyond this value, so if the water levels in the key wells rise to an elevation that falls outside the range of the field measurement (due to the hypothetical elimination of all groundwater extractions in the groundwater flow model), we do not currently have a mechanism to quantify that flow rate. The best available information for this topic is the empirical relationship.
Piru	1	1-8	Bondy Groundwater Consulting, Inc.	9/29/2021	3.2.5	NS	NS	Depletions of interconnected surface water - SMC	The justification for not developing SMC for the depletions of interconnected surface water sustainability indicator can be better described. Only a few sentences are devoted to this critical decision. The concern is that the basis for not developing SMC will be unclear to those who did not directly participate in the planning process, including certain stakeholders and DWR reviewers. It is suggested that Section 3.2.5 be expanded to more fully present the rationale for not developing depletions of interconnected surface water SMC. For example, Point No. 2 in Section 3.2.5 should be supported with appropriate references. Pertinent information from the Stillwater memo appendix could be summarized here together with a more detailed description of why the decision to not develop depletions of interconnected surface water SMC is not inconsistent with designation of the Santa Clara River as critical habitat for steelhead. Lastly, consider more fully describing the process for reaching the decision. More description of the number of meetings this matter was discussed, outreach, feedback received, etc. could be included to support the decision.	See the updated language in Appendix J, Section 3.6.5 and GSP Section 3.2.1.
Piru	1	1-9	Bondy Groundwater Consulting, Inc.	9/29/2021	Appendix J, Section 3.6.5	NS	NS	Depletions of interconnected surface water - SMC	Appendix J, Section 3.6.5 makes the argument no significant and unreasonable effects will occur because estimated past and future depletion rates are similar. This logic is questionable. For example, could GSAs in the Central Valley continue with subsidence so long as the subsidence rates are less than or equal to historical rates? Probably not. A potentially stronger argument may be that there have not been reported undesirable results historically and depletion rates are not projected to increase; therefore, undesirable results are not expected in the future. The lack of reported undesirable results should be emphasized and supported in the GSP and appendix to provide a more solid basis for not developing depletions of interconnected surface water SMC.	The rate of subsidence is not similar to rate of ISW depletions (the rate of ISW depletion at East Grove and Fish Hatchery areas fluctuates within a range of values through time), while a constant rate of subsidence will result in cumulatively worse conditions over time. Section 3.6.5 in Appendix J has been revised to expand on the rationale for not developing a MT.
Piru	1	1-10	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Degraded water quality - SMC	The GSP establishes minimum thresholds and measurable objectives for degraded water quality but then says the GSA is not responsible for meeting them. This approach does not appear to be consistent with the GSP Emergency Regulations because it does not address any degradation that could be caused by pumping or plan implementation. DWR has been very clear that GSPs must address any potential degradation that may be caused by pumping or plan implementation. The GSPs do not provide information concerning whether pumping or plan implementation can potentially cause water quality degradation. If there is no nexus between water quality degradation and groundwater pumping or plan implementation, then the GSPs should present the technical evidence, clearly state there is no nexus, and use this information to further justify the approach for this sustainability indicator. If there is potential for groundwater pumping or plan implementation to degrade water quality, then the GSPs should describe that potential and caveat the SMC by saying the criteria only apply if GSA determines that the degradation in question is being caused by pumping or plan implementation. This is the approach taken by several other GSAs.	Section 3.3.4 of the GSP states that the GSA will continue the water quality monitoring program during GSP implementation to assess if any observed material water quality changes are caused by the implementation actions. Neither historical or current extraction rates or water levels have resulted in undesirable GW quality results. The GSP does not propose any projects or management actions that would change the groundwater extraction regime in the basin.
Piru	1	1-11	Bondy Groundwater Consulting, Inc.	9/29/2021	3.2.3.1, 3.3.1	NS	NS	Chronic lowering of groundwater levels	Section 3.2.3.1 of the GSPs states that an undesirable result for chronic lowering of groundwater levels occurs when groundwater elevations drop below the bottom of well perforations (i.e., screen) in 25% of the representative monitoring sites. Section 3.3.1 goes on to say that "the Agency acknowledges wells going dry is an undesirable result, yet, a certain number of shallow water wells (i.e., less than 100 ft deep) going dry is acceptable (see DBS&A, 2021c [Appendix J]). A concern is that justification for the 25% criterion and "a certain number of shallow water wells going dry" is not supported by an analysis of impacts on beneficial uses. There is a concern that the DWR reviewers may conclude that there is insufficient justification for this criterion. It is suggested that the GSP be expanded to include a description of the effects on beneficial uses that would be expected if groundwater levels reached the minimum threshold levels and to provide justification for why those effects are not considered to be significant and unreasonable.	See updated language in Section 3.2.3.1 of the GSP
Piru	1	1-12	Bondy Groundwater Consulting, Inc.	9/29/2021	3.3.2, 3.4 Appendix J	NS	NS	Reduction of groundwater storage	The GSP text and SMC Appendix (Appendix J) are in conflict. The GSP text (Section 3.3.2) uses the sustainable yield for the minimum threshold. In contrast, Appendix J uses groundwater levels as a proxy and adopts the minimum thresholds for the chronic lowering of groundwater levels sustainability indicator. The GSP text (Section 3.4) does not establish a measurable objective. In contrast, Appendix J uses groundwater levels as a proxy and adopts the measurable objective for the chronic lowering of groundwater levels sustainability indicator. The approach proposed in Appendix J is preferred because of the sustainable yield values presented in the GSPs understate the true pumping potential of the basins, as discussed in an earlier comment.	We have adjusted the text to remove the conflict.
Piru	1	1-13	Bondy Groundwater Consulting, Inc.	9/29/2021	NS	NS	NS	Implementation costs	Implementation costs were not included in the draft GSP. These should be made available as soon as possible for stakeholder review.	Full implementation costs can be developed once the Mitigation Plan for supplying supplemental groundwater supplies to the Cienega Springs Restoration project has been prepared and the Board of Directors has the opportunity to consider the other projects identified in Section 4 of the GSP.

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Piru	1	1-14	Bondy Groundwater Consulting, Inc.	9/29/2021	3.2.2, 3.2.3	NS	NS	Groundwater levels and quality	GSP Sections 3.2.2 state that "water quality degradation beyond historical conditions" is an undesirable result. GSP Sections 3.2.3 state that "groundwater levels changes (i.e., declines) can extend to any of the applicable undesirable results. When considering these statements together, there is an implication that a causal relationship between groundwater levels and groundwater quality exists. The GSPs do not provide technical information to justify or refute a causal relationship between groundwater levels and groundwater quality. More information should be provided in the GSPs to clarify whether declining groundwater levels cause groundwater quality degradation. The statement in Section 3.2.3 should be revised if it is concluded that declining groundwater levels do not cause groundwater quality degradation.	Pumping does not have an evident impact on GW quality, based on analysis of GW level and quality trends (Appendix K, Section 2.2.2.5.2). The documented historical fluctuations in water levels have not resulted in undesirable results.
Piru	2, A	2,A-1	California Department of Fish and Wildlife (CDFW)	10/20/2021	2.2.1.6, Appendix K	2-35; Appendix K page 132	15-19	Hydrologic Conceptual Model (HCM) data gaps	There is insufficient information in the Draft GSP about the hydrologic interconnection between the shallow aquifer and the Main aquifer. Page 2-35 of the Draft GSP states, "Data gaps (Figure 2.2-14) in the HCM comprise a lack of groundwater level data in the shallow groundwater of the Main Aquifer along the streams (e.g., Santa Clara River and Piru Creek), and a lack of groundwater level data in the Deep Aquifer. The shallow groundwater data gaps in the stream areas will be addressed with the installation of monitoring wells by the Agency (per DWR Grant Funding) and installation of shallow monitoring wells by UCSB (Stillwater, 2021b)". CDFW appreciates the efforts the GSA undertook to analyze the Basin in terms of geologic and hydrogeologic characterization. CDFW also appreciates PBGA's proposed plans to utilize the updated HCM to fill in the data gaps and deficiencies identified in the Draft GSP. However, there is a need for a better understanding of the interactions between interconnected surface water and groundwater particularly in the GDE areas mentioned below in Comment 2,A-2. Additional clarification is needed in the final GSP along with a description of future assessments on how this data gap will be addressed. Recommendation #1(a): Accurate hydrogeologic modeling requires an accurate and complete data set. CDFW recommends the installation of shallow groundwater monitoring wells near potential GDEs and interconnected surface waters. Recommendation #1(b): CDFW also recommends pairing multiple-completion wells with additional streamflow gages to facilitate an improved understanding of surface water- groundwater interconnectivity and subsurface recharge channels. CDFW agrees with the PBGA proposal to install more multiple-well monitoring facilities across the basin. The Draft GSP states that "Construction of twenty of these facilities equally spaced across the Basins would greatly decrease GSP analysis uncertainty and would be consistent with the DWR's data quality recommendations but would likely be cost prohibitive for FPBGSA rate payers in the Fillmore and Piru Basins." (Page 3-33, Lines 20-23, Draft Text). CDFW recommends the PBGA commit to a more modest number of strategically placed well monitoring facilities in the Project and Management Actions.	- Surface water occurs at limited areas during various time periods. The only perennial surface water areas are the East Grove, followed by Cienega Riparian Complex (which goes dry during drought periods). The other GDE areas depend on groundwater and occasionally have surface water present nearby. - RE: Recommendation #1(a) - the GSA plans to install shallow GW monitoring wells near the GDEs - RE: Recommendation #1(b) - streamflow gages have been considered infeasible in the SCR and lower Sespe Creek channels by USGS, Ventura County and United. Multi-completion wells are not necessary (only clustered, single-completion wells are necessary) for understanding shallow GW levels near/beneath GDEs. The difficulty of maintaining streamflow gages within the basin prevents characterization of potential interconnected SW, with the limited exception of identifying surface water with aerial imagery and/or field mapping.
Piru	2, A	2,A-2	California Department of Fish and Wildlife (CDFW)	10/20/2021	Appendix D, Section 6.4.1	Appendix D page 98	NS	Groundwater Dependent Ecosystems	The Draft GSP presents a thorough analysis of ecosystems potentially reliant on groundwater known as "indicators of groundwater dependent ecosystems" (ridges), however, of the five areas within the Basin that were mapped as containing iGDEs, only one area was considered as certain to be groundwater dependent. (Appendix D, Section 6.4.1, Piru Groundwater Basin, starting on Page 98). They are as follows: •Area 1 – Cienega Riparian Complex Area: 154 acres with mulefat and giant reed (Arundo donax); •Area 2 – Del Valle: 433 acres with riparian forest and widespread willows and cottonwoods; •Area 3 – Piru Basin Santa Clara River Riparian Shrubland: 317 acres; giant reed (Arundo donax), patches of sandbar willows and large mulefat thickets; •Area 4 – Piru Creek Riparian: 246 acres; and, •Area 5 – Piru Basin Tributary Riparian: 5.6 acres. The PBGA utilized three categories when evaluating groundwater dependence of iGDEs: unlikely, possible, and certain. The Cienega Riparian Complex Area was the only GDE to be categorized as certain to be dependent on groundwater. The Del Valle GDE was categorized as likely to be groundwater dependent. The Piru Basin Santa Clara River Riparian GDE was categorized as possible to be groundwater dependent. The Piru Basin Tributary Riparian GDE Unit and Piru Creek Riparian GDE were categorized as unlikely to be groundwater dependent. The PBGA indicated that the Del Valle GDE was located where "Perennial surface water flows are likely connected with groundwater" (Appendix D, Page 98). The PBGA indicated that the Piru Basin Santa Clara River Riparian GDE was located where "Intermittent surface flows are not connected with groundwater" (Appendix D, Page 100). The PBGA indicated that the Piru Basin Tributary Riparian GDE was located where "Intermittent and ephemeral surface water flows are not connected with groundwater. Hopper Canyon Creek within the Piru Basin may be a passage corridor for O. mykiss, but is likely dependent on surface water flows rather than groundwater for passage" (Appendix D, Page 104). The PBGA indicated that the Piru Creek Riparian GDE was located where "Groundwater wells in the rooting zone of plants (<30 ft) are rare in this unit and Releases from Santa Felicia Dam sustain surface flows" (Appendix D, Page 103).	No comment needed
Piru		2,A-2 (cont'd)							The Draft GSP uses words such as "likely not connected" and "unknown but unlikely" to rule out GDEs from further monitoring because there are data gaps in the monitoring system. The elevation and movement of subsurface flow is uncertain as is the interconnectivity of surface water relative to shallow aquifers and the main aquifers. CDFW believes the shallow perched groundwater, shallow alluvium, and surface water can still be connected to groundwater and hydrologic connectivity cannot be ruled out. These sources of water could be impacted in the future by new production wells that would adversely affect these GDEs. Water Code § 10721 (x)(6) requires GSPs avoid significant and unreasonable adverse impacts to beneficial uses of surface water including aquatic ecosystems reliant on interconnected surface water. If hydrologic-connectivity exists between a terrestrial or aquatic ecosystem and groundwater, then that ecosystem is a potential GDE and must be identified in a GSP. [23 CCR§354.16 (g).] Hydrologic-connectivity between surface water and groundwater, as well as groundwater-accessibility to terrestrial vegetation, must, therefore, be evaluated carefully, and conclusions should be well-supported. Hydrologic-connectivity considerations include connected surface waters, disconnected surface waters and transition surface waters. According to The Nature Conservancy (TNC), "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" (TNC 2019). CDFW believes shallow perched aquifers, intermittent surface flows and shallow alluvial aquifers, although rarely used for a water supply, are extremely important to the ecological communities or species that depend on groundwater emerging from all aquifers or from groundwater occurring near the surface within the Basin.	The presence of extensive shallow perched aquifers in the Piru Basin has not been shown, although the area of rising groundwater near the Fillmore/Piru basin boundary is a possible area. The FPBGSA has an ongoing project to install three shallow monitoring wells in this area to investigate those waters and provide properly constructed monitoring locations. The TNC (2019) reference is a general comment and the inference that there are significant vertical gradients across the hydrostratigraphic units in the Piru basin is not supported by the data. Intermittent surface water flow (detached from the underlying aquifers) is not, by definition, groundwater. If vegetation, for example, is supported by the intermittent surface water flows, it does not meet the definition of a Groundwater Dependent Ecosystem. It is well documented that much of the Santa Clara River in the Piru Basin is disconnected from the underlying aquifers with the exception being the area of rising groundwater near the Fillmore/Piru basin boundary.

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Piru		2,A-2 (cont'd)							Recommendation #2(a): CDFW recommends the five areas within the Basin that were mapped as containing potential GDEs be included in the Final GSP as GDEs because these areas rely on the shallow perched groundwater, bedrock groundwater and/or surface water within the Basin. The PBGA has not provided enough data to make the assertion that the groundwater interaction with these GDEs should remain omitted. Water in the shallow alluvial aquifer can also percolate to the main aquifer below. As groundwater pumping occurs from the principal aquifer, water from the shallow alluvial aquifer can become depleted as it recharges the principal aquifer. These are important contributions to sustaining these habitats and Areas 3, 4, and 5 should be reinstated in the Final GSP as GDEs. This shallow alluvial "aquifer" needs to be protected under SGMA. If these GDEs are adversely impacted, groundwater plans should be in place to facilitate appropriate and timely monitoring and management response actions. Recommendation #2(b): CDFW recommends that the best scientific data on depth to groundwater be included in the analysis of interconnected surface waters before any data is excluded. USGS mapped springs/seeps and comparisons of recent groundwater level contours to vegetation root zones should also be included in the analysis. Mapping GDEs and other beneficial uses is an essential component in the consideration, development, and implementation of GSPs (Water Code §10723.2) and in assessing the potential effects on groundwater beneficial uses. GSAs must also include sustainable management criteria and monitoring to detect adverse impacts on all groundwater beneficial users. Recommendation #2(c): CDFW recommends using Normalized Difference Vegetation Index (NDVI) and Normalized Difference Moisture Index (NDMI) to assess habitat health for all five areas on an annual basis and should inform the revision of both the planning and minimum thresholds for the representative wells to within or near the historic baseline. CDFW does not recommend relying solely on soils information. For example, the presence of sandy, dry, and friable soils, does not mean that existing plant species do not rely on groundwater for some portion of their life cycle. Capillary fringe associated with root networks from native plants could be accessing groundwater from deeper depths.	A) There isn't any evidence that potential GDEs rely on perched groundwater or groundwater from the bedrock. The Riparian Shrubland GDEs are mostly comprised of mulefat and other plants that combine shallow roots (< 2 ft) with low water requirements. These plants are generally located where groundwater is 5-10 ft at its shallowest, and generally deeper , based on the new depth to water map in Fall 2011 (ie., the roots are located above the groundwater elevation and the capillary fringe). They are outside the area of mapped rising groundwater and typically do not support surface flow. The plants that make up this GDE may use groundwater during wet years given some uncertainty in the elevation of groundwater, but if groundwater were typically within the rooting zone, the dominant vegetation likely be cottonwoods and willows. B) The depth to groundwater map has been updated using Fall 2011 groundwater contours provided by United Water, based on the assumption that this wet year represents the highest summer groundwater levels in the basin. A discussion of the depth relative to rooting zones has been added to the GSP. C) NDVI and NDMI monitoring of the potential GDE sites has been included in the monitoring program.
Piru	2, A	2,A-3	California Department of Fish and Wildlife (CDFW)	10/20/2021	Appendix K, Section 6.2.1	Appendix K page 136	NS	Fish Hatchery pumping	CDFW is concerned that the Fillmore Fish Hatchery pumping is overquantified. The PBGA states on page 136 that "…there is potential that Fish Hatchery groundwater pumping which constitutes the largest pumping by a single entity in the basins for some years may complicate interpretation of water level data gathered from a new monitor well facility (i.e., measured water levels may not be representative static water levels if they are significantly influenced by the nearby pumping)." Although the Draft GSP identifies the Fish Hatchery as the largest pumping entity (pg. 136), impacts to groundwater levels are substantially minimized by returning pumped water to the main aquifer for recharge. Most of the water pumped from CDFW groundwater wells enter the fish hatchery raceway to sustain young fish. Although some water is lost from evaporation after entering the raceway, the majority of pumped well water is returned to the groundwater system via soil saturation and percolation. CDFW agrees with the PBGA's concern (pg. 136) that the Fish Hatchery production well has the potential to interfere with the accuracy of data collected from the shallow monitoring wells. The Fish Hatchery well is screened at the 300-foot-level whereas the shallow monitoring wells have been proposed at the 100-foot-level. The cone of depression from the Fish Hatchery production well has the potential to skew data as the surrounding areas of the production well in aquifer are slowly replenished. Recommendation #3(a): CDFW recommends the final GSP accurately quantify pumping activities at the Fillmore Fish Hatchery using both pumping and return flow quantities that recharge the aquifer when evaluating impacts to the groundwater. The rising groundwater area around the Fish Hatchery should retain sufficient water levels to protect both the pumping of water and key GDEs as suggested on page ES-1 of the Draft GSP. Recommendation #3(b): CDFW recommends the PBGA investigate adding additional shallow aquifer monitoring wells away from the vicinity of the Fish Hatchery production well to generate additional monitoring data that will accurately identify groundwater pumping trends, interactions, or interferences.	- Depletion of ISW is considered not unreasonable per SWRCB designations of beneficial uses/users (which are specifically referred to in SGMA) and the lack of evidence of spawning/rearing of Steelhead to support the significance of NMFS defined critical habitat. Beneficial use related to fish is limited to migration activities, which are conceptualized to occur when large surface water flows occur along the SCR and tributaries during storm events and wet periods, rather than during dry periods when surface water flow is limited to areas of rising groundwater (i.e., the basin boundaries). The GSA hosted multiple discussions with stakeholders on the merit of including surface water temperature monitoring in the ISW MT. It is not evident how the GSA would alter the GSP if the temperature data were available. Groundwater extraction reductions during prolonged droughts have been shown to not mitigate groundwater declines and shift undesirable impacts to other beneficial uses/users (e.g., DACs, agricultural operations, municipal water supplies).
Piru	2, A	2,A-4	California Department of Fish and Wildlife (CDFW)	10/20/2021	4.1	4-2	23-27	Mitigation	CDFW has not engaged in meaningful discussions of Basin overdraft mitigation with PBGA regarding SGMA project and management actions at the Cienega Springs Ecological Reserve. Page 4-2 of the Draft GSP states, "The FPBGSA desires to dampen the impacts of groundwater extraction by supporting the restoration efforts at the Cienega Restoration Project. The primary action being considered by the FPBGSA is to provide supplemental groundwater to the restoration program during multiyear droughts when the shallow groundwater levels decline to below the Critical Water Level" (Draft Text, Page 4-2, Lines 1-4). Page 4-2 of the Draft GSP also states, "FPBGSA staff have engaged with CDFW representatives about this project and the conversations are continuing. A detailed Mitigation Plan will be developed after the GSP has been adopted by the FPBGSA and the GSP submitted to DWR for their review (Jan 2022)" (Draft Text, Page 4-2, Lines 23-26). CDFW had a meeting on July 12, 2021 to talk about the Cienega Riparian Complex Area with members of TNC and PBGA. Beyond any initial discussions, CDFW has not received detailed information on PBGA's mitigation proposal. CDFW is open to discussing PBGA's potential mitigation projects or management actions that may include the construction of a production well on CDFW property. CDFW believes the Cienega Riparian Complex is situated in an area of rising groundwater. This Cienega Riparian Complex should retain sufficient water levels to protect key GDEs as suggested on page ES-1 of the Draft GSP except during "below normal years of precipitation". During instances of "below normal years of precipitation," the Cienega Riparian Complex has the potential to remain resilient through project and adaptive management actions. Recommendation #4(a): CDFW recommends the installation of additional shallow monitoring wells to inform specific trigger levels and thresholds requiring adaptive management actions. Recommendation #4(b): CDFW recommends the PBGA consider alternate project and management actions as opposed to a production well on CDFW property such as: i) reduced groundwater pumping; ii) implement groundwater pumping allocations; iii) implement Arundo donax removal; and iv) increase the quantity of imported water. CDFW looks forward to discussing these project and management actions to achieve groundwater sustainability within the Basin. Recommendation #4(c): CDFW proposes the final GSP incorporate Recommendation #3(b).	The Basin is not in overdraft. CDFW representative(s) are aware of and have attended FPBGSA Board meetings, where discussion among Board members and stakeholders has occurred regarding potential mitigative actions at the Cienega Springs Restoration Project area. The Board, in consultation with stakeholders, determined that a mitigation project of supplemental water for GDE support during droughts is the best solution for all beneficial users and uses of groundwater. GSA staff have met with CDFW representatives on at least two occassions to outline the proposed mitigative program. The current high-level mitigation plan is to provide supplemental water (from an existing deep well) to restoration experts (i.e., CDFW, TNC) who already have invested time and money in formal plans to make GDEs more resiliant and have jurisdiction over and expert knowledge regarding the best use of water for GDEs. - Recommendation #4(a) - shallow MWs are proposed and planned to be installed at the CSRP area. - Recommendation #4(b) - (i) pumping reductions have been shown to be ineffective at providing total mitigation of declining water levels in prolonged droughts and functionally shift the total impact of drought-induced water level declines to groundwater pumper (including the Fish Hatchery operations). Pumpers have no control over drought-induced groundwater declines, (ii) pumping allocations are not considered reasonable by the Board and merely shift the undesirable impacts from one beneficial user group to others. An allocation program could mean that the Fish Hatchery operations would be subject to a reduction in its groundwater extractions, also. Allocations would also impact the DACs in the basin. Allocations are not favored given the ability to use supplementabl water to mitigate GDE dieoff and reduce undesirable results on GW pumpers (i.e., the economy); (iii) and (iv) are being considered by the Board following GSP adoption. - Recommendation #4(c) - see response to comment 3,A-4

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Piru	2, A	2,A-5	California Department of Fish and Wildlife (CDFW)	10/20/2021	3.2.5	3-7	3-13	SMC - southern California steelhead	CDFW is concerned the depletion of interconnected surface waters will have undesirable impacts on the Federal Endangered Species Act (ESA)-listed southern California steelhead (Oncorhynchus mykiss or steelhead). The PBGA states on page 3-7, lines 3-13 "The Agency deliberated extensively to determine if undesirable results related to the depletion of interconnected surface water, namely loss of Steelhead rearing and spawning habitat along the Santa Clara River as a sustainability indicator, is a significant and unreasonable effect of groundwater conditions. Ultimately, the Agency does not consider this a significant and unreasonable effect related to depletions of interconnected surface water because: (1) there is no designated existing or potential beneficial use for spawning and rearing along the Santa Clara River in the Basin per the LARWQCB Basin Plan (LARWQCB, 1994); (2) there is no evidence of these fish using the surface water (except during major flood events when the Santa Clara River is fully connected with runoff); and (3) even severe (i.e., 50%) pumping reductions would not prevent the surface water at Cienega Riparian Complex from going dry during severe droughts". The Santa Clara River is designated as critical habitat for the survival of steelhead and contains important steelhead spawning and rearing habitat in Southern California (NMFS 2021). The Southern California Steelhead Recovery Plan published in January 2012 by the National Marine Fisheries Service (NMFS) identified the Santa Clara River as one of the highest priority sites for recovery actions, as one of the most likely to sustain independently viable populations, and as critical for ensuring viability of the species as a whole (NMFS, 2012). Threats to steelhead, such as excessively high-water temperatures in the spring, summer, and early fall, reduce available juvenile rearing habitat. Low flows in the fall and winter can delay adult passage to critical spawning areas. CDFW is concerned that groundwater overdraft will lead to losing streams, temperature increases, diminishing refugia pools, and a lack of connectivity flows needed for steelhead migration. Recommendation #5: CDFW believes the Sustainable Management Criteria (SMC) needs to be revised to implement measures that will protect against significant and unreasonable effects related to depletions of interconnected surface water that have been identified in the Basin. Minimum thresholds and measurable objectives for the SCR are important tools that SGMA has provided to quantify groundwater conditions and ensure groundwater sustainability. Monitoring the temperature of the Santa Clara River, which is critical to steelhead survival, is a much- needed component in the Final GSP.	- Depletion of ISW is considered not unreasonable per SWRCB designations of beneficial uses/users (which are specifically referred to in SGMA) and the lack of evidence of spawning/rearing of Steelhead to support the significance of NMFS defined critical habitat. Beneficial use related to fish is limited to migration activities, which are conceptualized to occur when large surface water flows occur along the SCR and tributaries during storm events and wet periods, rather than during dry periods when surface water flow is limited to areas of rising groundwater (i.e., the basin boundaries). The GSA hosted multiple discussions with stakeholders on the merit of including surface water temperature monitoring in the ISW MT. It is not evident how the GSA would alter the GSP if the temperature data were available. Groundwater extraction reductions during prolonged droughts have been shown to not mitigate groundwater declines and shift undesirable impacts to other beneficial uses/users (e.g., DACs, agricultural operations, municipal water supplies).
Piru	2, A	2,A-6	California Department of Fish and Wildlife (CDFW)	10/20/2021	NS	NS	NS	Editorial	The GSA may need to revise the GSP before it is finalized and adopted by the GSA. Recommendation #6: CDFW recommends the GSA provide a red-lined version of the final GSP to understand the changes made between the daft GSP and final GSP. Alternatively, CDFW recommends the GSA provide a summary of changes made and comments addressed by the GSA in preparation of a final GSP.	A red-lined draft Final GSP was posted on the FPBGSA wesbite and available for public review prior to adoption of the Final GSP by the FPBGSA.
Piru	2, A	2,A-7	California Department of Fish and Wildlife (CDFW)	10/20/2021	NS	NS	NS	Sensitive species and habitats	Three of the five GDEs identified in the draft GSP as wetland, and riverine features, excluded by the PBGA are utilized by ESA-listed Steelhead; the FESA-and California Endangered Species Act (CESA)-listed least Bell's vireo (Vireo bellii pusillus), and the FESA-CESA-listed southwestern willow flycatcher (Empidonax traillii extimus). Southwestern pond turtle (Actinemys pallida) was designated as a California Species of Special Concern (SSC) in 1994 and is known to occur throughout the Santa Clara River watershed in four of the five GDEs specified in the Draft GSP. Southwestern pond turtle preferred habitat is permanent ponds, lakes, streams, or permanent pools along intermittent streams associated with standing and slow-moving water. A potentially important limiting factor for the southwestern pond turtle is the relationship between water level and flow in off-channel water bodies (groundwater dependent), which can both be affected by groundwater pumping. Other wildlife resources that could be substantially adversely affected based on declining water levels designated as SSC include coast horned lizard (Phrynosoma blainvillii); coast patch- nosed snake (Salvadora hexalepis virgultea); California legless lizard (Anniella spp.); two-striped garter snake (Thamnophis hammondii); and burrowing owl (Athene cunicularia). If groundwater depletion results in reduced streamflow due to interconnected surface waters, the nesting and foraging success of the SSC yellow warbler (Dendroica petechia), the SSC yellow breasted chat (Icteria virens), least Bell's vireo, southwestern willow flycatcher and other bird species may be diminished due to the reduced nesting habitat and food availability. Proper management of both shallow and deep groundwater pumping combined with reduced surface water pumping and diverting such as that from the would ensure that the Basin is not negatively impacted. Unsustainable use of groundwater can impact the shallow aquifers and interconnected surface waters on which these species and GDEs reply on for survival. This may lead to adverse impacts on fish and wildlife and the habitat they need to survive. Determining the effects groundwater levels have on surface water flows in the Basin will inform how the groundwater levels may be associated with the health and abundance of riparian vegetation. Poorly managed groundwater pumping, and surface water flows have the potential to reduce the abundance and quality of riparian vegetation, reducing the amount of shade provided by the vegetation, and ultimately leading to increased water temperatures in the Basin. Additionally, shallow groundwater levels near ISWs should be monitored to ensure that groundwater use is not depleting surface water and adversely affecting fish and wildlife resources in the Basin.	There is no recorded surface water pumping in this basin. The surface water diversions in this basin average less than 100 AF/year. The GSP provides a rationale for managing groundwater extractions in the basin within sustainable parameters. The GSP increases groundwater monitoring in the areas of rising groundwater in the Fillmore Basin, particularly near the Cienega and East Grove, where rising groundwater connects to interconnected surface water (discharges to the surface, generating surface water).
Piru	2, A	2,A-8	California Department of Fish and Wildlife (CDFW)	10/20/2021	NS	NS	NS	CDFW - environmental conclusions	CDFW has significant concerns about data gaps in the Hydrologic Conceptual Model (HCM), Riparian Groundwater Dependent Ecosystems being eliminated, the description of the CDFW Fillmore Fish Hatchery and listing the proposed Mitigation Plan Project as a SGMA project. CDFW urges the GSA to plan for and engage in responsible groundwater management that minimizes or avoids these impacts to the maximum extent feasible as required under applicable provisions of SGMA and the Public Trust Doctrine. In conclusion, the Draft GSP does not comply with all aspects of SGMA statute and regulations, and CDFW deems the Draft GSP inadequate to protect fish and wildlife beneficial users of groundwater for the following reasons: 1.The assumptions, criteria, findings, and objectives, including the sustainability goal, undesirable results, minimum thresholds, measurable objectives, and interim milestones are not reasonable and/or not supported by the best available information and best available science. [CCR § 355.4(b)(1)] (See Comments 2,A-1, 2, and 5); 2.The Draft GSP does not identify reasonable measures and schedules to eliminate data gaps. [CCR § 355.4(b)(2)] (See Comments 2,A-1, 2, 3, 4 and 5); 3.The sustainable management criteria and projects and management actions are not commensurate with the level of understanding of the basin setting, based on the level of uncertainty, as reflected in the Draft GSP. [CCR § 355.4(b)(3)] (See Comments 2,A-2, 3, 4 and 5); and, 4.The interests of the beneficial uses that are potentially affected by the use of groundwater in the basin, have not been considered. [CCR § 355.4(b)(4)] (See Comments 2,A-1, 2, 3, 4, 5 and see General Comments).	See responses to comments 3, A-1, -2, -3, -4, and -5.

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329:3329	3	3-1	Los Angeles County Sanitation Districts	10/22/2021	NS	NS	NS	Water quality	The Santa Clarita Valley Sanitation Districts are concerned that the chloride, sulfate, and total dissolved solids (TDS) results from wells in the Lower Area East of Piru Creek were compared to incorrect water quality objectives. Per Table 3-13 in Chapter 3 of the Water Quality Control Plan: Los Angeles Region Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan), the water quality objectives for the Lower Area East of Piru Creek are 200 mg/L for chloride, 1,200 mg/L for sulfate, and 2,500 for TDS, which are not reflected in the draft GSP. We recommend that the water quality objectives used in the GSP match those in the Basin Plan. The Sanitation Districts would like to suggest several changes that reflect progress that has been made to comply with the Upper Santa Clara River (USCR) Chloride Total Maximum Daily Load (TMDL), which is designed in part to protect groundwater in the east Piru Basin. (See comments 3-2 through 3-5.)	See adjusted text in Section 2.2.2.5.2 of the GSP.
Piru	3	3-2	Los Angeles County Sanitation Districts	10/22/2021	2.2.2.5.2	2-44	13 and 19-20	Water quality	Suggested deletions indicated with double underline, and additions in **bold text**: Section 2.2.2.5.2, TDS, page 2-44, lines 13 and 19-20: Recommend correcting the TDS water quality Objective (WQO) and stating that the TDS result was below the WQO (if the result was below 2,500 mg/L). We also recommend including the TDS result when it's compared to the WQO. Line 13: "• Lower area east of Piru Creek (WQO = 1,200 mg/L **2,500 mg/L**)" Lines 19-20: "One well **[Enter result]** shows TDS by TFR above **below** the WQO in Lower area East of Piru Creek."	See adjusted text in Section 2.2.2.5.2 of the GSP.
Piru	3	3-3	Los Angeles County Sanitation Districts	10/22/2021	2.2.2.5.2	2-45	19 and 24-25	Water quality	Suggested deletions indicated with double underline, and additions in **bold text**: Section 2.2.2.5.2, Sulfate, page 2-45, lines 19 and 24-25: Recommend correcting the sulfate water quality Objective (WQO) and stating that the sulfate result was below the WQO." Line 19: "• Lower area east of Piru Creek (WQO = 600 mg/L **1,200 mg/L**)" Lines 24-25: "One well (646 mg/L) shows sulfate above **below** the WQO in Lower area East of Piru Creek."	See adjusted text in Section 2.2.2.5.2 of the GSP.
Piru	3	3-4	Los Angeles County Sanitation Districts	10/22/2021	2.2.2.5.2	2-46	19 and 24-25	Water quality	Suggested deletions indicated with double underline, and additions in **bold text**: Section 2.2.2.5.2, Chloride, page 2-46, lines 19 and 24-25: Recommend correcting the chloride water quality Objective (WQO) and stating that the chloride results were below the WQO." Line 19: "• Lower area east of Piru Creek (WQO = 100 mg/L **200 mg/L**)" Lines 24-25: "All three wells (117 - 158 mg/L) sampled in 2015 show **chloride below** sulfate above the WQO limit and **but** at or above the toxicity threshold for avocados in Lower area East of Piru Creek."	See adjusted text in Section 2.2.2.5.2 of the GSP.
Piru	3	3-5	Los Angeles County Sanitation Districts	10/22/2021	2.2.2.5.2	2-47	22-24	Water quality	Suggested deletions indicated with double underline, and additions in **bold text**: Section 2.2.2.5.2, Chloride, page 2-47, lines 22-24: Recommend correcting the year the USCR Chloride TMDL was adopted. The USCR Chloride TMDL was fully adopted in 2004. In addition, the Sanitation District has made progress on implementing TMDL actions to mitigate chloride impacts and we recommend that this progress be noted. Lines 22-24: "A chloride total maximum daily load (TMDL) for the Upper Santa Clara River was adopted in 2008 **2004**, but the proposed TMDL actions to reduce and mitigate chloride impacts in the Piru Basin have not yet been fully implemented, **and actions to comply with the TMDL implementation plan to reduce and mitigate chloride impacts in the Upper Santa Clara River and east Piru Basin are underway. The Sanitation District has begun operating the UV disinfection facilities at the Saugus and Valencia WRPs and anticipates that the Advanced Water Treatment Facility will be operational by December 2022, which will bring the Valencia and Saugus WRPs into full compliance with the requirements of the Upper Santa Clara River Chloride TMDL.**"	See adjusted text in Section 2.2.2.5.2 of the GSP.
Piru	4,B	4,B-1	State University of New York College of Environmental Science, University of California Santa Barbara, and Cardiff University	10/9/2021	NS	NS	NS	Groundwater Dependent Ecosystems	Commentors shared research findings to help improve the identification and consideration of GDEs in the Fillmore Basin. These include: 1. Riparian vegetation die-off during the 2012-2016 drought is linked to groundwater decline. 2. The groundwater decline causes more water stress to riparian vegetation than climatic variables. 3. Native cottonwood and willow trees are groundwater-dependent species that rely on constant root access to groundwater for survival and growth, especially during dry summer months and in drought years. 4. The rate of groundwater level decline is as important to riparian vegetation as the absolute depth below which their roots completely lose access to the water table ("critical water depth"). 5. The installation of more shallow monitoring wells is needed to support ongoing efforts to understand the ecohydrological links between groundwater and riparian forests along the SCR. See comment letter for further discussion of these findings.	Additional monitoring wells are planned following the adoption of the GSP in the Cienega area (near the boundary with the Fillmore Basin), along Piru Creek, and between the Del Valle GDE Unit and the confluence with Piru Creek. We have added text about the importance of the rate of groundwater decline to the text of the GDE memo and added a reference to Kibler 2021.

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Piru	5	5-1	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/20/2021	NS	NS	NS	Disadvantaged Communities and Drinking Water Users	The identification of Disadvantaged Communities (DACs) and drinking water users is incomplete. The GSP provides information on DACs, including identification by name and location on a map (Figure 2.1-4). However, the GSP fails to clearly state the population of each DAC or include the population dependent on groundwater as their source of drinking water in the basin. The GSP provides a density map of domestic wells in the basin. However, the plan fails to provide depth of these wells (such as minimum well depth, average well depth, or depth range) within the basin. These missing elements are required for the GSA to fully understand the specific interests and water demands of these beneficial users, and to support the consideration of beneficial users in the development of sustainable management criteria and selection of projects and management actions. Recommendations: 1. Provide the population of each identified DAC. 2. Identify the sources of drinking water for DAC members, including an estimate of how many people rely on groundwater (e.g., domestic wells, state small water systems, and public water systems). 3. Include a map showing domestic well locations and average well depth across the basin.	Figure 2.1.4 provides information on the domestic well locations (with the bottom of the well screen depths) and DAC population. In addition, all of the existing well information is publically available at www.https://fillmore-piru.gladata.com/. Groundwater is the source of drinking water for the entire basin.
Piru	5	5-2	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/20/2021	NS	NS	NS	Interconnected Surface Waters	The identification of Interconnected Surface Waters (ISW) is insufficient, due to lack of supporting information provided for the ISW analysis. To assess ISWs, the plan refers to a previous report by United Water Conservation District, included in the GSP as Appendix E. This Appendix describes a numerical model developed for a regional area that includes the Piru Basin. The main text of the GSP presents a summary of annual depletions of ISW in the Piru Basin at one location of the Santa Clara River. The ISW section of the GSP concludes with the statement (p. 2-56): "Data gaps remain regarding identifying the extent and timing of interconnectedness of other stream channel areas (e.g., Piru Creek and central and eastern portions of the Santa Clara River), due to a lack of paired groundwater level and surface water level monitoring sites. Stream conditions are considered to vary between all three stream conditions depicted on Figure 2.2-28, except at the Dell Valle potential GDE unit (Figure 2.2-30), where stream flows are sustained perennially by wastewater effluent from the Santa Clara River Valley East. The significance of interconnected surface water and groundwater conditions at these areas is less than that of the area of rising groundwater, because surface water exists less often in the Piru Creek and central Santa Clara River reaches (Figure 2.2-11) and surface water flows are sustained in Piru Creek by United releases from Lake Piru." However, no map is provided to show the stream reaches to which this statement refers. Without a map of labeled stream reaches in the basin, it is difficult to understand the location of these reaches, and whether the GSP has included them as potential ISWs in the GSP. In addition, it is unclear whether the GSP is only considering ISWs in areas with "rising groundwater" (gaining conditions). Under SGMA's ISW definition, they must also include losing reaches that maintain a connection with the saturated zone at any point in time and space.	No comment needed
Piru		5-2 (cont'd)		10/20/2021					Recommendations: 1. Provide a map showing all the stream reaches in the basin, with reaches clearly labeled with stream name and interconnected (gaining, losing) or disconnected status. 2. Provide more discussion in the GSP about the groundwater elevation data and streambed elevation data that could be used to verify the modeling analysis for interconnected reaches. Include a map of the interpolated groundwater elevations and spatial extent of groundwater monitoring wells used to produce the map. Discuss screening depth of monitoring wells and ensure they are monitoring the shallow principal aquifer. 3. To confirm the results of the groundwater modeling, 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 D. 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. 4. On the ISW map, clearly label the areas with data gaps. While the GSP clearly identifies data gaps and their locations 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.	1. A map of the interconnected reaches (Figure 4-6) has been added to the GDE memo 2. The data resolution for shallow groundwater and land surface elevations are not sufficent to accurately generate interconnected reaches by the method suggested in Attachment D of the reviewers comment. Additional shallow monitoring wells are planned to augment the current water level information for the shallow aquifer. 3. Depth to groundwater maps were generated using methods outlined in the recomendations and have been clarified in the text. 4. Reaches with uncertain connection to groundwater were highlighted.
Piru	5	5-3	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/20/2021	NS	NS	NS	Groundwater Dependent Ecosystems	The identification of Groundwater Dependent Ecosystems (GDEs) is incomplete. We commend the GSA for their efforts to evaluate GDEs in the basin, as presented in the GDE Technical Memorandum (Appendix D). The GSP mapped GDEs and potential GDEs using multiple sources, including the NC Dataset (also referred to in the GSP as the iGDE database), California Department of Fish and Wildlife (CDFW) VegCAMP, US Department of Agriculture (USDA) CalVeg, and National Wetlands Inventory data. However, we would also like to see aquatic GDEs (e.g., steelhead critical habitat) mapped. Table 2.2-5 describes the type of GDEs in the basin with dominant flora species and acreage within the basin. Table 2.2-7 presents the critical habitat and special status species in the basin. The Appendix states (p. 21): "In light of the limitations of the monitoring well data, the groundwater elevation data presented in this section are intended to illustrate general trends within GDE units. The spring 2019 depth to water surface (Section 2.1.2), as opposed to monitoring well data, is used to establish GDE connectivity with shallow groundwater." The Appendix describes the challenges with using groundwater monitoring well data for some of the GDE units and explains that 2019 groundwater levels are conservative for GDE mapping. However, we would like to see additional discussion and use of groundwater data from the pre-SGMA benchmark date of 2015 where available (e.g., pre-drought 2011 water levels) to determine which GDE units are connected to groundwater. Furthermore, we found that some mapped features in the NC dataset were improperly disregarded (i.e., coastal live oak (Quercus agrifolia) on slopes). NC dataset polygons were incorrectly excluded for mapped vegetation growing on a clear slope, based on landscape position and improbable connection to groundwater. However, without groundwater data, there is no way to confirm that these NC dataset polygons are not GDEs. If no data are available, then these polygons should be retained as potential GDEs. Recommendations: 1. For GDE units where groundwater elevation data are available, we recommend the pre-SGMA period of 2005-2015 be used to verify a connection to groundwater. If complete data from this period are not available, consider the use of data from 2011 (a wet year) since it is before the SGMA benchmark date of 2015. 2. Identify aquatic GDE habitats (e.g., steelhead critical habitat) in the GSP, and specify which reaches support migration, spawning, and rearing. 3. Re-evaluate the NC dataset polygons that were removed based on their location on a slope. If groundwater elevation data are not available to verify connection to groundwater, retain these polygons as potential GDEs in the GSP.	The 30 ft depth to water was altered based on Fall 2011 water surface data. This increased the extent of GDEs in the Piru Basin, but had little influence on GDEs in the Fillmore Basin. Aquatic GDE units (represented by connected reaches are shown in the new figure 4-6 in the GDE appendix. The justification of removal of coast live oak was expanded in the text of the Section 2.1.3 GDE Appendix "These stands typically occur on the fringes of the basin, where the non-water bearing Pico Formation bedrock outcrops (Figure 2.2-3) and average slopes exceed 20%. It is therefore extremely unlikely that oaks in these areas are connected to groundwater-bearing alluvial or fluvial sedimentary formations."

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Piru	5	5-4	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/20/2021	NS	NS	NS	Native vegetation and managed wetlands	Native vegetation and managed wetlands are water use sectors that are required to be included in the water budget. The integration of native vegetation into the water budget is sufficient. We commend the GSA for including the groundwater demands of this ecosystem in the historical, current and projected water budgets. Managed wetlands are not mentioned in the GSP, so it is not known whether or not they are present in the basin. Recommendation: 1. State whether or not there are managed wetlands in the basin. If there are, ensure that their groundwater demands are included as separate line items in the historical, current, and projected water budgets.	1. There are no managed wetlands in the Basin (based on ...). Evapotranspiration (ET) in the water budget represents all vegetation water use.
Piru	5	5-5	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/20/2021	NS	NS	NS	Stakeholder engagement	Stakeholder engagement during GSP development is insufficient. SGMA's requirement for public notice and engagement of stakeholders is not fully met by the description in the Communication and Engagement Plan (Appendix B). We note the following deficiencies with the overall stakeholder engagement process: 1. The opportunities for public involvement and engagement are described in very general terms. They include attendance at public meetings, a stakeholder email list, updates to the GSP website and social media, and information shared at meetings held by other local agencies and organizations. There is no specific outreach during the GSP development process described for environmental stakeholders and domestic well owners. 2. The Communication and Engagement Plan does not include a detailed plan for continual opportunities for engagement through the implementation phase of the GSP that is specifically directed to environmental stakeholders. Recommendations: 1. Include a more detailed and robust Communication and Engagement Plan that describes active and targeted outreach to engage DAC members, domestic well owners, and environmental stakeholders during the remainder of the GSP development process and throughout the GSP implementation phase. Refer to Attachment B for specific recommendations on how to actively engage stakeholders during all phases of the GSP process.	The FPBGSA conducts extensive outreach to actively engage all stakeholder interests within the basin. Additional text has been added to GSP Section 2.1.5 Notice and Communication that further describes stakeholder outreach and engagement that occured during GSP preparation, including targeted outreach to domestic well owners, including those within DACs. DACs and well owners within those communities are representated on the Board by the Ventura County, City of Fillmore, and Pumpers Association Directors. In addition, among the organizations represented by the Environmental Stakeholder Director is Central Coast Alliance United for a Sustainable Economy (CAUSE), which protects environmental and DAC interest. Outreach to DACs includes numerous mailings and communications to well owners by the Pumpers Associations and FPBGSA participation at targeted stakeholder outreach and education meetings ("WaterTalks") sponsored by the Watersheds Coalition of Ventura County Integrated Regional Water Management (IRWM). Environmental interests are represented on the FPBGSA Board by the Environmental Stakeholder Director. A number of local environmental organizations nominate the Environmental Director and she regularly reaches out and coordinates with numerous local environmental organizations as described in Section 2.1.5. The Ventura County Director provides information and updates to IRWM and Santa Clara River Watershed Committee. The FPBGSA will use the Communications and Engagement Plan and continue GSP development outreach methods to engage a diversity of stakeholders through GSPimplementation."
Piru	5	5-6	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/20/2021	NS	NS	NS	SMCS/Disadvantaged Communities and drinking water users - groundwater levels	For chronic lowering of groundwater levels, the GSP mentions impacts to DACs and domestic drinking water wells when defining undesirable results. The GSP states (p. 3-3): "Groundwater levels below the base of well perforations (or screen intervals) prevents beneficial uses (i.e., domestic) and users (i.e., DACs) from benefiting from the California Human Right to Water due to dry well conditions." However, the GSP does not sufficiently describe how the existing minimum threshold groundwater levels are consistent with avoiding undesirable results in the basin. The measurable objectives set for groundwater elevations do not consider DACs and drinking water users. The GSP states (2-41): "Historically water quality chemicals (analytes or constituents) of concern (COCs) in the Fillmore and Piru basins have generally included, but are not necessarily limited to, the following analytes: Total Dissolved Solids (TDS), Sulfate, Chloride, Nitrate, and Boron." The GSP further states (2-50): "Additional potential COCs in the Piru Basin were identified [as] Radiochemistry (gross alpha and uranium), Selenium, Lead, Iron, and Manganese." The GSP states that the minimum thresholds for degraded water quality correspond with water quality objectives (WQOs) and maximum contaminant levels (MCLs) established by the Los Angeles Regional Water Quality Control Board (LARWQCB) Basin Plan and California Division of Drinking Water (DDW), respectively. However, they are not specifically provided in Section 3 (Sustainable Management Criteria) of the GSP. For degraded water quality, the GSP does not discuss direct and indirect impacts on DACs or drinking water users when defining undesirable results for degraded water quality, nor does it evaluate the cumulative or indirect impacts of proposed minimum thresholds on these stakeholders. The GSP does not set any measurable objectives for the degraded water quality sustainability indicator.	No cooment needed

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Piru	5	5-6 (cont'd)	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund						Recommendations re: Chronic Lowering of Groundwater Levels: 1. Describe further the direct and indirect impacts on DACs and drinking water users when defining undesirable results for chronic lowering of groundwater levels. 2. Consider and evaluate the impacts of selected minimum thresholds and measurable objectives on DACs and drinking water users within the basin. Further describe the impact of passing the minimum threshold for drinking water users. For example, provide the number of domestic wells that would be de-watered at the minimum threshold. Recommendations re: Degraded Water Quality: 1. Describe direct and indirect impacts on DACs and drinking water users 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." 2. Evaluate the cumulative or indirect impacts of proposed minimum thresholds for degraded water quality on DACs and drinking water users. 3. Include the minimum thresholds established for the identified COCs in Section 3 (Sustainable Management Criteria) of the GSP, instead of just stating that they align with drinking water standards. 4. Set measurable objectives for the degraded water quality sustainability indicator.	The GSA is responsible for the impacts associated with the implementation of the GSP. The GSP does not materially change how the water resources in the basin are being managed. DACs are subsets of the domestic, municipal, and agricultural groundwater users in the basin. The reviewers comments suggest that DACs in the Piru basin are a separate group of stakeholders that are not included within other stakeholder categories. The DACs in the basin are served by a combination of the Town of Piru's water system, various mutual water companies, or by their own domestic wells. The GSP addresses impacts to DACs when discussing how projected future groundwater conditions will effect municipal and industrial, domestic well owners, and agricultural users. It is not correct in this basin to equate all DACs to domestic well users nor are all domestic well operators DACs. The MT for the Declining Water Level sustainability indicator was set by the FPBGSA Board of Directors at when the water levels in 25% of the representative wells (there are several in the basin) decline to depths below the bottom of the well perforations (functionally a dry well). The representative wells are spatially distributed throughout the basin and complete at a variety of depths. So, the number of domestic wells that would be impacted by a MT violation would depend on which suite of the representative wells had water levels fall below the bottom of the well screen. There are several possible permutations. Qualitatively, if the deepest 25% of the representative wells exceed the MT, then several shallow domestic wells would be impacted, however if the shallowest 25% of the representative wells exceeded the MT, the number of shallow domestic wells that would be impacted will be less. Table 2.2-3 provides a summary table of the regulatory water quality thresholds for several analytes, however, it is acceptable to incorporate references to water quality standards rather than providing a detailed list in the GSP. MOs were not set for the degraded water quality sustainability indicator as the GSA is not responsible for regulating water quality in this basin. The inclusion of MOs sets objectives that the GSA is expected to strive for, however, they lack the regulatory authority over water quality.
Piru	5	5-7	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/20/2021	NS	NS	NS	SMCs/ Groundwater Dependent Ecosystems and Interconnected Surface Waters	We commend the GSA for their comprehensive analysis of undesirable results for GDEs and ISWs. The GSP analyzes the impacts on GDEs when defining undesirable results for three sustainability indicators (i.e., chronic lowering of groundwater levels, degraded water quality, and depletions of interconnected surface waters). For minimum thresholds, the GSP states (p. 3-9): "The MT for groundwater levels in the Cienega Restoration / Fish Hatchery area is set at the critical water level (Kibler, 2021 and Kibler et al., 2021), 10 ft below 2011 low groundwater levels (i.e., the MO). If/when this MT is exceeded, mitigation (Section 4) will be implemented to offset the undesirable result that would occur without adequate soil moisture." The GSP does not, however, assess the impacts of minimum thresholds on the other GDEs in the basin. The GSP notes that the Cienega Riparian Complex has historically shown the greatest degradation due to groundwater levels (p. 2-78). It also describes this impact as an undesirable result due to groundwater levels declining, resulting in (p. 3-4) "die off of riparian vegetation (e.g., cottonwood or willow species in the Cienega Riparian Complex GDE unit), due to groundwater level declines below the critical water level, that are attributable to groundwater pumping." If the minimum threshold is exceeded, the referenced mitigation action will require months or years to implement. However, there is no discussion of interim pumping reductions or other actions that could have an immediate positive impact on the undesirable result. Recommendations: 1. Provide explicit discussion of how the minimum threshold (10 feet below 2011 groundwater levels) will prevent undesirable results specifically for all GDEs in the basin, not just those in the Cienega Restoration / Fish Hatchery area. 2. State directly what the depth to groundwater corresponds to under the GDEs for the proposed minimum threshold (10 feet below 2011 groundwater levels), and how it compares to plant rooting depth information. 3. Consider GDEs when establishing measurable objectives and evaluate the measurable objectives based on GDE water needs.	We used Kibler 2021 as the source for definig a critical water level. Kibler's analyses indicated that a 10 ft decline in the water level was an important threshold below which vegetation can die off. This relationship was presumed to be applicable to other the other GDEs. Based on Stillwater 2021a, the only GDE area to experience material die off was the Cienega/Fish Hatchery area. The explicit MT is shown at Figure 3.5-4. The MO for GDEs is the 2011 low water level which functionally represents "a full basin condition".
Piru	5	5-8	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/20/2021	NS	NS	NS	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 Regulations8 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 effects of climate change can intensify the impacts of water stress on GDEs, making available shallow groundwater resources more critical for their survival. Research shows that GDEs are more likely to succumb to water stress and rely more on groundwater during times of drought9. When shallow groundwater is unavailable, riparian forests can die off and key life processes (e.g., migration and spawning) for aquatic organisms, such as steelhead, can be impeded. 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 does 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 key inputs (e.g., precipitation, evapotranspiration, surface water flow, and sea level) of the projected water budget. However, imported water is not included in the projected water budget or stated to be adjusted for climate change. The GSP calculates a sustainable yield based on the projected water budget with climate change incorporated. However, if the water budgets are incomplete, including the omission of extremely wet and dry scenarios and projected climate change effects on imported water volumes, 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: 1. Integrate climate change, including extreme 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. 2. Incorporate imported water inputs that are adjusted for climate change to the projected water budget. 3. Incorporate climate change scenarios into projects and management actions.	Use of the 2070CT climate change factors in the forward groundwater modeling effort indicated that the basin was in a functionally sustainable condition. Analysis of the extreme wet future climate scenario, would have resulted in the basin being "more sustainable." The 2070CT extremely dry scenario was not considered likely based on independent analyses provided by Oakley et al 2019. The 2070CT climate change factors are considered sufficient in other approved GSPs. Climate change factors were incorporated into the projected water budgets. When the GSA is prepared to consider their projects and management actions, they will likely conduct further analyses on the cost-benefit relationship under future climate scenarios. It is important to recognize that the future climate conditions for this inland portion of Ventura County are not dramatically different from current conditions and certainly those differences are not of the magnitude forecast for other regions.

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Piru	5	5-9	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/20/2021	NS	NS	NS	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 basin. Figure 2.1-8 (Existing Groundwater Elevation Monitoring Programs Map) and Figure 2.1-9 (Existing Groundwater Quality Monitoring Programs Map) show that no monitoring wells are located across portions of the basin near DACs and domestic wells (see maps provided in Attachment E). 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. The GSP provides comprehensive discussion of data gaps for GDEs and ISWs. Section 3.5.4.4.2 (Potential New Monitor Wells) discusses plans to include installation of new shallow monitoring wells to provide water level data around GDEs and ISWs, which is further described in Appendix D (Assessment of Groundwater Dependent Ecosystems for the Fillmore and Piru Basins Groundwater Sustainability Agency) and Appendix K (Monitoring Network and Data Gaps). However, this information is scattered across several locations in the GSP without a comprehensive set of maps provided. Recommendations: 1. Provide maps that overlay monitoring well locations with the locations of DACs and domestic wells to clearly identify potentially impacted areas. Increase the number of representative monitoring points (RMPs) in the shallow aquifer across the basin for the groundwater elevation and water quality groundwater condition indicators. Prioritize proximity to DACs and drinking water users when identifying new RMPs. 2. Provide maps that overlay existing and proposed monitoring well locations with the locations of GDEs and ISWs to clearly identify potentially impacted areas. 3. Describe further 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 basin. Appendix D discusses remote sensing of GDEs using NDVI or other data to monitor the health of GDEs through time, but few details are provided. 4. Provide discussion that adaptive changes in SMC for GDEs will be made, if GDE groundwater or biological monitoring reveals that existing SMC are not protective of these ecosystems.	1. Additional monitoring wells are being installed with DWR Grant Funding; Figure 3.5-1 shows the locations of the proposed new wells to be added to the monitoring network. The GSA can consider adding some of the new monitoring wells to the RMP list if is assists with water resource management strategies. the data gap figure can be updated with domestic wells to demonstrate sufficient data coverage 2. Section 3 contains a figure (3.5-1) showing GDEs, ISW and proposed monitoring points. 3. The biological monitoring will be focused on the use of NDVI analyses from the Fall of each year and will be evaluated and summarized in each 5-year GSP update.
Piru	5	5-10	The Nature Conservancy, Audubon California, Local Government Commission, Union of Concerned Scientists, Clean Water Action/Clean Water Fund	10/20/2021	NS	NS	NS	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 beneficial users of groundwater such as DACs and drinking water users. We commend the GSA for including several projects and management actions with explicit benefits to the environment. However, the GSP does not discuss the manner in which DACs and drinking water users may be benefitted or impacted by projects and management actions identified in the GSP. 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. The plan's commitment to mitigate the undesirable result on the Cienega Riparian Complex GDE is insufficient. The plan is confusing in that the mitigation refers only to the Cienega Springs Restoration project and does not seem to propose any mitigation for the Cienega Riparian Complex GDE. Furthermore, it is not clear how the proposed Projects 1 & 2 would mitigate impacts to the Cienega Riparian Complex GDE even if it is part of the Cienega Springs Restoration project area. Recommendations: 1. 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. 2. 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. 3. For GDEs, include the following: 1) Add a map showing the locations of the Cienega Riparian Complex GDE and the Cienega Springs Restoration project, 2) Explain how the proposed management actions will mitigate the undesirable result occurring at the Cienega Riparian Complex GDE, 3) Develop immediate and longer term management actions to address the undesirable result occurring at the Cienega Riparian Complex (e.g., immediate pumping reductions when the minimum threshold is reached, non-native vegetation removal should die-off occur). 4. If the data gathered from additional monitoring in the basin reveals that other GDEs are present, develop mitigation actions for undesirable impacts on those GDEs.	1. We refer to the Statewide Dry Well Reporting system for collecting information on dry well conditions (known have been reported in this system, nor at Board meetings by representatives). Domestic well users frequently fall into the de minimus category and the GSA cannot mandate that de minimus users report their groundwater extractions or water levels. The GSA can, with the approval of the de minimus user, record water levels. The GSP does not explicitedly follow the system offered in the Drinking Water Well Impact Mitigation Framework, however, many of its element have been incorporated into the GSP. For example, no "Yellow Light" or "Red Light" triggers (as presented in the DWWIMF) exist for the Piru basin. 2. The Mitigation Plan for the Cienega Springs Restoration Project has yet to be developed. The details of that plan will include a consideration of how the mitigative actions will effect both the CSRP and CRC GDEs. (3) Pumping reductions near the Santa Clara River have been shown to be ineffective at totally mitigating declining water levels during a drought. Pumping reductions likely create undesirable impacts to groundwater users such as DACs, municipalities, and agriculture. The GSP includes a potential Project and Management Action regardin non-native vegetation removal that will be considered by the GSA in the future.
Piru		5-10 (cont'd)							5. Recharge ponds, reservoirs, and facilities for managed stormwater recharge can be designed as multiple-benefit projects to include elements that act functionally as 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." 6. Develop management actions that incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results.	5) No response required 6) When the GSA is prepared to consider their projects and management actions, they will likely conduct further analyses on the cost-benefit relationship under future climate conditions.
Piru	6	6-1	United Water Conservation District	10/22/2021	1.0	NS	NS	Introduction	The Piru Basin GSP is well organized and well written. The purpose and sustainability goals of the Piru Basin GSP are clearly defined, and the background agency information presented is consistent with United's understanding.	Comment noted
Piru	6	6-2	United Water Conservation District	10/22/2021	2.0	NS	NS	Plan Area and Basin Setting	United appreciated the opportunity to contribute to the Piru basin GSP through the development of the recent updates for the hydrogeologic conceptual model and the numerical surface water and groundwater flow modeling that were referenced and used throughout much of Section 2. The GSP hydrogeologic conceptual model identifies and describes aquifer zones A, B, and C within the basins that are based on varying aquifer properties and depths of occurrence following United's presentation of a similar convention within the referenced modeling reports. We believe that the GSP adequately describes the variability within the aquifer zones with the data currently available. For management purposes, we believe that identifying a single Principal Aquifer within both the Piru and Fillmore basins is appropriate given the limited number of wells screened only in zone C, as well as the number of wells that are screened across zones B and C in both basins. As new data become available in the future, we look forward to collaborating with the FPBGSA to continually improving our understanding of surface water and groundwater conditions, refine the hydrogeologic conceptual model for the basins if necessary, and periodically refine and update the numerical surface water and groundwater flow models, as needed.	Comment noted

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Piru	6	6-3	United Water Conservation District	10/22/2021	3.0	NS	NS	Sustainable Management Criteria	United believes the sustainable management criteria described in the GSP and supporting documents, including measurable objectives and minimum thresholds, are defined appropriately and are reasonable. However, we suggest that more content from Appendix J (Technical Memorandum relating to the Sustainable Management Criteria) be included within the relevant portions of the GSP document and be referenced more clearly, especially in Section 3.4 where measurable objectives are addressed. United agrees that the current understanding of present-day and future groundwater uses in Piru Basin does not suggest that significant and unreasonable impacts should be expected for the six SGMA sustainability indicators. United agrees that undesirable results related to seawater intrusion are not applicable sustainable management criteria in Piru Basin as described in Section 2.2.2.4 of the draft GSP. Additionally, United agrees that the potential future depletion of interconnected surface water as presented in the Piru Basin GSP in the context of temporary habitat loss is reasonable and should not be considered a significant and unreasonable effect, as supported by the explanations mentioned in Section 3.2.5 of the draft GSP. Related to the monitoring network background, analysis, and proposed expansion, United agrees with the information provided in Section 3 of Piru Basin's Draft GSP and looks forward to supporting efforts to collect additional data related to the current and proposed expansion of the monitoring network for the sustainable management criteria for which sustainable management criteria have been developed.	See updated Section 3.4
Piru	6	6-4	United Water Conservation District	10/22/2021	4.0	NS	NS	Projects and Management Actions	United agrees with the proposed projects and management actions that support the five sustainable management criteria for which sustainable management criteria have been developed. We agree that these projects and management actions have the potential to enhance the water resources of the Piru Basin and aid in keeping the basin closer to the desired future conditions. United looks forward to supporting efforts related to ongoing project planning and implementation in the near future.	Comment noted
Piru	6	8-5	United Water Conservation District	10/22/2021	5.0	NS	NS	Implementation	United is committed to supporting efforts related to ongoing project planning and implementation in the future.	Comment noted
Piru	7	7-1	Ventura County Public Works Agency	10/21/2021	Executive Summary	ES-1	NS	Editorial - SMC terminology	On page ES-1, it is recommended that the sustainability criteria be renamed to match the terminology used in the regulations: 1. Chronic Lowering of Groundwater Levels 2. Reduction of Groundwater Storage 3. Seawater Intrusion 4. Degraded Water Quality 5. Land Subsidence 6. Depletions of Interconnected Surface Water	See updated ES-1
Piru	7	7-2	Ventura County Public Works Agency	10/21/2021	Executive Summary	ES-1	NS	SMCs, Groundwater Dependent Ecosystems and Interconnected Surface Waters	On page ES-1, the rationale for exclusion of the sustainable management criteria (SMC) for Interconnected Surface Water because it is "not applicable due to significant effect of droughts that deplete rising groundwater areas" should be explained in more detail. There is interconnected surface water as well as GDEs supported by rising groundwater, all of which are influenced by the hydrology, including groundwater pumping. This comment applies to all portions of the Draft where interconnected surface water and GDEs are discussed and the SMC is excluded, particularly in Section 3 (SMC).	See Sections 2.2.1.5.6, 2.2.2.7 and 3.2.1 inthe GSP, as well as additional technical details in Appendix J.
Piru	7	7-3	Ventura County Public Works Agency	10/21/2021	NS	NS	NS	Editorial, groundwater model	There are references to the groundwater model in Appendix E throughout the text body. It would be helpful to include a summary discussion on the model in the GSP text rather than requiring the reader to review the detailed modeling appendix.	Comment noted
Piru	7	7-4	Ventura County Public Works Agency	10/21/2021	Executive Summary	ES-2	57	Water quality	On page ES-2, line 57 states "Water quality changes in the basin are not expected due to the implementation of the GSP." It should be noted if there are water quality impacts from upstream wastewater effluent disposal.	See updated language in the Executive Summary
Piru	7	7-5	Ventura County Public Works Agency	10/21/2021	2.1.2.2	NS	NS	Conjunctive use programs	In Section 2.1.2.2, recommend listing the conjunctive use programs between the Upper Santa Clarita Water District and United Water Conservation District that would provide greater operational flexibility of groundwater resources within the Basin.	See updated language in Section 2.1.2.2
Piru	7	7-6	Ventura County Public Works Agency	10/21/2021	2.2.1.3	NS	NS	Sustainable yield, basin storage	In Section 2.2.1.3, the description of the interface of the water-bearing alluvium and underlying consolidated material of the San Pedro Formation implies that the basin bottom is not clearly defined. There is no discussion of how this could affect the estimated sustainable yield or basin storage.	- This does not significantly affect the ability to evaluate changes in storage because the significant changes in storage occur in the shallower portions of the aquifer by virtue of changes in the water table associated with the predominant unconfined conditions of the Principal Aquifer.
Piru	7	7-7	Ventura County Public Works Agency	10/21/2021	2.2.1.4	NS	NS	Aquifer zones	Section 2.2.1.4 lists the two principal aquifers in the Subbasin (unconfined Main Aquifer and the semi-confined Deep Aquifer). There are subsequent references to Aquifer Zones A, B and C per United (2021a). Discussion of the relationship between the principal aquifers and the Aquifer Zones is not introduced until Section 3.5.1.2.2. It would be helpful to the reader to introduce this relationship in Section 2.2.1.4 and when discussing Aquifer Zones in other parts of the text. Further, it would be helpful to include the relative depths (and thickness) of these aquifers and the aquitard separating them found in Section 2.2.1.4.2 to better support Section 2.2.1.3.	See responses to comments 1-1, 1-2, and 1-3. See updated Section 2.2.1.4.
Piru	7	7-8	Ventura County Public Works Agency	10/21/2021	2.2.1.4.4	NS	NA	Well status	Section 2.2.1.4.4 states that 316 wells have at least one historical water quality sample. Are these wells still active and can they be sampled?	There are many active wells in the basin (147), however, it is unknown how many could be sampled for water quality. The ability to sample the wells depends on the access to the property, wellhead configuration (i.e., is the well equipped with a sampling port or similar method to collect a water sample), presence/absence of pumping equipment in the well, and availability of power to operate the pump.
Piru	7	7-9	Ventura County Public Works Agency	10/21/2021	2.2.1.4.4, 2.2.2.5.1	NS	NS	Groundwater quality	In Sections 2.2.1.4.4 and 2.2.2.5.1, elevated chloride and sodium levels in groundwater east of Piru Creek could be attributed to wastewater effluent discharged to the Santa Clara River from upstream Santa Clarita wastewater treatment plants (WWTPs). Have there been any actions or orders from the Los Angeles Regional Water Quality Control Board (LARWQCB) to reduce chloride and sodium in these effluents?	See updated language in Section 2.2.2.5.1 in the GSP

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Piru	7	7-10	Ventura County Public Works Agency	10/21/2021	2.2.1.5.6	NS	NS	Surface water diversions	In Section 2.2.1.5.6, it would be informational to include an estimate of the quantities of water diverted by each listed entity.	See updated information is this section of the GSP
Piru	7	7-11	Ventura County Public Works Agency	10/21/2021	2.2.2.5.2	NS	NS	Groundwater quality	In Section 2.2.2.5.2, elevated nitrate levels could be attributed to upstream discharges from septic systems and agricultural fertilizers and chemicals.	Comment noted
Piru	7	7-12	Ventura County Public Works Agency	10/21/2021	2.2.2.5.3	NS	NS	Groundwater quality	Section 2.2.2.5.3 states that the water percolated by the Piru WWTP percolation ponds likely does not have sufficient volume to impact the groundwater quality in the basin. Has a comparison been made between COC concentrations of the effluent discharged by the Piru WWTP to other WWTPs in Santa Clarita? Additional monitoring wells located on the eastern boundary of the basin might provide further data pertaining to the influx of chloride and other COCs from upstream sources.	A comparison of the upstream WWTPs effluent water quality and that of the Piru WWTP has not been performed.
Piru	7	7-13	Ventura County Public Works Agency	10/21/2021	NS	2-6	9,18	Surface water budget	On page 2-62, lines 9 and 18, recommend explaining how the surface water diversions are accounted for in the groundwater model.	Surface water diversions are discussed in Appendix E
Piru	7	7-14	Ventura County Public Works Agency	10/21/2021	NS	2-63	7	Surface water budget	On page 2-63, line 7 states "The Basin water budget is estimated based on flows calculated from the calibrated VRGWFM (United, 2021a)." It would be beneficial to elaborate on the main components of the groundwater and surface water budgets.	Subsequent sections in the GSP contain more information on the details of the water budgets.
Piru	7	7-15	Ventura County Public Works Agency	10/21/2021	NS	2-63	26-28	Surface water budget	On page 2-63, lines 26–28 state "underflow from the East Santa Clara River Valley basin is modelled as essentially zero in the groundwater model because the outside hydrogeology is significantly less permeable and the aquifer material…is thin." Has the underflow been quantified or estimated?	- The groundwater model budget has been updated to include underflow (compare ranges to historical studies).
Piru	7	7-16	Ventura County Public Works Agency	10/21/2021	NS	2-64	28	Surface water budget	On page 2-64, line 28 states "the maximum ET flux was increased to 0.014 feet per day (5.2 feet per year) in order to account for…" This reference is from the groundwater model. Are other groundwater model assumptions used as components of the water budget?	- Yes they are described in greater detail in each corresponding water budget component in the United GW model documentation.
Piru	7	7-17	Ventura County Public Works Agency	10/21/2021	NS	2-67	Table 2.2-8, 5-7	Groundwater budget	In Table 2.2-8 and lines 5–7, "United's allocation of imported SWP water deliveries varies from between zero and 60% (of the 3,150 AFY allocation for Santa Clara River Valley basins) during dry years, to more than 60% and even more than 100% during above average and wet years." There may be more recent estimates of average deliveries. The 2019 SWP Delivery Capability Report has reported Table A deliveries at 52-58%.	- Incorporated.
Piru	7	7-18	Ventura County Public Works Agency	10/21/2021	NS	NS	Table 2.3-9	Historical water budget	In Table 2.2-9, a note should be added for the years that are represented as "historical." The text later indicates 1988-2015 for groundwater budget on Table 2.2-10. Is this the same period for surface water? What is the relationship between the values from the surface water budget and the groundwater budget?	- Table updated with historical years noted. (1988-2015) - Same period for surface water. (1988-2015) - The surface water budget and groundwater budget are related primarily by the SW-GW exchange component.
Piru	7	7-19	Ventura County Public Works Agency	10/21/2021	NS	2-70	11-13	Historical water budget	On page 2-70, lines 11-13 state "Higher average pumping rates during dry periods (Figure 2.2-34) is biased largely due to wells that pumped during the early 1990s drought but have since become inactive or destroyed." How does this affect pumping in future scenarios?	- Future pumping relates to analogous years from the historic pumping records. Analogous years were selected based on the years in the historic record that are similar to the precipitation and temperature of each year in the future climate dataset (created based on adjusting historic time period 1943 through 2019 with climate change factors provided by DWR). Therefore, the future pumping samples historic pumping from a mixture of years, including the higher pumping rates from the early 1990s and lower pumping rates from recent years (i.e., 2017-2019).
Piru	7	7-20	Ventura County Public Works Agency	10/21/2021	NS	NS	Tables 2.2-10, 2.2-12, 2.2-14	Groundwater budget	An explanation should be provided regarding how the annual flow for Mountain Front Recharge is calculated/estimated in Tables 2.2-10, 2.2-12 and 2.2-14. Is this based on stream exchange data?	Please refer to Section 3.5.2.4 in Appendix E.
Piru	7	7-21	Ventura County Public Works Agency	10/21/2021	3.2.3.1	3-5	NS	Undesirable results criteria	On page 3-5, Section 3.2.3.1, more rationale should be provided on the criteria to define undesirable results (i.e., drop below well screen in 25% of the representative monitoring sites or groundwater elevations drop below the minimum threshold (MT) [not yet discussed] equivalent to the critical water level of 10 feet below fall of 2011 conditions.	- See updated Section 3.2.3.1.
Piru	7	7-22	Ventura County Public Works Agency	10/21/2021	3.3.1	NS	NS	Groundwater levels	Section 3.3.1 indicates that no dry wells have occurred in Ventura County, according to the DWR Household Water Supply Shortage Reporting System. Does FPBGSA plan to survey wells to assess if any have become dry?	The Pumpers Association can initiate outreach to pumpers, but there is no significant threat identified based on historical groundwater elevation contours and similarities simulated in the future GW model with climate change. Domestic wells are likely de minimus extractors and are not required to report their pumping to the GSA, but can certainly share water level data from their wells with the GSA at their discretion. The GSA does not cuttently have plans to survey the domestic wells.
Piru	7	7-23	Ventura County Public Works Agency	10/21/2021	3.3.5	NS	NS	Subsidence minimun threshold	In Section 3.3.5, the rationale for the establishment of the subsidence MT should be explained.	The subsidence MT is established based on tech memo from Pumper's Association / Bryan Bondy, as well as extensie stakeholder discussions at multiple board meetings and workshops.

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GSP	Letter No.	Comment No.	Commenter(s)	Date	Section	Page No.	Line No.	Topic	Comment	Response
Piru	7	7-24	Ventura County Public Works Agency	10/21/2021	NS	NS	NS	Evapotransporation	Is there an available and up-to-date evapotranspiration map available for the Basin and/or the adjacent Fillmore Basin? Figure 2.1-3 is a Land Use Map listing various crops in the Basin, but it would be helpful to develop an evapotranspiration figure based on the various crops.	Basin-scale evapotranspiration maps are not included in the UWCD groundwater model documentation or the GSP. An evapotranspiration map can be developed for the 5 year GSP update, if deemed appropriate.
Piru	7	7-25	Ventura County Public Works Agency	10/21/2021	3.5.4.1.1, 3.5.4.4.2	NS	NS	Data gaps - monitoring points	Sections 3.5.4.1.1 and 3.5.4.4.2 state that there is a potential monitoring point data gap in the eastern portion of the Basin and there are a limited number of wells that access deep groundwater from the Deep Principal Aquifer. Does FPBGSA plan to install additional monitoring points to address these gaps?	See adjusted text in these sections.
Piru	7	7-26	Ventura County Public Works Agency	10/21/2021	4.5	NS	NS	Water quality monitoring	In Section 4.5, water quality monitoring wells should be installed to monitor shallow groundwater quality, especially entering the eastern boundary of the Basin.	The alluvium thickness in the extreme eastern portion of the Piru basin is thin (a few 10s of feet) and this area was not prioritized for new monitoring wells at this time. If grant or other funds become available in the future, the GSA can consider additional monitoring wells in the extreme eastern portion of the basin.

Fillmore and Piru Basins
Groundwater Sustainability Agency

Appendix C-3

Response to Comments on Preliminary Draft Subsidence Technical Memorandum

APPENDIX C2
RESPONSE TO COMMENTS ON EARLY DRAFT TECHNICAL MEMORANDA - SUBSIDENCE

The following technical memorandum on subsidence was released as preliminary drafts in February 2021 to provide an opportunity for stakeholder input early in the GSP preparation process:

- *Fillmore and Piru Basins **Land Subsidence Evaluation** Technical Memorandum, DBS&A, February 4, 2021. (Link to February 4, 2021 Draft Subsidence Tech Memo)*

RESPONSE TO COMMENTS ON FEBRUARY 2021 DRAFT LAND SUBSIDENCE EVALUATION

Comment Letter 7. County of Ventura Public Works, March 5, 2021

Comment 7-1:

Background

- *The memo states subsidence related to oil and gas withdrawal in the subbasins has not been historically observed or determined. How are conclusions drawn regarding hydrocarbon extraction without quantifiable or known hydrocarbon extraction data? It appears that there are plugged oil and gas wells within both subbasins which could have historically had an impact on subsidence.*
- *There is no discussion regarding hydrogeological continuity with the Santa Clara River Valley East Subbasin, groundwater extraction from this subbasin and the effect of recharge on the Piru/Fillmore subbasins, and surficial deposition and sedimentation from tributaries and the upper reaches of the Santa Clara River.*

Response to Comment 7-1:

The quantity of hydrocarbons removed from the subsurface in the Fillmore and Piru basins cannot definitively determined due to lack of adequate reporting of historical operations. For the purposes of SGMA, the quantity of the hydrocarbons is of secondary importance to the physical manifestations of land subsidence. While hydrocarbon extraction is a documentable causative factor in some oil fields, there is no readily identifiable evidence of land subsidence associated with historical hydrocarbon extraction operations. Very few currently active hydrocarbon extraction wells are found in or near these basins and likewise, no subsidence has been documented with their operations. The 2020 Ventura County General Plan does not refer to land subsidence associated with hydrocarbon extraction as a current hazard.

Groundwater extraction from the Santa Clara River Valley East Subbasin does not have a direct effect on the water levels in the Piru basin. A significant proportion of the surface water flow from the Santa Clara River East Subbasin is effluent from the waste water treatment plants in that Subbasin. The water levels near the Ventura / Los Angeles County Line are generally very stable (Appendix K) as a result of that effluent and there is little groundwater extraction occurring in that area. More detailed discussions of the relationship between the waste water treatment plant effluent and water levels in the Piru basin are contained in the GSP (for example Section 2 and Appendix K) with supplemental data contained in the online database (www. https://fillmore-piru.gladata.com/).

Surficial deposition/sedimentation is not a sustainability indicator defined in SGMA. Any potential compaction of the sediments due to self-weight loading is beyond the scope of this Plan. SGMA is focused on subsidence due to groundwater extractions.

Comment 7-2:

Geodetic Surveys

- *Overall, the historical survey data is not very representative of groundwater extraction-related subsidence. It shows a good case for a need for more survey locations overlying the subbasins. It currently does not provide enough data to support any trends.*

Response to Comment 7-2:

We agree that the geodetic data from the existing CGPS is not necessarily representative of the potential land movements of the parts of the basin underlain by alluvium and where groundwater extractions are most extensive. The FPBGSA Board of Directors will consider the need for additional CGPS monitoring locations as more InSAR data becomes available (see Section 4 of GSPs). The long-term trends were supplied by UNAVCO.

Comment 7-3:

lnSAR Data

- *The memo states that general land surface movement trends can be seen in the lnSAR data. Agreed, the data and data collection locations are representative of minor subsidence occurring in the Fillmore Subbasin and indicative of potential elastic rebound via groundwater replenishment in the central Piru Subbasin.*

Response to Comment 7-3:

It is important to recognize that the InSAR data shows, in almost all locations, that the land surface movements derived from the satellite-generated data, are less than the instrumental resolution of the technology. While it is tempting to draw inferences from the data values less than the technologies resolution, it is generally not considered a sound scientific conclusion.

Comment 7-4:

Future Potential Subsidence

- *There is no discussion of the potential for future planned development to impede surface water infiltration and percolation (elastic subsidence) or the effect of increased pumping due to development.*

Response to Comment 7-4:

The future planned development in these basins is negligible based on information supplied by the City of Fillmore and Ventura County. These basins are not likely to experience large urbanization programs that would materially change of the amount of impervious cover and alter infiltration of runoff.

The effects of increased future groundwater extractions were considered in Section 6 of this technical memorandum. The groundwater flow model for these basins was used to simulate what water levels are expected to be in the future using the 2070 Climate Change Factors proposed by CA DWR. The future scenarios included climate change, increases in groundwater extraction (as defined by Fillmore Basin Pumpers Association, Piru Basins Pumpers Association, City of Fillmore, and Waring Water), changes in waste water treatment plant effluents for City of Fillmore and County of Ventura, and potential changes in waste water effluent from the treatment plants in Santa Clarita (see GSP section 2, Appendices E, F, H, I, J, and K). Figure 8 in the Subsidence Technical Memorandum illustrates how future groundwater levels are not likely to fall below the estimated historical low water levels.

Fillmore and Piru Basins
Groundwater Sustainability Agency

Appendix C-4

Response to Comments on Preliminary Draft Groundwater Dependent Ecosystems Assessment

RESPONSE TO COMMENTS

Comment number	Comment	Organization	Issue	Response
GDE_001	**Do Not Eliminate GDEs Based on the 30-foot Depth to GroundwaterCriterionComment:** 2.1.2 Procedure, starting on p. 11 - GDE identification, required per California Code of Regulations, Title 23 § 354.16(g), is based on methods that risk exclusion of ecosystems that may depend on groundwater. **Issue #1:** The GDE-FPB Memo utilizes Rohde *et al* . (2018) by "*assigning GDE status to vegetation communities either within 30 feet of the ground surface or where interconnected surface waters are observed* " (pg. 11). This depth-to-groundwater method applied to the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset to eliminate potential GDEs is fallible.	CDFW	Do not use 30 ft depth to Groundwater	The 30 foot depth to water threshold does a reasonable job of capturing phreatophytes in the basins and is considerably deeper than the rooting depth of most of the mapped vegetation which is <15 ft. In addition, because the gradient in groundwater is relatively steep outside the zones of rising groundwater, increasing the threshold depth would not change the extent of GDEs very much (see Figure 2.1-2 in the revised document).
GDE_002	**Issue #2:** CDFW is concerned with the removal of potential GDEs with a depth to groundwater greater than 30 feet from the 2005-2015 baseline. The 2005-2015 baseline that the analysis depends on (starting pg. 74) falls several years into a historic drought when groundwater levels throughout the Fillmore Basin were trending lower than usual due to reduced surface water availability. As such, this period of groundwater elevations with several years of a historic drought does not consider representative climate conditions or account for GDEs that can survive a finite period without groundwater access (Naumburg et al. 2005). Naumburg *et al* .(2005) presents several models that evaluate how GDEs rely on fluctuating groundwater elevations for long-term survival. GDEs have been sustained by groundwater, despite the depth of the groundwater table being greater than 30 feet below ground surface due to these fluctuating groundwater elevations.	CDFW	Do not use 30 ft depth to Groundwater	Our approach used the highest groundwater data (e.g., Spring 2019) that was available to us. Our goal was to include vegetation communities that could potentially use groundwater at any time in their life history (i.e., not just in summer or drought years). We did not exclude GDEs within 30 ft, but do note where the rooting depth of most plants is shallow and groundwater is deep. The text was revised to clarify the approach we used.
GDE_003	**Recommendation:** CDFW recommends developing a hydrologically robust baseline that considers the groundwater elevation fluctuations associated with climate conditions. This approach would also account for the inter-seasonal and inter-annual variability of GDE water demand.	CDFW	Develop new baseline hydrology	See above, we do this by using the highest groundwater available.
GDE_004	**Comment**: 3.3.1 Piru Groundwater Basin, p. 27 - data gap regarding effluent releases in Los Angeles County. Issue: CDFW agrees with the GDE-FPB Memorandum that effluent releases in Los Angeles County are believed to be a significant contributor to surface water flow. Riparian habitat, a GDE within the basin, relies on various locations with a high groundwater table and the subsurface flows that help to maintain the high groundwater table.	CDFW	Effluent into basin as a data gap	Given the relatively thin alluvial sediments in this reach, the team was unable to find a suitable place to monitor groundwater.
GDE_005	Recommendation: CDFW recommends closely monitoring effluent releases in Los Angeles County, to understand and incorporate how much the effluent releases contribute to not only surface flow, but also subsurface flow and groundwater recharge.	CDFW	Effluent into basin as a data gap	Releases from Los Angeles County will continue to be monitored by UWCD.
GDE_006	Comment #3: Additional Remote Sensing and Shallow Groundwater Wells are Needed to Understand Groundwater Elevations for GDE Units Comment: 3.1 Groundwater Levels, p. 19 - data gaps "because there are no representative wells located in or near the unit. Many of the wells used in the analysis below are screened below the shallow groundwater depths used by GDEs and may not accurately represent the actual groundwater elevation."	CDFW	Sparse monitoring network	See response GDE_008
GDE_007	Issue: CDFW agrees with the GDE-FPB Memorandum that the groundwater levels may not be accurate under the GDEs due to lack of critical groundwater level data. According to p. 30 - "The role of shallow groundwater elsewhere in the basin is less certain and will be assessed based on interpolated groundwater elevation and vegetation." The current monitoring network lacks enough representative distribution of shallow groundwater monitoring wells to monitor impacts to environmental beneficial uses and users of groundwater and interconnected surface waters [23 CCR § 354.34(2)].	CDFW	Sparse monitoring network	See response GDE_008
GDE_008	Recommendation: CDFW recommends the installation of shallow groundwater monitoring wells near potential GDEs and interconnected surface waters, potentially pairing multiple-completion wells with additional streamflow gauges. CDFW agrees with the GDE-FPB Memorandum's recommendation on p. 91 that states: "remote sensing and shallow groundwater elevation monitoring, particularly during and following droughts is recommended." This will facilitate an improved understanding of surface water-groundwater interconnectivity and the overall health of GDEs.	CDFW	Sparse monitoring network	The Fillmore and Piru Basins GSA has identified 6 new or modified wells to monitor groundwater elevations. These wells are located near GDEs and cover gaps in the data record.
GDE_009	Many wells are located at higher elevations compared to GDEs, and when comparing depth-to-groundwater well data to plant rooting depths this can result in misinterpretation in groundwater-connectivity. Recommendation: Instead of using groundwater well data near GDEs, correct for land surface elevation at GDEs to determine depth-to-groundwater at the GDEs. See Best Practice #5 in this TNC guidance: https://groundwaterresourcehub.org/public/uploads/pdfs/TNC_NCdataset_BestPracticesGuide_2019.pdf	FSCR	Sparse monitoring network	Added description of GDE elevation transects to Section 3.1. Added maximum and minimum GDE elevations to depth to water plots and discussion.
GDE_010	Section 5.4.3 should describe groundwater thresholds for the 3 GDE units most susceptible to groundwater impacts. For example, it is highly recommended that groundwater levels at Cienega be restored to pre-drought (circa 2011) levels. This will ensure that groundwater conditions can facilitate riparian succession can occur, that the invasive non-native Arundo donax doesn't take over and increase evapotranspiration losses in the basin, and critical species habitat isn't permanently lost. Recommendation: One way to determine thresholds and objectives (ideal conditions) for your three target GDEs is to plot NDVI versus depth to groundwater (DEM corrected). This would assist in determining what depth to groundwater conditions are needed to maintain GDE conditions. Use a baseline prior to the recent drought, which is more hydrologically robust, building in resilience and taking precautions for future droughts and accounting for projected mega-droughts. The average 2011 hydrograph and groundwater level in the shallowest aquifer could perform as a measurable objective.	FSCR	Describe groundwater thresholds for GDE units	Added depth to water and NDVI plots to the technical memo.
GDE_011	The Nature Conservancy has new updated guidance on developing groundwater thresholds and objectives for ecosystems. Recommendation: Please review https://groundwaterresourcehub.org/public/uploads/pdfs/GroundwaterThresholdFramework_Final_updated_Dec2020.pdf	FSCR	Updated Nature Conservancy guidance on depth to water	Added description of GDE elevation transects to Section 3.1. Added max/min GDE elevations to depth to water plots and discussion.
GDE_012	Reevaluate Elimination of GDE's Based on a 30-foot Depth to Groundwater Criteria. At the March 18, 2021 FPBGSA stakeholder workshop, California Department of Fish and Wildlife representative Steve Slack noted that the Department has noted GDE's with the rooting depth to groundwater that was greater than 30 feet and voiced concern with the removal of potential GDEs using this criteria. Page 3 of 9 FPBGSA Draft GDE Tech Memo Recommendation: Follow CDFW suggestion to develop a hydrologically robust baseline that considers groundwater elevation fluctuations associated with climate conditions, inter-seasonal and inter-annual variability of GDE water demand and source species list noting GDE's with a rooting depth greater than 30 feet.	FSCR	Do not use 30 ft depth to Groundwater	See Response to GDE_002.
GDE_013	Projected Flow Releases from Los Angeles County. Effluent releases from Santa Clarita wastewater treatment works and bypass flows from Pyramid Dam (Southern State Water Project) are contributors to surface water flow, and riparian habitat and GDEs within the basin. Both facilities are going through re-permitting processes. Recommendation: Monitoring and/or request reporting of effluent releases from Los Angeles County needs to be adequately captured in the inter-basin memorandum of understanding. The MOU should include timelines to adequately capture any and all foreseen changes to future releases, particularly if these trigger minimum thresholds associated with sustainable management criteria for beneficial users and uses.	FSCR	Effluent into basin as a data gap	UCWD will continue to monitor effluent releases from LA County.
GDE_014	However, the potential effects on non-vegetative beneficial users and uses such as Southern steelhead, and the subsequent steps of setting of sustainability criteria for these, needs further development and improvement. Without a thorough understanding of hydrologic/biotic relationship, the draft Groundwater Sustainability Plan cannot ensure that significant and unreasonable adverse impacts from groundwater depletion are avoided (California Department of Water Resources 2016).	FSCR	Non-vegetation GDEs	Text changes were made to section to specifically address O. mykiss.
GDE_015	Recommendation: Further analysis and efforts to assess the quantity and timing of interconnected surface water and groundwater is necessary for GDE's. These either need to be developed or captured as a data gap with actionable study to address data gap by the five-year review of the GSP. Installation of additional shallow groundwater monitoring wells and streamflow gauges near GDEs are necessary to understand the interconnectedness and monitor ongoing health and SMC compliance.	FSCR	Interconnected surface water	Additional monitoring wells are discussed in the monitoring appendix. These wells are located near GDEs and should improve our understanding of shallow groundwater dynamics. There is a section on interconnected flows in the document and we have more explicitly discussed fish passage and interconnected surface water.

RESPONSE TO COMMENTS

Comment number	Comment	Organization	Issue	Response
GDE_016	Currently, the Draft Sustainability Criteria for GDEs are based on statewide data on "vegetation known to use groundwater" and doesn't include minimum thresholds and measurable objectives for groundwater used by other biological resources, such as seasonal migration of fishes. The TNC framework does call for further biological assessment in the case of endangered species. The lack of further biological assessment and SMC development would be a gross omission in thoroughly identifying GDE needs in the Draft Plan. In addition to supplying water to the root zone of plants, groundwater can also contribute to surface flows, influencing the timing, duration, and magnitude of surface flows, particularly base flows that support aquatic invertebrates, avian fauna, and fish species, including native resident and anadromous fishes. Groundwater that supports seasonal surface flows can also contribute to the life-cycle of migratory fishes, such as steelhead and lamprey, that can make use of intermittent flows for both migration, spawning and rearing. While we appreciate and commend Stillwater Sciences on identifying GDE, the current vegetative-centric approach to minimum thresholds and measurable objectives of GDE's is not sufficient to capture the potential impact to other beneficial uses/biota.	FSCR	Interconnected surface water	We have added more information on O. mykiss passage related to groundwater. O. Mykiss rearing in the mainstem is a data gap. SMC development is discussed elsewhere in the GSP.
GDE_017	Recommendation: All identified environmental beneficial uses and users need to be explicitly included in the Draft Plan's sustainability goals, not solely vegetative communities. SMC's need to be developed that will capture and protect all GDE's identified. Model-based predictions suggest a minimum flow of 800 cfs is required to provide a depth of 0.6 ft continually across 10ft of channel (Keller et.al, 2006), and should be considered when setting sustainability criteria for a wider set of beneficial uses/users in the GSP.	FSCR	Assess impacts on in-stream habitat	The beneficial users have been more explicitly described in the text. Text changes were made to section to specifically address O. mykiss in relation to interconnected surface water.
GDE_018	While these groundwater-influenced flows may not support permanent vegetative cover, they can nevertheless support seasonal use of this reach of the Santa Clara River for migratory or rearing purposes, depending on the amount, and timing of annual rainfall and runoff and the groundwater elevation. The Santa Clara River along its entire reach is always connected to an aquifer because it either receives water from the surrounding sediments or supplies water to the surrounding sediments, or both. This reach is also designated critical steelhead habitat and constitutes a beneficial use.	FSCR	Assess impacts on in-stream habitat	We have expanded this discussion. Note that interconnected surface water requires that the groundwater be connected to surface flows through a continuous saturated zone. Groundwater recharge from disconnected surface water is common in many reaches of the Santa Clara River.
GDE_019	It is also important to recognize that the TNC assessment of groundwater water conditions reflects conditions that have been and continue to be significantly influenced by extensive water developments within the Santa Clara River watershed, including extensive water diversion and groundwater pumping programs (e.g., Pyramid, Santa Felicia, and Castaic dams); these activities have had a cumulative affect on groundwater levels and related surface flows within the Fillmore and Piru basins (Stillwater 2011a). Past and/or current effects of anthropogenic activities should not exclude or significantly delay the capacity of the aquatic environment to develop or maintain essential physical or biological features that species rely upon for growth and survival, otherwise the SMC's and ultimately the GSP would not be consistent with the sustainability requirements of SGMA. This reiterates the importance of the MOU and inter-basin agreement with upstream users aforementioned...To ensure that the Fillmore and Piru Basins GSA's GDE Tech Memo and subsequent GSP's adequately recognizes instream beneficial uses of the Santa Clara River that are potentially affected by the management of groundwater within the basins, the sustainable management criteria, minimum thresholds, and measurable objectives, must analyze and capture the important relationship between the extensive surface diversions and groundwater recharge program within the basins, and its potential adverse effects on GDE's and namely the federally endangered steelhead (Oncorhynchus mykiss).	FSCR	Assess impacts on in-stream habitat	Text changes were made to section to specifically address O. mykiss in relation to interconnected surface water.
GDE_020	Undesirable results for Southern steelhead include any adverse loss or modification to critical steelhead habitat (rearing, spawning and migration corridors) that hinders the ability of designated critical habitat to provide for steelhead survival because of pumping. Outside of the aforementioned flow metricadditional complementary sustainability metrics could include those used in NMFS "envelope method"3. Many natural variables such as seasonal surface flow patterns, water quality including temperature and established wetted channel, are significantly impacted by artificial modification in freshwater habitat and are possible metrics for minimum thresholds and measurable objectives. Ultimately identifying a metric that will identify an affect to the timing, duration and/or magnitude of surface flows essential for steelhead migration, spawning and rearing due to sub-surface extractions. Steelhead metrics will likely have a spatial and temporal component, as sustainability needs may vary due to life-cycle needs and migration windows, which may require dedicated management areas.	FSCR	Assess impacts on in-stream habitat	Steelhead rearing in the Santa Clara River is a data gap. There is no data on steelhead rearing in the Fillmore and Piru basins, although previous research has identified the mainstem Santa Clara River as a migration corridor (Stoecker and Kelley 2005). We have adjusted the text to reflect the connection bewteen rising groundwater and steelhead passage.
GDE_021	. To adequately address Southern steelhead impacts, a steelhead limiting factor analysis may likely be needed, as the Recovery Plan's analysis may be too course for these two basins. This is a data gap that can better inform management decisions that invariably may impact the endangered species. The GSA needs to identify the flow levels that effectively support essential life-history functions, specifically flows that adequately support adult steelhead and smolt migration during the winter and spring, and juvenile rearing year-round. The steelhead limiting factor analysis, shallow groundwater monitoring wells paired with stream flow gauges will begin to address the existing data gap around hydrologic/biotic relationships. Low summer baseflow is a significant stress to steelhead, and groundwater inputs can affect fine scale surface flow conditions and will need to be closely monitored in identified GDE areas.	FSCR	Assess impacts on in-stream habitat	Based on the lack of data on steelhead use of interconnected surface water in the Fillmore and Piru Basins, a limiting factors analysis is beyond the scope of the GSA's responsibility, but the GSA would offer letters of support for such a study.
GDE_022	While pool depths and riffle depth were discussed as possible sustainability metrics, it was acknowledged that changing channel morphology makes it difficult to map in a reliable way. Furthermore, we would caution using a minimum instream flow need, as these don't necessarily address broader life history needs and habitat requirements for long-term survival and recovery. Functional flows that incorporate and provide migration cues for adult steelhead and ecological flow functions will need to be sustained.	FSCR	Assess impacts on in-stream habitat	See previous comments regarding steelhead.
GDE_023	FSCR requests that a revised Draft Tech Memo and Sustainable Management Criteria Matrix be re-circulated to give interested parties an opportunity to review and comment on the memo before it is finalized. Particularly, as per the TNC Critical Species Lookbook, it behooves the GSA to formally request NMFS' comments on the draft at this juncture. Further input from the Santa Clara River Steelhead Coalition could also be requested to ensure pertinent stakeholders are adequately engaged.	FSCR	Additional agency input	Noted.
GDE_024	We do however recommend removal of the California Condor, as known condor habitats are not associated valley floor riparian areas.	UWCD	Change species inventory	Condor is removed as a GDE species because the habitat is not part of a GDE in these basins.
GDE_025	As noted by the authors, the Tech Memo also includes multiple incorrect references to Pacific lamprey occurrence in the Santa Clara River upstream of Sespe Creek and in lower Piru Creek. Please remove those inaccurate references.	UWCD	Change species inventory	This has been fixed.

RESPONSE TO COMMENTS

Comment number	Comment	Organization	Issue	Response
GDE_026	The authors appear to presuppose that all riparian habitats in the Piru and Fillmore basins are Groundwater Dependent Ecosystems (GDEs). The documents consistently refers to all riparian communities as "GDE Units." Simply "riparian plant communities" or "potential GDE Units" would be a much better working reference throughout the document. Consistent use of the GDE Unit term applied to areas that are finally determined to not be GDEs provides ample opportunity for inaccurate or misleading citations or references to the Tech Memo. Notable, the authors drop the GDE Unit tag in Section 5.4.3 when three Riparian Complexes are identified as important GDEs for consideration in the Groundwater Sustainability Plans (GSPs) for the Piru and Fillmore basins.	UWCD	GDE vs riparian unit	We've added some discussion to clarify this and describe the GDEs as potential GDEs, then discuss GDE likelihood in Section 5.
GDE_027	The Tech Memo lacks a clear definition of what distinguishes a GDE from other riparian communities sustained by surface water flows, soil moisture, or shallow local/perched groundwater occurrence that is not subject to significant influence from pumping from the main aquifers of the basins. It would be helpful if these definitions were included early in the document.	UWCD	GDE vs riparian unit	This has been clarified in the text.
GDE_028	Discussion of the hydrology associated with the Del Valle Riparian Complex could be much improved. United's understanding is that rising groundwater primarily occurs in the upper portions of this complex in the western portion of the Eastern basin (in Los Angeles County). Less than a mile downstream of the county line (the rather arbitrary head of the Piru basin), the abandoned Blue Cut gaging station is located on a bedrock high. From this point downstream to the Las Brisas bridge, surface flow is thought to be stable, and sustained by the rising water and recycled water discharges in Los Angeles County. The river transitions to a losing reach near the Las Brisas bridge, the current location of the USGS stream gage. A shallow water table commonly exists in this area, but is clearly sustained by the surface water flows from upstream areas. Please take care to describe this area in more detail and note that the occurrence of rising water in this area is not influenced by any known groundwater pumping in the Fillmore basin.	UWCD	Del Valle hydrology discussion	Added description of Del Valle and upstream hydrology, following UCWD comments.
GDE_029	Please take care when referencing United's groundwater elevation contours. Noting a shallow depth to water in a single year near the western margins of Santa Clara River Riparian Shrubland habitats in the Piru and Fillmore basins should not suggest that United believes shallow groundwater is common across those habitats. United agrees with Stillwater's assessment that Tributary Riparian areas are not likely to be "connected to groundwater."	UWCD	UCWD groundwater elevation contour references	We've added a map of the contour depth and text that clarifies that these are high groundwater conditions and are not reflective of typical groundwater levels.
GDE_030	Well 03N20W08A01S may be a poor choice to represent shallow groundwater elevations in the East Grove Riparian Complex. Water level records from this well appear to show a confined aquifer response from deeper production zones. One would expect shallow groundwater levels to be much more stable in this area known to commonly have groundwater discharge to the channel of the Santa Clara River.	UWCD	Selection of representative wells	Well deleted.
GDE_031	Regarding the Del Valle Riparian Complex, surface water flow in the first mile of the Santa Clara River within the Piru basin likely includes groundwater inputs, but below Blue Cut the river is stable or losing. Care should be taken to appropriately characterize how or if groundwater production in the Piru basin would significantly influence the health or extent of the Del Valle Riparian Complex.	UWCD	Impact of groundwater production in Piru basin on Del Valle unit	Added discussion of Del Valle.
GDE_032	Page 2 states flows on Piru Creek have been regulated except for the 1969 flood. In 2005 the dam also spilled (12,000 cfs?) and so there may be other instances of this. UWCD staff should check the records to verify this statement.	Ventura Co Public Works	Piru surface water	Refer this question/comment to United.
GDE_033	Page 4, reference to USGS gauge 11114000 seems to indicate it is still active. The USGS has not maintained or published the data for this gauge for sometime. Currently this is done by Watershed Protection for their gauge 723 and wehave operated the gauges at locations 720 and 724 as well.	Ventura Co Public Works	Gage 11114000	The period of record (1927-2004) was added to the text.
GDE_034	The inconsistent use of plant community nomenclature throughout the document, as well as the lack of clear community descriptions, invalidates the conclusions regarding ecological value and dependence on groundwater.	Ventura Co Public Works	Vegetation descriptions	We have clarified some of the community names in the text (e.g., tamarisk versus saltcedar). We decided to use the community name assigned by the relevant vegetation map (there were 3 different). We then used our experience in the basin to assess dominant species and things like rooting depth.
GDE_035	Incorrect usage/spelling of common and scientific names occurs throughout the text.	Ventura Co Public Works	Vegetation descriptions	This has been edited.
GDE_036	For special-status species, we suggest emphasizing that SWFL and WYBC requiremore extensive and contiguous riparian woodlands, compared to LBVI which canmake use of smaller scrub patches.	Ventura Co Public Works	Vegetation descriptions	Added text to describe this.
GDE_037	We agree that m ore shallow wells are needed to discern the true level and extent of groundwater in the GDEs. Incomplete data sets lead to many assumptions in the analyses.	Ventura Co Public Works	Sparse monitoring network	Comment noted.
GDE_038	We agree with the conclusion that the Del Valle, Cienega, and East Riparian Complexes are the most important GDE units Grove to consider in the GSP analyses. We recommend more study and data collection to determine how the Santa Clara River Riparian Shrubland GDE units are affected by groundwater and if its management wou ld affect them. The Shrublands form substantial cover within the river and provide habitat connectivity among the Riparian Complexes.	Ventura Co Public Works	Sensitivity of SCR Riparian Shrubland units to GW changes	One of the monitoring wells proposed by FPBGSA is located near the downstream end of the riparian shrubland. This unit has very shallow rooted plants, disconnected surface water and very rare shallow groundwater.
GDE_039	In this section, please clarify why the FPBGSA has not determined projects and/or management actions are needed. Do the conclusions in this and other reports indicate the GDEs are adequately sustained and current groundwater extractions are not affecting them? Or has the FPBGSA not yet developed management actions due to a need for more information or time?	Ventura Co Public Works	Projects and management actions	This is clarified in the Draft GSPs.
GDE_040	The Stillwater Sciences 2013 reference page 11 is not included in the list of literature cited.	Ventura Co Public Works	References	Reference updated.
GDE_041	As explained more fully in the enclosure, the Draft Memorandum does not, but should, adequately address the recognized instream beneficial uses of the Santa Clara River, or other GDE, potentially affected by the management of groundwater within the Fillmore and Piru Groundwater Basins. In particular, the revised Draft Memorandum should adequately recognize or analyze the important relationship between the extensive groundwater extractions program within Fillmore and Piru Groundwater Basins (and the conjunctively managed Fox Canyon Groundwater Basin) and its potential adverse effects on the federally endangered steelhead (Oncorhynchus mykiss) and habitat for this species.	NMFS	Assess impacts on in-stream habitat	We have clarified the discussion of interconnected surface water where the interconnected water occurs and have highlighted special status species dependent on interconnected water.
GDE_042	Management of the groundwater of the Fillmore and Piru Basins has affected the water resources and other related natural resources in the Santa Clara River Watershed. For example, extraction of groundwater from these basins has lowered groundwater levels to the point of inducing eliminated artesian springs that supported a wide variety of plant and animal species, and affected surface flows that support the migrations of endangered steelhead in the Santa Clara River Watershed (Stillwater Sciences 2007a, 2007b, 2011a, 2011b, Beller et al. 2011). The development and operation of surface water supply facilities throughout the Santa Clara River are integral in the management of the groundwater resources associated with the Santa Clara River. Facilities such as Pyramid Reservoir, Santa Felicia Dam, Piru Creek Diversion and spreading basins, and the Vern Freeman Diversion Dam and spreading basins have profoundly altered the natural surface flow and groundwater recharge patterns in the Santa Clara River Watershed, from the headwaters to the Pacific Ocean (e.g., NMFS 2008a, 2008b). Unless the Draft Memorandum is revised to reflect the operation of these integral components of the groundwater management program for the Santa Clara River, the future adopted GSP will be unable to meet the requirement of SGMA to explicitly provide for the protection of habitats, including those recognized instream beneficial uses that are dependent on groundwater such as fish migration, spawning and rearing, as well as other GDE.	NMFS	Assess impacts on in-stream habitat	We have expanded the discussion of O. mykiss and compared groundwater flows with passage flows and more explicitly indicated that while this reach of the Santa Clara is thought to be primarily a migration corridor, the use of the interconnected portions of the stream for rearing is a data gap.

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Comment number	Comment	Organization	Issue	Response
GDE_043	When analyzing impacts on steelhead or other aquatic organisms resulting from groundwater and related streamflow diversions, identifying flow levels that effectively support essential life functions of this organism is critical (Belin 2018, Barlow and Leake 2012). Specifically, it is essential to determine what flows (and pool depths) adequately supports adult steelhead migration during the winter and spring, and juvenile rearing year round. Without an understanding of these hydrologic/biotic relationships, a GSP cannot ensure that significant and unreasonable adverse impacts from groundwater depletion (and in the case of the Santa Clara River, the integrally related surface water diversion/groundwater recharge program) are avoided (Heath 1983, California Department of Water Resources 2016	NMFS	Assess impacts on in-stream habitat	We have added information on passage flows for the mainstem Santa Clara. See response to NMFS 2 regarding rearing habitat.
GDE_044	page 1. The Draft Memorandum relies heavily on the Nature Conservancy's (TNC) guidance for GDE analysis (Rohde et al. 2018). According to this guidance, GDE are defined on their dependence on groundwater for all or a portion of their water needs. The Draft Memorandum concludes, "Mapping GDEs requires mapping vegetation that can tap groundwater through their root systems, assessing where the depth of groundwater is within the rooting depth of that vegetation, and mapping the extent of surface water that is interconnected with groundwater (Rohde et al. 2018)." The method used by TNC in identifying GDE is based on statewide data on "vegetation known to use groundwater", and therefore does not adequately reflect the uses made of groundwater by other biological resources, such as seasonal migration of fishes, or other organisms such as invertebrates that have differing life-cycles and environmental requirements than plants (TNC 2018). In addition to supplying water to the root zone of plants, groundwater can also contribute to surface flows, influencing the timing, duration, and magnitude of surface flows, particularly base flows. These base flows provide essential support to aquatic invertebrates, avian fauna, and fish species, including native resident and anadromous fishes. In addition, groundwater that only seasonally supports surface flows can contribute to the life-cycle of migratory fishes, such as steelhead, that can make use of intermittent flows for both migration, spawning and rearing (Boughton et al. 2009, 2006).	NMFS	Non-vegetation GDEs	We have expanded the discussion of interconnected surface water as GDEs and the influence of base flows.
GDE_045	pages 5-7 The Draft Memorandum relies almost exclusive on historical ecology study of Beller et al. (2011). This study, while providing valuable information on the type and distribution of various vegetative communities does not provide comparable information on aquatic species associated with the Santa Clara River. The habitats covered Beller et al (2011) are principally riparian and terrestrial, omitting coverage of various types of aquatic habitats (e.g., pools, runs, riffles, glades, etc.) should be covered explicitly.	NMFS	Assess impacts on in-stream habitat	See discussion of aquatic habtats in the Section 4.1.4. Given the correspondence between the historical wetlands and interconnected surface water Beller et al. (2011) seems appropriate. We do not know the changes to the extent of habitat units through time, but this is likley tied to changes in geomorphology rather than groundwater.
GDE_046	pages 8-14 methodology focuses exclusively on vegetation known to use groundwater and, therefore, ignores the seasonal variation in the groundwater levels in the reach of the Santa Clara River underlain by the Fillmore and Piru Basins that can periodically (seasonally, or intra-annually) support surface flows by affecting their timing magnitude, and duration.	NMFS	Interconnected surface water	We have clarifiied the correspondence between the historical wetland units and interconnected surface water.
GDE_047	The surface flows at the confluence of Piru Creek, Hopper Creek, Pole Creek and Sespe Creek are important for maintaining surface hydrologic connectivity for steelhead (and other native aquatic-dependent species) attempting to migrate between these major tributaries and the middle reaches of the Santa Clara River (Kelley 2004, Kajtaniak 2008, Francis 2009). While these groundwater-influenced flows may not be sufficient to support permanent vegetative cover, they can nevertheless support seasonal use of this reaches of the Santa Clara River for migratory or rearing purposes, depending on the amount and timing of annual rainfall and runoff and the groundwater elevation. (For a study of the role of intermittent flows in the rearing phase of O. mykiss, see Erman and Hawthorne 1976, Boughton et al. 2009).	NMFS	Assess impacts on in-stream habitat	Groundwater connection of these reaches is not known.
GDE_048	page 16 In describing its procedure to identifying sensitive species, the Draft Memorandum includes "Direct—species directly dependent on groundwater for some or all water needs (e.g., cottonwood with roots in groundwater, juvenile steelhead in dry season)." We would note that groundwater levels can influence late spring surface flows, and these flows can be important for juvenile O. mykiss attempting to emigrate out of the Santa Clara River Watershed, including from the Piru Creek, Hopper Creek, and Sespe Creek tributaries that are within the boundaries of the Fillmore and Piru Basins.	NMFS	Assess impacts on in-stream habitat	We expanded the discussion of O. Mykiss.
GDE_049	page 19. The revised Draft Memorandum should recognize that the effects of droughts on groundwater levels can be and often are exacerbated by groundwater extractions. One of the primary purposes of SGMA is to identify these anthropogenic effects on groundwater levels (and the related GDE) so that groundwater resources may be managed in a way to protect all beneficial uses of groundwater, including fish and wildlife, such a southern California steelhead (as well as other native aquatic resources). Therefore, when revising the Draft Memorandum, every effort should be made to ensure that: 1) all anthropogenic effects on the amount and extent of groundwater are properly and accurately cataloged, 2) practices are defined to remedy the cataloged effects on GDE, and 3) the practices are instituted and the effects adaptively managed to ensure GDE receive sufficient protection in accordance with the SGMA.	NMFS	anthropogenic effects on groundwater levels	New modeling information discussing the effects of groundwater pumping on surface flows have been added to the discussion.
GDE_050	page 19. The Draft Memorandum also notes, "Long-term records of shallow groundwater are relatively rare in the Fillmore and Piru groundwater basins." And, "We were unable to examine the groundwater levels in the Tributary Riparian GDE unit because there are no representative wells located in or near the unit." As noted above, groundwater levels that support surface flows, particularly in the late spring can be important in maintaining surface flow connectivity between the Santa Clara River and the tributaries (Sespe Creek, Pool Creek, Hopper Creek, Piru Creek) which lay within the boundaries of the Fillmore and Piru Basins. These surface flows can be important for juvenile O. mykiss attempting to emigrate out of the Santa Clara River watershed, including from the Piru Creek, Hopper Creek, Pole Creek, and Sespe Creek tributaries. Interrupting the timing, magnitude, and duration of these flows as a result of groundwater extraction can be deleterious to juvenile O. mykiss. Groundwater levels should be monitored in the Tributary Riparian GDE, and any potential effects should be addressed in the revised Draft Memorandum.	NMFS	Interconnected surface water	It is not clear that these reaches have interconnected surface water and most of the Tributary Riparian Unit is unlikley to be affectd by groundwater extraction.
GDE_051	page 27. The Draft Memorandum notes, "Surface waters within the Piru and Fillmore groundwater basins have varying degrees of connection to groundwater." And the "Santa Clara River has alternating perennial and intermittent reaches with perennial reaches occurring where rising groundwater contributes the vast majority of the surface water (except during storm events with significant runoff) and the intermittent reaches are losing reaches that are disconnected from groundwater during most of the year." The pattern of alternating perennial and intermittent/or ephemeral surface flows are known as an "interrupted" surface flow regime, and is common in southern California watersheds, particularly where groundwater play a role in maintaining surface flows. This pattern can be altered through changing the groundwater elevations; this issue should be addressed in the revised Draft Memorandum.	NMFS	Interconnected surface water	The area's rising and falling groundwater have persisted since the earliest records (see Beller et al. 2011) and are geologically controlled by variations int the valley width rather than by grounwater extractions.
GDE_052	The Draft Memorandum notes, "Several small ephemeral tributaries to the Santa Clara River and Piru Creek occur in the reach and are disconnected from groundwater." It is not clear what tributaries are being referred to here. In addition to several unnamed tributaries in this reach (which may be ephemeral), there are also two other significant tributaries which enter from the north side of the Piru Basin (Piru Creek and Hopper Creek); neither of these should be classified as intermittent, though both have been impacted by water surface water diversions (Santa Felecia Dam on Piru Creek) and groundwater extractions (from both Piru Creek and Hopper Creek).	NMFS	Piru surface water	We are not aware of evidence suggesting that Piru Creek was historically perennial in the basin and would be happy to get some. Similarly, the degree to which Hopper Creek within the basin is disconnected due to groundwater pumping rather than due to deep surface groundwater is not known.

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Comment number	Comment	Organization	Issue	Response
GDE_053	page 28. The Draft Memorandum also notes, "To our knowledge, there has not been a systematic exploration of the extent of surface water in lower Piru Creek." We would note that similarly there is no known systematic exploration of the extent of surface water in lower Hopper Creek. For a discussion of the hydrology and steelhead resources of Piru Creek, (including lower Piru Creek, see NMFS (2008b).	NMFS	Piru surface water	Uncertainty surrounding Hopper Creek has been added.
GDE_054	page 28. The Draft Memorandum notes, "Other tributaries within the Fillmore Groundwater Basin, including Pole Creek, Boulder Creek, and Timber Creek are typically ephemeral or intermittent." The upper reaches of Pole Creek maintains perennial flows, but surface flows in the lower reaches within the Fillmore Groundwater Basin have been impacted by development on the alluvial fan formed by the confluence of Pole Creek and the Santa Clara River. As noted above groundwater levels that support surface flows, particularly in the late spring can be important in maintaining surface flow connectivity between the Santa Clara River and the tributaries (Pole Creek and Sespe Creek) which lay within the boundaries of the Fillmore Basin. These surface flows are important for juvenile O. mykiss attempting to emigrate out of the Santa Clara River watershed. Interrupting the timing, magnitude, and duration of these flows as a result of groundwater extraction can be deleterious to juvenile O. mykiss. This potential effect should be addressed in the revised Draft Memorandum.	NMFS	Assess impacts on in-stream habitat	The lower reaches of Pole Creek are not currently connected to groundwater, and the degree to which the upper reaches are connected to groundwater or to the main aquifer is a data gap.
GDE_055	page 28. The Draft Memorandum noted, "This period includes [a] relatively wet 2011 and the 2012–2016 drought." The revised Draft Memorandum should provide correlative groundwater extraction rates for these years to better understand the effects of variable groundwater levels and precipitation.	NMFS	anthropogenic effects on groundwater levels	We have included a model showing the change to surface flows if 50% of the pumping (pumping near the river) was eliminated.
GDE_056	page 28. Additionally, the timeframe for depicting historic hydrologic conditions is relatively short, and does not capture the hydrological conditions that prevailed before large-scale water development in the Santa Clara River Watershed. Using an environmental baseline that has been highly modified as framework for identifying impacts to GDE and developing management strategies to address those impacts runs the risk of falling into the "shifting baseline syndrome" that results in a distorted view of ecosystem functions, and inappropriate conservation goals and objectives (Pauly 1995, 2019).	NMFS	Develop new baseline hydrology	We are limited in our baseline hydrology by the available groundwater data.
GDE_057	page 30. The Draft Memorandum noted, "There are few shallow groundwater wells in the Fillmore and Piru groundwater basins, but many of the deeper wells show that there continues to be shallow groundwater and interconnected surface water at the basin boundaries at the historical Del Valle, Cienega, and East Grove riparian woodlands (Figure 1.4-1)." Without shallow groundwater wells that would provide specific data on relationship between groundwater levels and surface flows is not clear how an assessment can be made of the effects extracting groundwater from these areas might effect GDE. This appears to be a significant data gap. The revised Draft Memo should address this by identifying the installation of shallow groundwater wells (or piezometers) to better describe these relationships.	NMFS	Sparse monitoring network	The text has been updated to be more clear. Shallow groundwater wells will be installed near the Cienega site and East Grove.
GDE_058	pages 30-55. See comments above regarding the focus on vegetative GDE.	NMFS	Non-vegetation GDEs	We have clarified the correlation between GDE units and surface water extent.
GDE_059	Page 35-38. In addition to designating critical habitat for the federally listed endangered Southern California Steelhead DPS, NMFS has also identified intrinsic potential habitat in the watershed for this species as part of its recovery planning process. As noted above, this habitat includes habitats that has the potential to provide spawning and rearing habitat. Within the Fillmore and Piru Basin, NMFS identified intrinsic potential habitat in Sespe Creek, upper Pole Creek, Hopper Creek, and Piru Creek (Boughton and Goslin 2006). The ability of these habitats to provide spawning and rearing opportunities has been negatively affected by surface water diversions and groundwater extractions. As noted above, reducing the connectivity between the mainstem of the Santa Clara River and the lower reaches of these tributaries impairs the intrinsic potential of these habitats. Restoring and maintaining surface hydrologic connectivity for steelhead attempting to migrate to or emigrate out of these major tributaries to the middle reaches of the Santa Clara River is an important objective of NMFS's Southern California Steelhead Recovery Plan. When revising the Draft Memorandum, the recognition of this GDE is should be explicit, and the GSP should ensure that, this GDE is not unreasonably impacted by groundwater extraction from the Fillmore and Piru Basin.	NMFS	Assess impacts on in-stream habitat	We have expanded our discussion of O. mykiss needs. The degree to which groundwater pumping inhibits passage is not known.
GDE_060	Pages 47 – 51. This section of the Draft Memorandum contains only a brief discussion fishes, and specifically discusses only one tributary, Piru Creek. There is no recognition or discussion of the Hopper Creek. The lower reach of Hopper Creek within the Piru Basin boundaries has been designated critical habitat; additionally NMFS has identified intrinsic potential spawning and rearing habitat throughout the Hopper Creek watershed; see Francis 2009. The Draft Memorandum indicates, "Most of the fish species listed in Table 4.1-4 are likely to occur in perennial reaches within the basin." It should also recognize that the anadromous species (e.g., O mykiss and Entosphenus tridentata) may also occur in the intermittent reaches, and that non-migratory species (e.g., Catostomus santaanae) fishes (as well as other native aquatic organisms) may occur in intermittent reaches. Therefore, the Draft Memorandum should be revised to provide a complete and accurate characterization of the environmental setting.	NMFS	Non-vegetation GDEs	Added Hopper Creek critical habitat to the text. Added potential use of Hopper Creek to the text.
GDE_061	Pages 62-65 This section of the Draft Memorandum contains only a brief discussion fishes, and specifically mentions only one tributary, Sespe Creek. There is no recognition of discussion of the Pole Creek; see, Kajtaniak (2008) for a survey of this watershed. The Draft Memorandum indicates, "Disconnected ephemeral tributaries in the Fillmore Groundwater Basin can be used by fish species seasonally, but do not contain surface water yearround and are not connected to groundwater and thus not considered here." Sespe Creek is a major tributary to the Santa Clara River whose confluence is within the boundaries of the Fillmore Basin. This tributary is currently intermittent in its lowermost reaches. However, its base surface flows have been and continued to be impacted by both surface diversions and groundwater extraction. Pole Creek, which is joins the Santa Clara River within the boundaries of the Fillmore Basin is intermittent (not ephemeral) in its lower reaches, and is perennial in its upper reaches; see Kajtaniak (2008) for a survey of this watershed. The revised Draft Memorandum should reflect this information.	NMFS	Non-vegetation GDEs	Added a discussion of Pole Creek to the document. Given that access to Pole Creek is blocked, only about 500 feet of the channel occurs upstream of the community within the basin, we have not included an extensive investigation of Pole Creek.
GDE_062	Page 69 The Draft Memorandum indicates, "The ecological value of each GDE unit was characterized by evaluating the presence and groundwater-dependence of special-status species and ecological communities, and the vulnerability of these species and their habitat to changes in groundwater levels (Rohde et al. 2018)." As noted above the method used by The Nature Conservancy in identifying GDE is based on statewide data on "vegetation known to use groundwater", and therefore does not adequately reflect the uses made of groundwater by other biological resources, such as seasonal migration of fishes, or other organisms such as invertebrates that have differing life-cycle and environmental requirements than plants.	NMFS	Non-vegetation GDEs	The GDEs include interconnected surface waters and aquatic beneficial users. We have made this more explicit in the updated draft.
GDE_063	Pages 69-70 In assessing the ecological values of the GDE in the Piru Basin, the Draft Memorandum did not, but should, consider the ecological values of Hopper Creek. This is a significant omission, because the surface hydrologic connectivity between Hopper Creek and the mainstem of the Santa Clara River can be affected by groundwater extractions; see additional comments above regarding Hopper Creek.	NMFS	Interconnected surface water	A discussion of Hopper Creek has been been added to the tributary riparian section.

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Comment number	Comment	Organization	Issue	Response
GDE_064	Page 70-71 In assessing the ecological values of the GDE in the Piru Basin, the Draft Memorandum did not, but should, consider the ecological values of Pole Creek. This is a significant omission, because the surface hydrologic connectivity between Pole Creek and the mainstem of the Santa Clara River can be affected by groundwater extractions; see additional comments above regarding Pole Creek.	NMFS	Interconnected surface water POLE CREEK	Pole Creek has been added to the text.
GDE_065	Page 74 The Draft Memorandum notes, "This section focuses on changes in vegetation through time using remote sensing data. While increases or decreases in vegetation health do not provide a definitive indication that other components of the ecosystem are thriving or under stress, it provides a reasonable first-order check on the clear linkage between groundwater and the other communities that compose the ecosystem." While changes to vegetation is an important component in assessing the ecological health aquatic habitats (Faber et al. 1989), it should not be used, as it is here, essentially as a substitute for other metrics, e.g., such as measured effects on surface flows, or depth or extent of pool habitat in response to artificial depletion of groundwater levels. See comments above regarding GDE Identification.	NMFS	Interconnected surface water	We have added text in the report to clarify this point and point to the difficulty of assessing changes in other features of the ecosystem.
GDE_066	Pages 75-79 The focus of the analysis is on vegetative features of four areas: De Valle Riparian Scrub GDE, Santa Clara River Riparian Scrub GDE, Piru Creek Riparian GDE, and Piru Basin Tributary GDE. None of these directly involves aquatic habitats. Also, the Draft Memorandum does not, but should, recognize Hopper Creek. As noted above, the surface flows at the confluence of Hopper Creek are important for maintaining surface hydrologic connectivity for steelhead (but also other native aquatic species) attempting to migrate between this tributary and the middle reaches of the Santa Clara River. Interrupting the timing, magnitude, and duration of these flows as a result of groundwater extraction can be deleterious to juvenile O. mykiss. This potential effect should be addressed in the revised Draft Memorandum.	NMFS	Assess impacts on in-stream habitat	Hopper Creek has been added to the discussion on tributary ripairan streams.
GDE_067	Pages 79-86 The focus of the analysis is on vegetative features of five areas: Santa Clara River Riparian Scrub, Cienega Riparian Complex GDE, East Grove Riparian Complex GDE, Fillmore Basin Tributary Riparian GDE, and Sespe Creek Riparian. None of these deals directly with aquatic habitats. Also, the Draft Memorandum does not recognize or provide any consideration or discussion of Hopper Creek. As noted above, the surface flows at the confluence of Pole Creek are important for maintaining surface hydrologic connectivity for steelhead (but also other native aquatic species) attempting to migrate between this tributary and the middle reaches of the Santa Clara River. Interrupting the timing, magnitude, and duration of these flows as a result of groundwater extraction can be deleterious to juvenile O. mykiss. This potential effect should be addressed in the revised Draft Memorandum.	NMFS	Assess impacts on in-stream habitat	We have adapted the text to clarify that three of the areas (Del Valle, Cienega, and the East Grove) have interconnected surface water. Pole Creek does not appear to be interconnected within the Fillmore and Piru Basins and currently has both passage and barriers. Nevertheless we do discuss the potential for O. mykis habitat in Pole Creek.
GDE_068	Page 86 The Draft Memorandum asserts, "As an overview, the future groundwater levels forecast with assumed climate change factors (2070CF [climate change factor]) are not materially different from those recorded during the historical record. There is no suggestion of long-term chronic declines in groundwater levels." The basis for this statement is unclear, and appears to conflict with general predictions for a drying climate in southern California, with consequent reduction in rainfall, runoff, and groundwater recharge. The reduction in surface water supplies stored in reservoirs, has frequently led to increased extraction of groundwater basins, with consequent reductions in base flows of rivers and streams, like the Santa Clara River and its tributaries that are interconnected groundwater-surface water systems. Ensuring groundwater recharge (and control of groundwater extraction for out-of-stream uses) can be an important mechanism for protecting base flows that are critical for the rearing phase of juvenile steelhead (as well as other native aquatic resources). Maintaining groundwater levels can serve as a buffer against projected climate change effects on stream flow. For a recent assessment of the effects of climate change on mean and extreme river flows, and effects of over pumping of groundwater basins on stream flow, see Burke et al. (2021), Gudmundsson et al. (2021), Jasechko (2021).	NMFS	Climate change	The analysis of climate change was based on the model used for the GSP and recommendations from DWR.
GDE_069	Page 86 As noted above, there is no recognition or discussion of Hopper Creek. This omission should be addressed in the revised Draft Memorandum.	NMFS	Interconnected surface water	Hopper Creek has been added to the tributary riparian section.
GDE_070	Page 89 Ecological Value: The Draft Memorandum concludes, "Although the Santa Clara River in the Unit provides migration habitat for Southern California steelhead and Pacific lamprey, the migration habitat has low vulnerability to groundwater reduction because most fish migration occurs during seasonal high surface water flow periods." This assertion does not appear to be corroborated in any meaningful way in the Draft Memorandum. Also, be aware that while adult steelhead are more likely to migrate during higher flows during winter months, steelhead smolts can emigrate downstream through the late spring in the absence of winter flows. Groundwater extractions that decrease these base surface flows can therefore negatively affect the successful emigration of steelhead (and possibly Lamprey ammocoetes) out of the Santa Clara River to the ocean. This assertion should be revised in the Draft Memorandum to accurately reflect what is known about the migratory behavior and ecology of steelhead and the expected impacts of groundwater withdrawals on habitat characteristics and condition for this species.	NMFS	Non-vegetation GDEs	We have added text to quantify flows from rising groundwater relative to upstream passage. We also clarified that for the Riparian shrubland, surface water flows are not connected with groundwater. United water releases water from Santa Felicia dam for outmigration of juveniles. Because this migration requires continuous surface flows, rising groundwater on its own is not sufficient to promote migration.
GDE_071	page 89 Ecological Condition: The Draft Memorandum concludes, "Groundwater provides little or no contribution to the ecological function and habitat value of the Santa Clara River in the Unit, which is intermittent and mainly supports seasonal migration habitat for anadromous fishes." The intermittent nature of a reach is not determinative of the contribution of groundwater to a GDE. Additionally, as noted above, steelhead smolts emigrate downstream through the late spring, among other times of the year, including during periods between elevated rain-induced discharge pulses. Groundwater extractions that decrease these base surface flows can therefore negatively affect the successful emigration of steelhead out of the Santa Clara River to the ocean (Booth 2016, 2020).	NMFS	Assess impacts on in-stream habitat	Comment noted. The role of groundwater in supplying downstream passage flows is not clear, but, where reaches are disconnected from groundwater, changes to pumping are unlikely. Booth 2020 also states that "Migration opportunities only result from storm events of sufficient magnitude and duration to generate extended surface flows." The degree to which groundwater extraction has altered surface flows in the Fillmore and Piru Basins is not clear, but the intermittent reaches betweeen the groundwater upwelling zones are currently dependent on surface water flows rather than rising groundwater.
GDE_072	Page 90 Susceptibility to Changing Groundwater Conditions: The Draft Memorandum concludes, "The Unit includes an intermittent reach of the mainstem Santa Clara River that does not provide perennial aquatic habitat or beneficial uses." While groundwater-influenced flows may not be sufficient to support perennial flows, they can nevertheless support seasonal use of this reach of the Santa Clara River for migratory or rearing purposes, depending on the amount and timing of annual rainfall and runoff and the groundwater elevation.	NMFS	Assess impacts on in-stream habitat	We do not see evidence that flow in the intermittent reaches is supported by groundwater within the basin.
GDE_073	Page 90 The Draft Memorandum concludes, "Modeling suggests that groundwater levels are likely to be stable in this reach. Moreover, the vegetation that makes up this unit may use groundwater when groundwater levels are high in the spring, but high groundwater levels are likely not persistent in this unit. The unit is therefore likely not strongly dependent upon groundwater and is comprised of sparse low water use species with relatively shallow rooting depths. Therefore, the potential for effects on this unit is low. " This conclusion, as much of the analysis, is based almost entirely on effects on vegetation, and ignores the potential effects on aquatic organisms that are dependent on surface flows (or ponding), and may make seasonal use of aquatic habitats, even though they are intermittent.	NMFS	Non-vegetation GDEs	We do not see evidence that flow in the intermittent reaches is supported by groundwater within the basin.

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Comment number	**Comment**	**Organization**	**Issue**	**Response**
GDE_074	Page 92 Susceptibility to Changing Groundwater Conditions: The Draft Memorandum concludes, "Piru Creek in this GDE unit has perennial flow due to releases from Santa Felicia Dam, but surface flow is not connected to groundwater. The lower portion of Piru Creek near the confluence with the Santa Clara River periodically lacks surface flow. As described previously, releases from Santa Felicia Dam likely raise groundwater levels and help maintain baseflows in Piru Creek." The construction of both Santa Felicia Dam and Pyramid Dam have significantly altered natural the flow patterns in Piru Creek, including those below the current site of Santa Felicia Dam (see, for example, NMFS 2008b). The language of this section incorrectly implies that but for the releases from Santa Felicia Dam, lower Piru Creek would naturally exhibit an intermittent, or ephemeral flow regime.	NMFS	anthropogenic effects on groundwater levels	Added under current conditions to clarify that currently releases from Santa Felicia help maintain baseflow.
GDE_075	page 92. Also, the claim that the "surface flow is not connected to groundwater" is contradicted by the assertion that "releases from Santa Felicia Dam likely raise groundwater levels and help maintain baseflows in Piru Creek".	NMFS	Interconnected surface water	The conceptual model of this reach is that releases from Santa Felicia infiltrate into the subsurface while also maintaining baseflows. Clarified that baseflows over some portion of the length of Piru Creek are maintained by releases.
GDE_076	Page 92 The Draft Memorandum notes, "Available data are insufficient to discern a clear effect on GDEs related to groundwater management in the Piru Creek Riparian Complex GDE Unit." The GSP should identify and include monitoring provisions that would enable the effects of groundwater extractions or recharge activities on this GDE to be determined.	NMFS	Sparse monitoring network	Clarified that under current conditions it is disconnected. It is unknown if Piru Creek was connected under historical conditions.
GDE_077	Page 92 Groundwater Dependence: The Draft Memorandum notes, "There are no shallow groundwater measurements in this unit." The GSP should identify and include monitoring provisions that would enable the effects of groundwater extractions or recharge activities on this GDE to be determined.	NMFS	Sparse monitoring network	The monitoring plan has gained access to a privately owned well to monitor groundwater levels in Piru Creek.
GDE_078	Tributary Riparian Unit Ecological Value: The Draft Memorandum concludes, "The species and ecological communities in the Unit have low vulnerability to changes in groundwater levels. The tributary streams in this GDE Unit are considered ephemeral and are not connected to groundwater, thus they provide little habitat value for fish and other aquatic species. They do, however, support valuable riparian habitat and likely movement corridors for a variety of native wildlife species." This Tributary Riparian GDE includes Hopper Creek, which is not ephemeral. Hopper Creek is not recognized or discussed. This omission should be addressed in the revised Draft Memorandum. See comments above regarding Hopper Creek.	NMFS	Assess impacts on in-stream habitat	See above. Hopper Creek has been added.
GDE_079	Tributary Riparian Unit Ecological Condition: The Draft Memorandum concludes, "Groundwater likely provides little or no contribution to the ecological function and habitat value of the ephemeral tributaries in the Unit, which support vegetation but have little habitat value for fish or other aquatic species." See comments above regarding Hopper Creek.	NMFS	Assess impacts on in-stream habitat	See above. Hopper Creek has been added.
GDE_080	Tributary Riparian Unit Susceptibility to Changing Groundwater Conditions: The Draft Memorandum concludes, "Streams within the Unit includes [sic] are ephemeral and do not provide perennial aquatic habitat or beneficial uses." This Tributary Riparian GDE includes Hopper Creek, which is not ephemeral. Hopper Creek is not recognized or discussed. This omission should be addressed in the revised Draft Memorandum. See comments above regarding Hopper.	NMFS	Assess impacts on in-stream habitat	See above. Hopper Creek has been added.
GDE_081	Tributary Riparian Unit Potential Effects The Draft Memorandum concludes, "Based on the position of this GDE unit in the watershed it is unlikely that groundwater management will affect the health of the GDE. Model results suggest that the groundwater levels will remain constant in the Fillmore and Piru Basins under climate change (DBS&A 2021). If groundwater pumping were to increase in this GDE unit, monitoring of groundwater levels and GDE health (using remote sensing) would be necessary. GDEs in the unit likely have low susceptibility to future changes in groundwater conditions and the synergistic effects of climate change." As noted above, the basis for this statement regarding climate change is unclear, and appears to conflict with general predictions for a drying climate in southern California, with consequent reduction in rainfall, runoff, and groundwater recharge. The reduction in surface water supplies stored in reservoirs has frequently led to increased extraction of groundwater basins, with consequent reductions in baseflows of rivers and streams, like the Santa Clara River and its tributaries, which are interconnected groundwater-surface water systems. Ensuring groundwater recharge (and control of groundwater extraction for out-of-stream uses) can be an important mechanism for protecting base flows that are critical for the rearing phase of juvenile steelhead (as well as other native aquatic resources). Maintaining groundwater levels can serve as a buffer against projected climate change effects on streamflow. For a recent assessment of the effects of climate change of mean and extreme river flows, and effects of over pumping of groundwater basins on stream flow, see Burke et al. (2021), Gudmundsson et al. (2021), Jasechko (2021).	NMFS	Climate change	The assessment of climate change on hydrology in the Santa Clara River was completed following DWR guidelines and is the best information we currently have for the basin.
GDE_082	Page 94 As noted above, there is no recognition or discussion of Pole Creek. This omission should be addressed in the revised Draft Memorandum.	NMFS	Interconnected surface water	Pole Creek included.
GDE_083	SCR riparian shrubland Groundwater Dependence: The Draft Memorandum notes, "There are few shallow groundwater measurements in this unit. Spring 2019 water contours provided by United water showed groundwater levels within 5-10 feet of the ground surface in parts of the unit." But nevertheless concludes, "Surface water flows are not interconnected with groundwater." The conclusion is questionable for a for at least two reasons: First, though the data provided in the Spring of 2019 followed an above average wet year it was proceed by a pronounced drought that lasted six years, depressing groundwater levels. Second, the number of wells were limited (and screened below shallow groundwater depths) and not likely to provide a complete picture of the groundwater conditions throughout the GDE. The GSP should identify and include monitoring provisions that would enable the effects of groundwater extractions or recharge activities on this GDE to be determined.	NMFS	Interconnected surface water	We added a discussion about the uncertainty of the contours in this reach. The lack of surface flows suggest surface water is not connected to groundwater in this reach.
GDE_084	page 94 SCR riparian shrubland Ecological Value: The Draft Memorandum note, "Although the Santa Clara River in the Unit provides migration habitat for Southern California steelhead and Pacific lamprey, the migration habitat has low vulnerability to groundwater reduction because most fish migration occurs during seasonal high surface water flow periods." While adult steelhead are more likely to migrate during higher flows during winter months, steelhead smolts emigrate downstream through the late spring, among other times of the year, including between periods of elevated flows. Groundwater extractions that decrease this base surface flow can therefore negatively affect the successful emigration of steelhead (and possibly ammocoetes) out of the Santa Clara River to the ocean (Reid and Goodman 2016).	NMFS	Assess impacts on in-stream habitat	There is no evidence that surface flows are interconnected with groundwater, and the intermittent nature of the reach suggests the flows are disconnected and not dependent on groundwater. United currently releases water to support outmigration of juvenilles.
GDE_085	page 94 SCR riparian shrubland Ecological Conditions: The Draft Memorandum concludes, "Because surface water in this reach is largely disconnected from groundwater, groundwater provides little or no contribution to the ecological function and habitat value of the Santa Clara River in the Unit, which is intermittent and mainly supports seasonal migration habitat for anadromous fishes." It is not clear what is meant by "largely disconnected". Also, this assertion appears to be contradicted by the assessment of susceptibility to changing groundwater conditions (see below). This should be addressed in the revised Draft Memorandum.	NMFS	Interconnected surface water	"largely" was deleted.

RESPONSE TO COMMENTS

Comment number	Comment	Organization	Issue	Response
GDE_086	page 94 Susceptibility to Changing Groundwater Conditions: "The Draft Memorandum notes, "Future changes in groundwater conditions in the Unit related to increased groundwater production or climate change could cause groundwater levels to fall below the baseline range and result in mortality to vegetation that comprises the GDE."(emphasis added). Additionally, the Draft Memorandum notes, "Projections of climate change and groundwater pumping in the future suggest that changes in groundwater elevation are unlikely. However, based on widespread tree mortality during the 2012–2016 drought, future changes in the frequency or duration of droughts similar to 2012–2016 could have a deleterious effect on the GDE, particularly at the downstream margin of the unit." These two statements appear to contradict each other, and should clarified in the revised Draft Memorandum	NMFS	Climate change	Added "climate changes that differ from modeled predictions "
GDE_087	Page 94 Also, "The Unit includes an intermittent reach of the mainstem Santa Clara River that does not provide perennial aquatic habitat or beneficial uses." As noted previously, while groundwater-influenced flows may not be sufficient to support perennial flows, they can nevertheless support seasonal use of this reach of the Santa Clara River for migratory or rearing purposes, depending on the amount and timing of annual rainfall and runoff and the groundwater elevation.	NMFS	Assess impacts on in-stream habitat	Our understanding of this reach is that groundwater is never shallow enough to connect with surface water (i.e., even during wet years this is a losing reach).
GDE_088	Page 95 The Draft Memorandum notes, "Modeling suggests that groundwater levels near the Santa Clara River Riparian Shrubland GDE unit are unlikely to change due to climate change or modest changes to groundwater pumping. However, GDEs in the Unit are moderately susceptible to future changes in groundwater conditions and the synergistic effects of climate change, which in combination could cause groundwater levels to fall below the baseline range and result in potential effects on GDEs." Again, these two statements appear contradictory. See comments above regarding climate change.	NMFS	Climate change	Clarifed that climate change effects could influence groudnwater levels if the models are incorrect.
GDE_089	Page 97 Groundwater Dependence: The Draft Memorandum notes, "There are no shallow groundwater measurements in this unit. Based on the position in the landscape a connection to the regional aquifer is unlikely." The GSP should identify and include monitoring provisions that would enable the effects of groundwater extractions or recharge activities on this GDE to be determined. Also, we note that this Tributary Riparian Unit include Pole Creek, which was omitted from the investigation. See comments above.	NMFS	Sparse monitoring network	A sentence discussing Pole Creek has been added. We propose monitoring the GDEs rather than groundwater in this reach because there is little pumping in the tributaries and the resources to install new wells were focused in higher priority areas more susceptible to groundwater management.
GDE_090	Page 98 Ecological Value: The Draft Memorandum concludes, "The species and ecological communities in the Unit have low vulnerability to changes in groundwater levels. The tributary streams in this GDE Unit are considered ephemeral and are not connected to groundwater, thus they provide little habitat value for fish and other aquatic species. They do, however, support valuable riparian habitat and likely movement corridors for a variety of native wildlife species." This Tributary Riparian Unit includes Pole Creek, which was omitted from the investigation. See comments above.	NMFS	Interconnected surface water	Pole creek has been added to the discussion here.
GDE_091	Page 98 Ecological Condition: The Draft Memorandum concludes, "Groundwater provides little or no contribution to the ecological function and habitat value of the ephemeral tributaries in the Unit, which support vegetation but have little habitat value for fish or other aquatic species." This Tributary Riparian Unit includes Pole Creek, which was omitted from the investigation. See comments above.	NMFS	Interconnected surface water	Pole creek has been added to the discussion here.
GDE_092	page 98 The Draft Memorandum concludes, "Based on the position of this GDE unit in the watershed it is unlikely that groundwater management will affect the health of the GDE. If groundwater pumping were to increase in this GDE unit monitoring of groundwater levels and GDE health (using remote sensing) would be necessary. GDEs in the Unit likely have low susceptibility to future changes in groundwater conditions and the synergistic effects of climate change." See the above comments regarding the potential effects of climate change.	NMFS	Climate change	Clarified the climate change effects on groundwater levels are unlikely.
GDE_093	Page 99 Groundwater Conditions: The Draft Memorandum notes, "Surface water flows are perennial for the upper portions of the reach and intermittent downstream. The connection to groundwater in the upper portion is unknown but unlikely." The GSP should identify and include monitoring provisions that would enable a determination of connectivity, and any potential effects of groundwater extractions or recharge activities on this GDE to be determined.	NMFS	Interconnected surface water	See below for additional monitoring well.
GDE_094	Page 99 Susceptibility to Changing Groundwater Condition: The Draft Memorandum notes, "Sespe Creek's connection to groundwater is undetermined" The GSP should identify and include monitoring provisions that would enable a determination of connectivity, and any potential effects of groundwater extractions or recharge activities on this GDE to be determined.	NMFS	Interconnected surface water	Modifications to an existing shallow well are planned for one site in Sespe Creek.
GDE_095	Page 99 The Draft Methodology concludes, "The GSP should identify and include monitoring provisions that would enable the effects of groundwater extractions or recharge activities on this GDE to be determined." See comments above regarding the potential effects of climate change.	NMFS	Climate change	Clarified uncertainty on Sespe Creek.
GDE_096	Page 100 The following additional GDE should be added to the list of GDE to be included in the GSP analyses for the development of "Sustainable Management Criteria": lower reaches of Sespe Creek, Pole Creek, Hopper Creek, and Piru Creek. As noted above, each of these contains either or/both designated critical habitat or intrinsic potential habitats for the federally listed endangered southern California steelhead DPS.	NMFS	Additional GDE	It is not clear that these reaches have interconnected surface water and hence may not be GDEs. O. mykiss was considered when setting SMCs.
GDE_097	Page 11 principal aquifer. This is an important distinction.	TNC (MMR inline)	GDE determination	Changed "regional" to "principal".
GDE_098	Page 11 with no connection to a principal aquifer	TNC (MMR inline)	GDE determination	Changed "regional" to "principal".
GDE_099	Page 14 Thank you for doing this!	TNC (MMR inline)	GDE determination	Noted.
GDE_100	Page 30 I highly recommend using the well data and a digital elevation model to estimate depth to groundwater under GDEs. Most wells exist at higher elevation than GDEs. See Best Practice #5 in this TNC document: https://groundwaterresourcehub.org/public/uploads/pdfs/TNC_NCdataset_BestPracticesGuide_2019.pdf	TNC (MMR inline)	Updated Nature Conservancy guidance on depth to water	Added description of GDE elevation transects to Section 3.1. Added max/min GDE elevations to depth to water plots and discussion.
GDE_101	Page 89 If you corrected for land surface elevation at the GDE, does the groundwater surface get within mulefat rooting depths?	TNC (MMR inline)	Updated Nature Conservancy guidance on depth to water	Text updated to clarify use of depth to water surface.
GDE_102	Page 91 But, groundwater levels must also be restored to pre-drought conditions to promote riparian succession of cottonwoods/willows and avoid establishment of arundo.	TNC (MMR inline)	Cienega riparian complex	Noted.
GDE_103	Page 91 Is this still true if you correct for land surface elevation at the GDE using a DEM?	TNC (MMR inline)	Updated Nature Conservancy guidance on depth to water	Text updated to clarify use of depth to water surface.
GDE_104	Page 96 I'd say the ecological condition is "Poor" given the widespread mortality that occurred here.	TNC (MMR inline)	Cienega riparian complex	Agreed and changed.
GDE_105	Page 97 And increased ET losses from arundo in the basin water budget... Also, reduced habitat for two federally listed species.	TNC (MMR inline)	Cienega riparian complex	Noted.
GDE_106	Page 99 Low or uncertain? How do you know the model output is correct if there are no shallow monitoring wells in the vicinity?	TNC (MMR inline)	Sespe Creek Riparian Complex	Changed to undetermined, likely low.
GDE_107	Page 100 GDEs Important to Consider When Establishing Sustainable Management Criteria.	TNC (MMR inline)	Text	Changed text.
GDE_108	Page 100 i	TNC (MMR inline)	Text	Typo fixed.
GDE_109	Page C-1 Why is this species not considered a GDE?	TNC (MMR inline)	Blue oak	Blue Oak occurs outside of the aquifer on the ridges and noses of the uplands and is not likley affected by pumping.

Fillmore and Piru Basins
Groundwater Sustainability Agency

Appendix D

Assessment of Groundwater Dependent Ecosystems for the Fillmore and Piru Basins Groundwater Sustainability Plan

TECHNICAL MEMORANDUM ◦ JUNE 2024

Assessment of Groundwater Dependent Ecosystems for the Fillmore and Piru Basins Groundwater Sustainability Plan

PREPARED FOR

Fillmore and Piru Basins Groundwater Sustainability Agency
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Cover Photo: The East Grove GDE Unit in the Fillmore Basin (credit: Bruce Orr)

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Appendices

1 Background and Setting

This Technical Appendix to the Fillmore and Piru Basins Groundwater Sustainability Plan (GSP) addresses the extent and condition of groundwater dependent ecosystems (GDEs) in the Fillmore and Piru Valley groundwater basins of the Santa Clara River Valley Groundwater Basin. The Fillmore and Piru groundwater basins are managed by Fillmore and Piru Basins Groundwater Sustainability Agency (FPBGSA). As part of the California's Sustainable Groundwater Management Act (SGMA), Groundwater Sustainability Agencies (GSAs) are required to consider GDEs and other beneficial uses of groundwater when developing their GSPs. SGMA defines GDEs as "ecological communities of species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" (23 CCR § 351(m)). As described in The Nature Conservancy's guidance for GDE analysis (Rohde et al. 2018), a GDE's dependence on groundwater refers to reliance of GDE species and/or ecological communities on groundwater or interconnected surface water for all or a portion of their water needs. SGMA defines interconnected surface water as "surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer" where "the overlying surface water is not completely depleted". Interconnected surface water is also referred to as areas of rising groundwater or a gaining stream. Mapping riparian or terrestrial GDEs requires mapping vegetation that can tap groundwater through their root systems, assessing the elevation of groundwater relative to the rooting depth of that vegetation, and mapping the extent of surface water that is interconnected with groundwater (Rohde et al. 2018). Mapping aquatic GDEs that rely on interconnected surface water requires mapping the extent of interconnected surface water, which changes based on season and the water year type. Once the GDEs are mapped, the occurrence of special-status species can be used to assess the beneficial users of GDEs and the ecological value of GDEs in the basin, while remote sensing measurements can be used to track the health of groundwater dependent vegetation through time. This information will be used to inform sustainable management criteria for each management unit. This appendix relies on hydrologic and geologic data presented in the GSP and its technical appendices.

Plants can rely on water infiltrating into the soil via local rainfall, groundwater, or surface water. GDEs are ecosystems linked to groundwater through plant roots or direct users of interconnected surface water, and the plants typically have water requirements that exceed available soil moisture provided by rainfall. Riparian plants, which are often present in GDEs, may instead be connected to surface water through their roots. Some species may be connected to groundwater when it is available, but not require groundwater for survival (e.g., mulefat [*Baccharis salicifolia*]), while other species (e.g., willows and cottonwoods) would not survive without additional water from groundwater or surface water. The presence of non-groundwater sources such as surface water and soil moisture within and near a GDE does not preclude the possibility that the GDE is supported by groundwater. A GDE is distinct from other riparian ecosystems in that it is either connected to a principal aquifer or is a beneficial user of a surface water or shallow/perched groundwater source that is connected to a principal aquifer.

1.1 Physiography

The Fillmore and Piru groundwater basins occupy the alluvial valley of the Santa Clara River from just west of the Los Angeles/Ventura County line to approximately 1 mile upstream of Santa Paula, California (Figure 1.1-1). The alluvial valley of the Santa Clara River includes the floodplain of the Santa Clara River and the adjacent alluvial terraces and alluvial fans. The valley width ranges from approximately half a mile at the eastern boundary of the Piru subbasin, just west of the Los Angeles/Ventura County line, to over 4 miles at the confluence of Sespe Creek

and the Santa Clara River. Together, the basins extend approximately 21 river miles along the valley axis and cover over 25,000 acres. Ground surface elevation ranges from 280 feet above sea level in the western Fillmore Groundwater Basin to about 1,000 feet above sea level in the eastern Piru Groundwater Basin and along the northern edge of the Fillmore Groundwater Basin (DWR 2016).

The basins are bounded to the north by Miocene to Pliocene marine deposits (the Pico Formation) of the Topatopa Mountains, uplifted by Tertiary thrusting along the San Cayetano Fault. The basins are bounded to the south by Oligocene continental deposits and Miocene to Pliocene marine deposits of the Oak Ridge and the Santa Susana mountains, uplifted by similar motion on the Oak Ridge Fault (Downs et al. 2020). The Santa Clara River occupies a valley between these ranges. Tectonic activity also influences drainage network patterns in the basins (Stillwater Sciences 2011).

Upstream of the Fillmore and Piru groundwater basins, the Santa Clara River is largely unregulated except for Castaic Dam on Castaic Creek and Bouquet Dam on Bouquet Creek. Castaic Dam regulates a large (154 square miles [mi^2]) watershed and forms Castaic Lake, which is operated with Pyramid Lake as a hydroelectric pumped storage project. Castaic Dam generally operates as a run-of-the river facility but may retain water for future release when inflows to Castaic Lake are high. Bouquet Dam regulates less than 1% of the Santa Clara River watershed area and is also unlikely to have a significant impact on watershed hydrology (Stillwater Sciences 2011). There is a strong rainfall gradient from the relatively wet Sespe and Piru drainages in the western part of the watershed to the drier upper Santa Clara watershed in Los Angeles County,

The largest tributary to the Piru Groundwater Basin is Piru Creek, which joins the Santa Clara River about 6 miles downstream of the Piru Groundwater Basin boundary near Buckhorn. Piru Creek has a drainage area of 438 square miles and is regulated by Santa Felicia Dam and Lake Piru 5.7 miles upstream of the confluence with the Santa Clara River. The Piru Groundwater Basin extends up Piru Creek from the Santa Clara River to Santa Felicia Dam. Santa Felicia Dam was constructed in 1955, and the subsequent peak flow was 28,800 cubic feet per second (cfs) in 1969. Releases are from the dam are rarely greater than 600 cfs (Dan Detmer, personal communication). Pyramid Dam was completed further upstream on Piru Creek in 1971 to impound water imported to the watershed via the California Water Project. Flows are released through Santa Felica Dam annually to recharge groundwater storage in the Fillmore and Piru groundwater basins and other downstream basins and to provide water for groundwater replenishment facilities further downstream. Hopper Canyon Creek joins the Santa Clara River approximately 3 miles downstream of the Piru Creek confluence.

The largest tributary in the Fillmore Groundwater Basin is Sespe Creek, which joins the Santa Clara River about 4.4 miles downstream of the boundary between the Fillmore and Piru groundwater basins near the town of Fillmore. Sespe Creek has a drainage area of 260 square miles and is undammed. The older portions of the City of Fillmore were situated on the alluvial fan built by sediments from Pole Creek, a smaller (10.7-square-mile) tributary between Sespe and Hopper Canyon creeks, which joins the Santa Clara River about 3 miles upstream of Sespe Creek. The drainage area of the Santa Clara River at the downstream end of the Fillmore Groundwater Basin is 1,476 square miles.

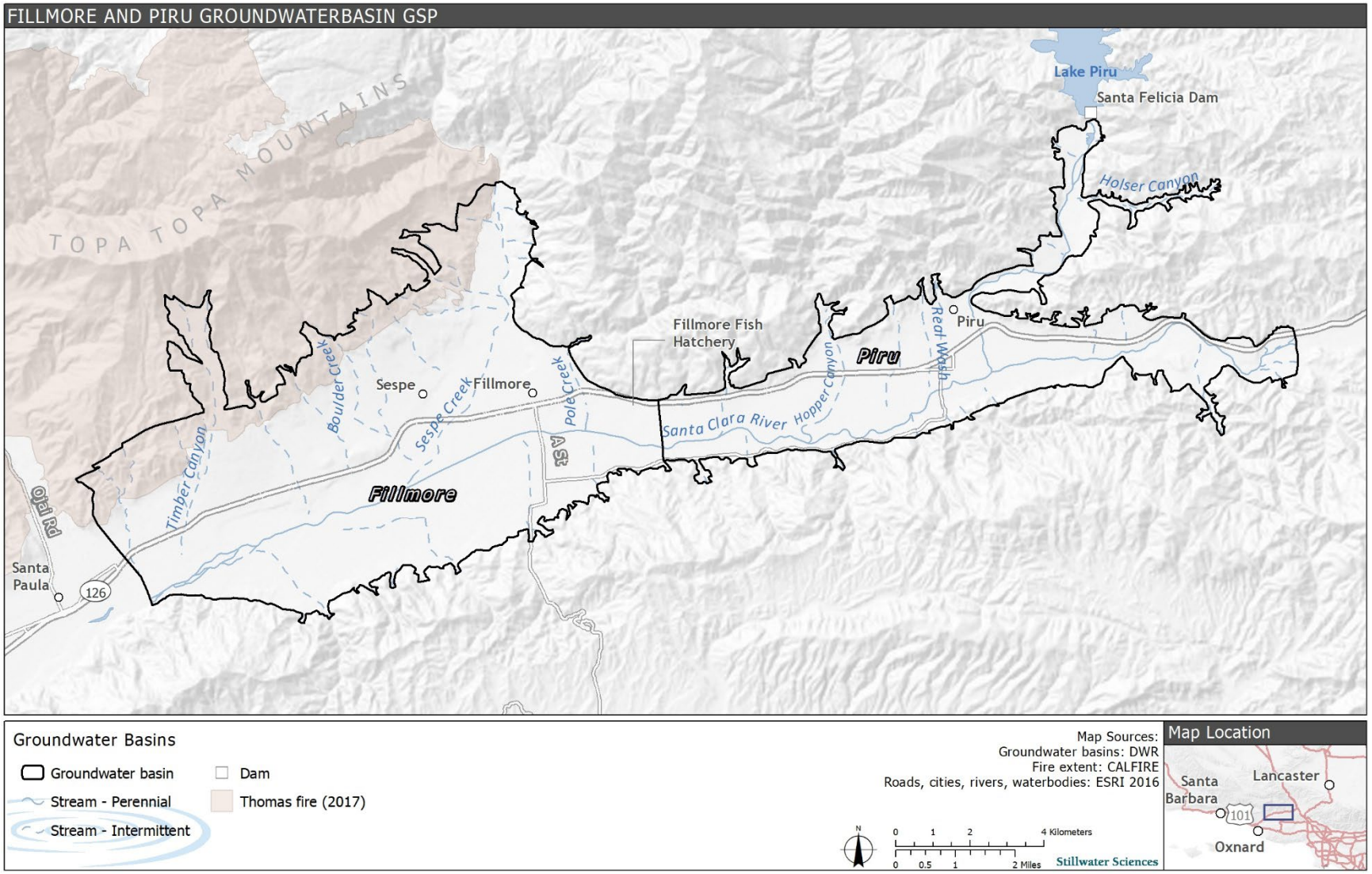


Figure 1.1-1. Fillmore and Piru groundwater basins.

1.2 Aquifer and Soils

The Fillmore and Piru groundwater basins are in the distinctive geological province of the west-east trending Transverse Ranges. The Santa Clara River watershed has a drainage area of 1623 square miles (mi^2) that retains a relatively natural state compared with other large watersheds in coastal southern California. In general, both groundwater basins consist of an upper aquifer of sand and gravel Quaternary alluvium underlain by Pleistocene Saugus Formation, which consists of permeable sand and gravels folded into an east-west trending syncline.

The Piru Groundwater Basin's eastern boundary coincides with exposures of shale and thinning of the surface alluvium to about 20 feet. The basin extends westward to the Fillmore Fish Hatchery, approximately 1 mile upstream of the City of Fillmore, where bedrock constriction of the alluvial basin forces groundwater closer to the land surface, resulting in seepage from the aquifer to the Santa Clara River. Recent alluvium is typically 60–80 feet thick in the Piru Groundwater Basin and is underlain by older alluvium, which occurs as terrace deposits up to 80 feet thick. Beneath the alluvium, the Saugus Formation extends to depths of up to 8,800 feet. Discontinuous clay layers also occur in the basin (Mann 1959).

The Fillmore Groundwater Basin lies directly west of the Piru Narrows, a constriction in the valley width located at the boundary between the Fillmore and Piru basins (Figure 1.1-1). The Fillmore Groundwater Basin includes the Santa Clara River alluvial valley, the Pole Creek fan, and Sespe Creek floodplain. The western boundary of the basin is located approximately half a mile east of the City of Santa Paula and coincides with shallow groundwater and a gaining reach of the Santa Clara River. At the eastern boundary, recent alluvium is approximately 60 feet thick, deepening to 80 feet downstream. Older alluvium reaches depths of approximately 100 feet. Along the valley, the Saugus Formation reaches a depth of approximately 8,400 feet; at the western boundary, it shallows to 5,000–6,000 feet. The northern portion of the basin is characterized by recent Quaternary alluvium. The most extensive alluvial fan, Pole Creek, is located between Sespe Creek and the Santa Clara River and underlies much of the City of Fillmore (Figure 1.1-1). West of Fillmore, the recent Sespe Creek alluvium is approximately 80 feet thick (Mann 1959).

Soils in the basins are alluvial or eolian in origin and are derived from the upper Santa Clara River and surrounding mountains. Three soil associations occur in the basins (Edwards et al. 1970). The Santa Clara River floodplain is covered by Riverwash-Sandy Alluvial Land, an excessively drained, highly stratified complex of sediment ranging in size from sand to cobbles with minimal silt and clay. The Pico-Metz-Anacapa association occurs on alluvial terraces and extends into some of the westerly drainages in the Fillmore Groundwater Basin. This association is characterized by well- to excessively drained sandy loam and is 60 or more inches deep. Within this association, Anacapa soils are slightly alkaline. The Mocho-Sorrento-Garretson association occurs at higher elevations in tributaries at the mountain front, particularly on the north side of the basins. These well-drained loams to silty clay loams reach depths of over 60 inches and are some of the most agriculturally productive in Ventura County.

1.3 Hydrology

Natural surface flows in the Santa Clara River are supplemented by controlled releases from Lake Piru and, upstream of the Piru Groundwater Basin, releases from Castaic Lake. Major tributaries in the Fillmore and Piru groundwater basins include Piru, Hopper, and Sespe creeks. Apart from high flows associated with high-intensity rainfall events, flows in the Santa Clara River are

generally low. At Montalvo (USGS gage 11114000) daily flows from 1927–2004 (the period of record) were less than 10 cfs for 50% of the year (Stillwater Sciences 2007d). Upstream of the Piru Groundwater Basin, at the county line (USGS gage 11108500), flow is typically 20–28 cfs (UWCD 2016). The low-flow hydrology of the Santa Clara River in the basin area has been characterized by alternating reaches of perennial and intermittent flow (Beller et al. 2016) based on bedrock constrictions and the resultant connection of the riverbed to the shallow aquifer. In the Fillmore and Piru groundwater basins, perennial flow commonly occurs at the basin boundaries, with the extent of the perennial reaches varying based on inflows to the basin.

In the Fillmore and Piru groundwater basins, the Santa Clara River is a dynamic semi-confined braided stream with perennial reaches at the basin boundaries with large intermittent reaches between. The Santa Clara River Basin has an extremely high sediment supply and is subject to extremely large floods (Stillwater Sciences 2011). Minor channel shifting occurs during most 5–10-year floods (frequently associated with El Niño years), but the largest changes in channel alignment occur during less frequent larger magnitude floods that exceed a 10-year recurrence interval (Stillwater Sciences 2007, Stillwater Sciences 2011).

Groundwater recharge primarily occurs though infiltration of surface waters into the bed of the Santa Clara River and its tributaries (UCWD 2016). The shallow aquifers in both the Fillmore and Piru groundwater basins are unconfined aquifers with deeper aquifers having varying degrees of confinement. In the Piru Groundwater Basin, groundwater generally flows from east to west, parallel to the river channel, in both the alluvium and the Saugus formation. At the bedrock constriction near the Fillmore Fish Hatchery, the narrower aquifer cross-section drives the water table upward locally, resulting in a perennial gaining reach of the Santa Clara River in all but the driest years. Downstream, in the Fillmore Groundwater Basin, the alluvium widens and depth to the water table increases. Near the boundary of the Fillmore Groundwater Basin and the Santa Paula Basin to the west, low-permeability bedrock constricts the alluvium, albeit less than near the fish hatchery (DBS&A 2020). Approaching the constriction, the narrower aquifer cross-section and southwest flow of recharged groundwater from the Sespe Creek alluvium drive the water table toward the surface. Downstream of the constriction, the water table deepens. This reach of the Santa Clara River experiences perennial gaining conditions even in dry years. Minimum depth to groundwater was less than 10 feet at both constrictions in 2015 during a period of drought (UWCD 2016)

The primary source of groundwater recharge is percolation from the Santa Clara River in the wider areas of the valley and alluvium and from Piru and Sespe creeks. Longitudinal groundwater inflow from the Santa Clara River Valley East Groundwater Basin is a significant source of recharge to the Piru Groundwater Basin, as is inflow to the Fillmore Groundwater Basin from the Piru Groundwater Basin. In both basins, recharge also occurs from stream percolation into outcrops of the Saugus Formation to the north, from direct precipitation on the alluvium and northern alluvial fans, and from agricultural return flow.

Groundwater levels in both basins are sensitive to changes in surface flow. Annual conservation releases from Lake Piru by United Water resulted in approximately10-foot increases in groundwater levels in the Piru Groundwater Basin and approximately 5-foot increases in the Fillmore Groundwater Basin from 2009 to 2012 (UWCD 2016). Conversely, groundwater levels declined significantly during the 2012–2016 drought period, during which no conservation releases were made.

1.4 Historical Ecology

The strongest process control on the distribution of floodplain wetland and riparian vegetation in the Santa Clara River is the availability of groundwater. Areas of rising groundwater that result in perennial surface flow and dense riparian woodlands are interspersed with "losing reaches" with intermittent surface flow conditions and less dense vegetation (Stillwater Sciences 2007a, Beller et al. 2011, Orr et al. 2011, Beller et al. 2016, Stillwater Sciences 2016). Within the forested wetland areas, flood disturbances are an important secondary control, with large floods causing significant adjustment of the channel and floodplain topography that periodically resets the pattern of vegetation. Surface erosion of the floodplain and bank erosion associated with lateral migration of channel causes uprooting of established trees while, subsequently, processes of deposition as the flood recedes establish barren surfaces suitable for vegetation regeneration.

Together, surface water flows and fluvial geomorphic processes are the basis for vegetation recruitment and succession in GDEs, with surface water or shallow groundwater availability critical for vegetation growth. Such controls are common to GDEs, with previous studies of riparian vegetation in semi-arid river systems highlighting controls such as the magnitude and frequency of flood disturbance (Bendix 1994, 1997; Harris 1999; Bendix and Hupp 2000), depth to groundwater (as reflected in preference for gaining versus losing reaches; Stromberg et al. 1996, Shafroth et al. 1998), and a combination of the two (Hupp and Osterkamp 1996, Lite 2003, Bagstad et al. 2006, Leenhouts et al. 2006, Osterkamp and Hupp 2010).

Prior to Euro-American settlement in valley in the late 1700s, mature stands of riparian woodland or forest were focused on four locations in the lower Santa Clara River corridor. Evidence suggests that these locations had discrete patches of dense, persistent cottonwood-willow (*Populus* and *Salix* species) riparian forest, and that they corresponded to hydrologically gaining reaches of rising groundwater (Boughton et al. 2006, Stillwater Sciences 2007c, Beller et al. 2011, Orr et al. 2011, Beller et al. 2016). While the extent of these four riparian forests has reduced over time as population increased in the Santa Clara valley, their locations have been persistent, pointing to the fundamental role of hydrogeological control on forest existent (Beller et al., 2016). Three of the four locations—the East Grove, Cienega, and Del Valle—occur in the Fillmore and Piru groundwater basins (Figure 1.4-1), with the East Grove located at the downstream end of the Fillmore Groundwater Basin, Cienega at the boundary between the Fillmore and Piru groundwater basins, and Del Valle at the upstream end of the Piru Groundwater Basin (Figure 1.4-1). All are areas where groundwater occurs close to the floodplain surface.

Although the general locations suitable for forested wetlands are unchanged from historical conditions as a function of hydrogeology, surface water and shallow groundwater conditions are now influenced by surface water diversions, managed water releases, and treated wastewater releases. As a result, despite significant changes in general to the vegetation of the Santa Clara River valley and riparian corridor (see for example, descriptions presented in Beller et al. 2011 and Stillwater Sciences 2016), remnants of the three historically persistent riparian-forested wetlands in the Fillmore and Piru groundwater basins that were dominated by willows and cottonwoods are still supported, albeit in a more fragmented form (Orr et al. 2011, Beller et al. 2016). This decreasing extent mirrors changes in the Santa Clara valley in the Fillmore and Piru basins. Between the mid-nineteenth century and 2005, the extent of active riparian corridor decreased by nearly half, from an estimated 15,500 acres to 8,000 acres (Beller et al., 2016). Agricultural and urban development and subsequent levees and berms reduced the area of riparian forest relative to historical conditions, particularly in the Cienega and East Grove areas (Downs et al. 2013, Beller et al. 2016).

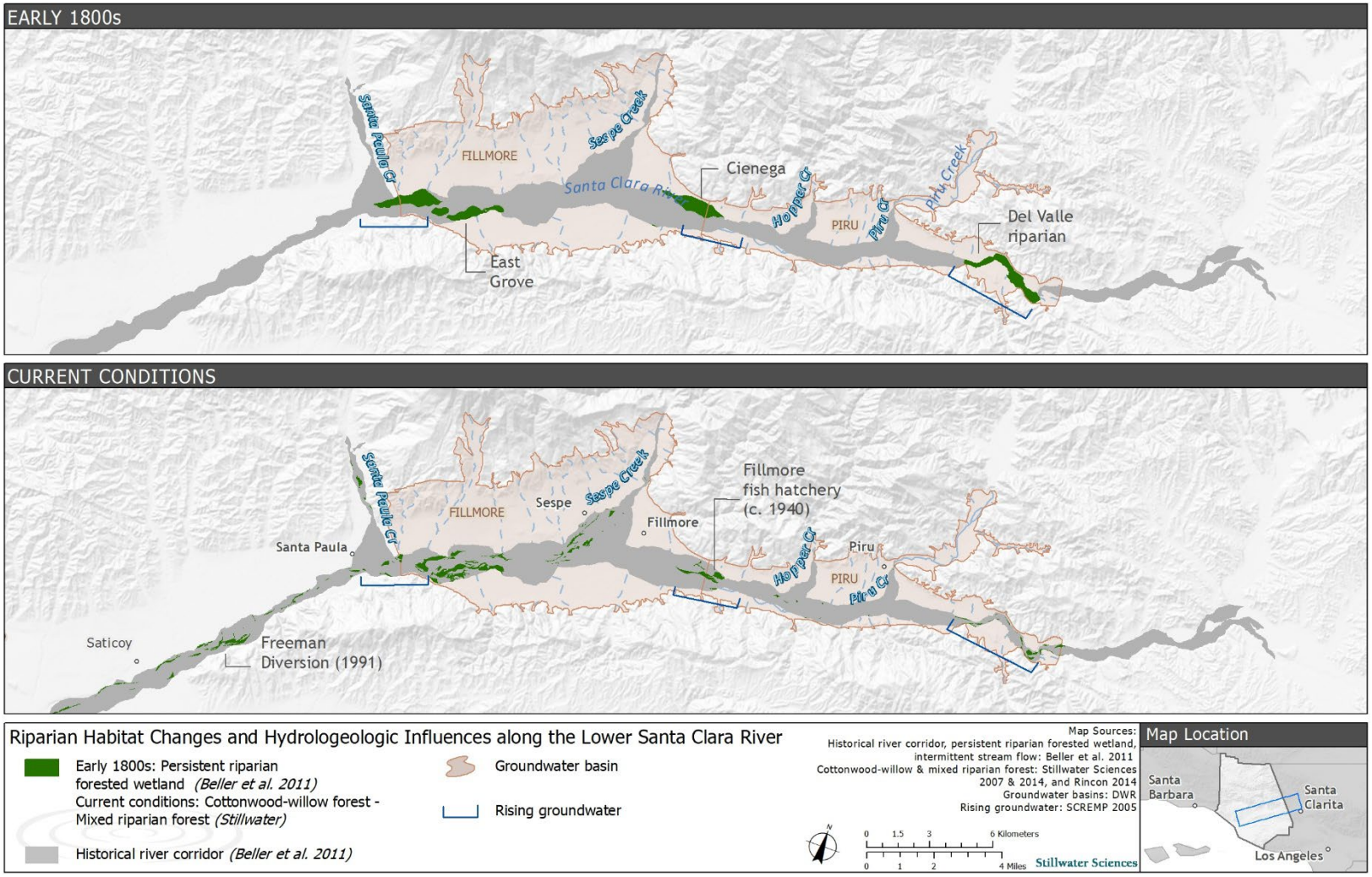


Figure 1.4-1. Riparian wetland forest extent along the Santa Clara River under historical and current conditions. Note the persistence of the three main forested wetland patches identified from historical sources from at least the early 1800s to the present. (Adapted from Beller et al. 2016 and Stillwater Sciences 2016).

2 Methods of GDE Identification and Special-Status Species Assessment

This section details the methods used to map potential GDEs (Section 2.1) and identify special-status species that are likely dependent on groundwater (Section 2.2).

2.1 Vegetation and Wetland Communities

Potential GDE units in the Fillmore and Piru groundwater basins were identified based on vegetation and the presence of interconnected surface water. Several studies have identified the extent of reaches of the Santa Clara River that are connected to groundwater (URS 2005, Stillwater Sciences 2008, Beller et al. 2011, Beller et al. 2016). Interconnected reaches were identified as part of the GDE units. California Department of Water Resources' (DWR) maintains an indicators of groundwater dependent ecosystems (iGDE) database. The database, which is published online and referred to as the Natural Communities Commonly Associated with Groundwater dataset (DWR 2020), includes vegetation and wetland natural communities. These data were reviewed and augmented with additional vegetation mapping datasets to produce a map of final GDE units; additional information on vegetation community composition, aerial imagery, depth to groundwater modeled from local wells (where available), plant and species distributions in the area, and plant species rooting depths were also reviewed to support this determination. Interconnected surface water was identified based on vegetation mapping (which identifies surface water), UWCD (2017), and field observations by Stillwater scientists. Maximum rooting depths from the literature are provided in Appendix C, Table C-1. Another way to explore the rooting depth of plants is to assess their elevation relative to the river channel surface (the relative elevation). Assuming that the groundwater elevation near the stream is similar to the stream elevation, we can assess the likely rooting depth of plants based on their relative elevation. Stillwater Sciences (2007a) assessed the relative elevation of various plant types in the Santa Clara River. Those results are provided in Appendix C, Table C-2.

2.1.1 Data Sources

This section includes brief descriptions of the vegetation community data and other information sources used to identify and aggregate potential GDEs into final GDE units. The iGDE database (DWR 2020) was reviewed in a geographic information system (GIS) and used to generate a preliminary map to serve as the primary basis for initial identification of potential GDEs in the Fillmore and Piru groundwater basins. This dataset is a combination of the best available data obtained from the following publicly available sources:

- Vegetation Classification and Mapping Program (VegCAMP), California Department of Fish and Wildlife (CDFW)
    - Santa Clara River Parkway Vegetation Database (Stillwater Sciences 2007b). *Imagery date: 2005; Minimum mapping unit (MMU): 1-acre.*
- Classification and Assessment with Landsat of Visible Ecological Groupings (CalVeg) – United States Department of Agriculture - Forest Service (USDA 2014). *Imagery date: 2005; Minimum mapping unit (MMU): 2.5-acre.*
- National Wetlands Inventory - Version 2.0 (NWI v2.0), U.S. Fish and Wildlife Service (USFWS 2018). *Minimum mapping unit (MMU): 0.5-acre.*

A more recent vegetation mapping effort for the Santa Clara River was completed in 2018. This dataset was used in the final GDE identification in place of the Santa Clara River Parkway Vegetation Database (Stillwater Sciences 2007b) referenced above.

- Vegetation Mapping of the Santa Clara River, Ventura County and Los Angeles County, California. Prepared for the Western Foundation of Vertebrate Zoology (Stillwater Sciences 2019). *Imagery date: 2016; Minimum mapping unit (MMU): 0.5-acre.*

The extent of the integrated data sources is shown in Table 2.1-1 and Figure 2.1-1.

Table 2.1-1. Vegetation and wetland data sources for Fillmore and Piru groundwater basins.

Data source	Mapped area (acres)		
	Fillmore	**Piru**	**Total**
Vegetation			
CalVeg	17,997.0	6,489.6	24,486.6
Vegetation Mapping of the Santa Clara River	4,580.4	4,405.6	8,986.0
Wetland			
NWI	8.5	0.3	8.8
Total[1]	**22,585.9**	**10,895.4**	**33,481.4**

[1] Totals may not appear to sum exactly due to rounding error.

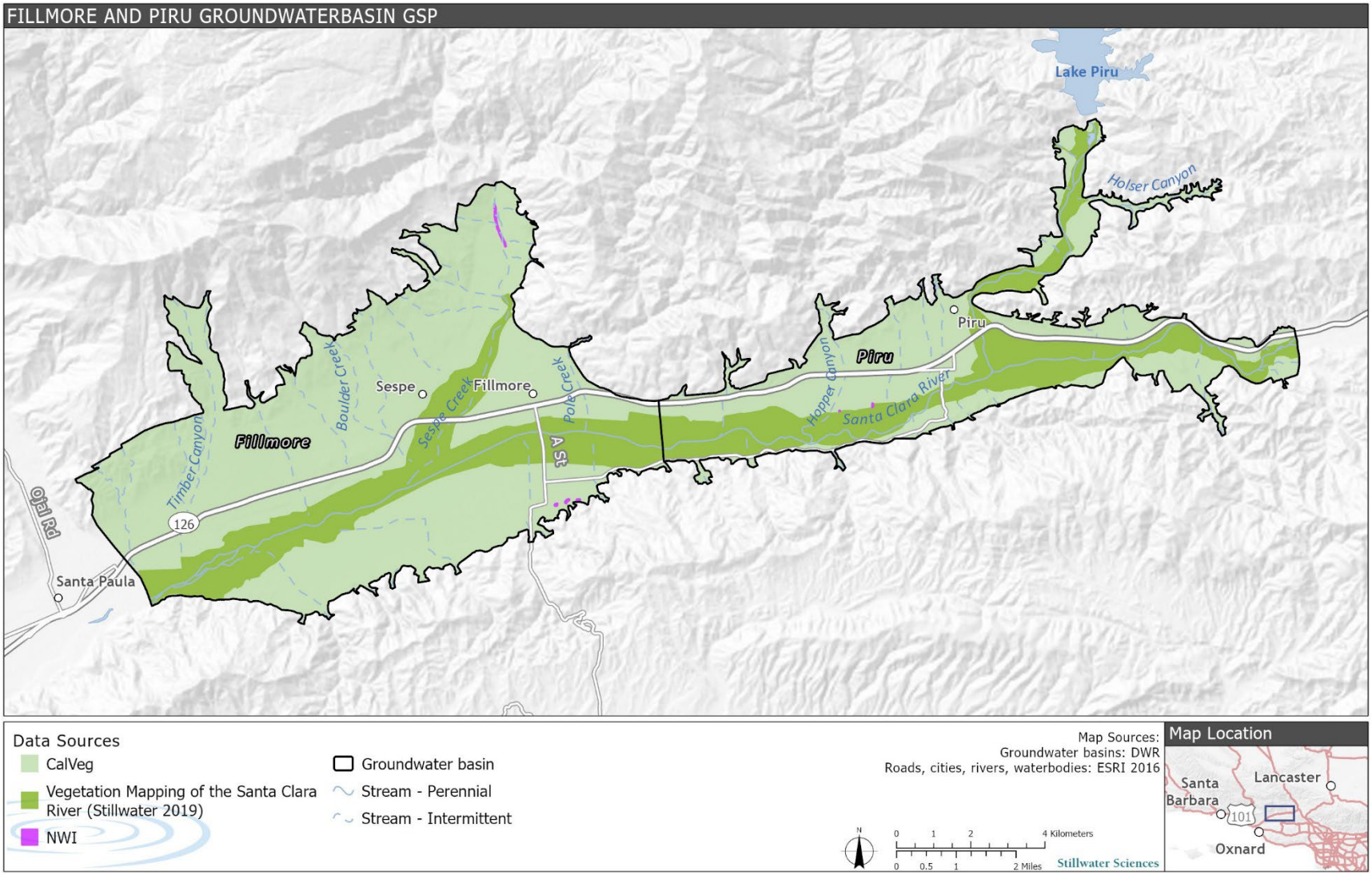


Figure 2.1-1. Vegetation and wetland data sources used for the final GDE map.

2.1.2 Procedure

The steps for defining and mapping GDEs outlined in Rohde et al. (2018) were used as a guideline for this process. A decision tree was applied to determine when species or biological communities were considered groundwater dependent based on definitions found in SGMA (State of California 2014) and Rohde et al. (2018). This decision tree, created to systematically and consistently address the range of conditions encountered, is summarized below; the term "unit" refers to an area with consistent vegetation and hydrology:

The unit is a GDE if groundwater is likely:

1. Interconnected with surface water OR
2. An important hydrologic input to the unit during some time of the year, AND
3. Important to survival and/or natural history of inhabiting species, AND
4. Associated with a principal aquifer used as a regionally important source of groundwater

The unit is not a GDE if its hydrologic regime is primarily controlled by:

1. Disconnected surface water and groundwater greater than 30 feet (ft) below the ground surface (to account for uncertainty in groundwater data and rooting depths). If groundwater is greater than 30 ft below the ground surface groundwater is unlikely a source of water for the plants that therefore must rely on surface water or rainfall.
1. Surface discharge or drainage from an upslope human-made structure(s) with no connection to a principal aquifer, such as an irrigation canal, irrigated fields, reservoir, cattle pond, or water treatment pond/facility.
2. Precipitation inputs directly to the unit surface. This excludes vernal pools from being GDEs where units are hydrologically supplied by direct precipitation and very local shallow subsurface flows from the immediately surrounding area.

Interconnected surface water occurs at the three historical wetlands (Figure 1.4-1) along the Santa Clara River at the upstream end of the Piru Basin (Del Valle), at the boundary between the basins (Cienega), and at the downstream end of the Fillmore Basin (East Grove). Because vegetation communities tend to co-occur with areas of rising groundwater (Stillwater Science 2007b), vegetation and interconnected surface water GDEs were combined where they coincide.

The vegetation community mapping data sources identified in Section 2.1.1 were combined in GIS to create a groundwater basin-wide vegetation map. Consistent with Klausmeyer et al. (2018), the most recent and highest resolution mapping was prioritized over earlier and coarser scale datasets. The datasets were prioritized in the following order, with the highest priority data sources listed first: Vegetation Mapping of the Santa Clara River (Stillwater Sciences 2019) and CalVeg (USDA 2014). A crosswalk between the two mapping classification systems (i.e., Manual of California Vegetation [Vegetation Mapping of the Santa Clara River] and CalVeg) can be found in Appendix A (Table A-1).

Finally, additional wetland mapping was incorporated where vegetation data were coarse and did not accurately capture wetland features. These additional wetland data sources were incorporated unilaterally across the selected vegetation data source and were chosen to represent the best available data for the extent of each vegetation data source. CalVeg was supplemented with the iGDE wetland mapping (DWR 2020), which is derived from the National Wetlands Inventory (USFWS 2018). The Vegetation Mapping of the Santa Clara River dataset was mapped to a scale that did not require supplemental wetland data.

Depth to Groundwater

Rohde et al. (2018) recommend that maps of potential GDEs be compared with local groundwater elevations to determine where groundwater is within the rooting depth of potential GDEs. Given uncertainties in extrapolating well measurements to GDEs and differences in surface elevation of wells and GDEs, Rohde et al. (2018) recommend assigning GDE status to vegetation communities either within 30 feet of the ground surface or where interconnected surface waters are observed. To make this determination, we subtracted groundwater elevation contours for the fall of 2011 (United Water 2020) from 2018 ground surface LiDAR (USGS 2018) in GIS. Figure 2.1-2 shows the 2019 groundwater elevation contours and resultant depth to water contours. The groundwater elevation in fall 2011 was used because the groundwater elevation was higher (i.e., closer to the ground surface) in this pre-drought year than other available years. Use of the highest groundwater elevation period likely results in an overestimate of potential GDE area; the presence of shallow groundwater in a single year does not necessarily indicate that shallow groundwater is common in a particular area. The groundwater elevation contours focus on the Santa Clara River alluvial plain, where more shallow groundwater data are available than along Sespe and Piru creeks. Contours to groundwater data are uncertain, particularly in the intermittent reaches where shallow groundwater wells are sparse or absent.

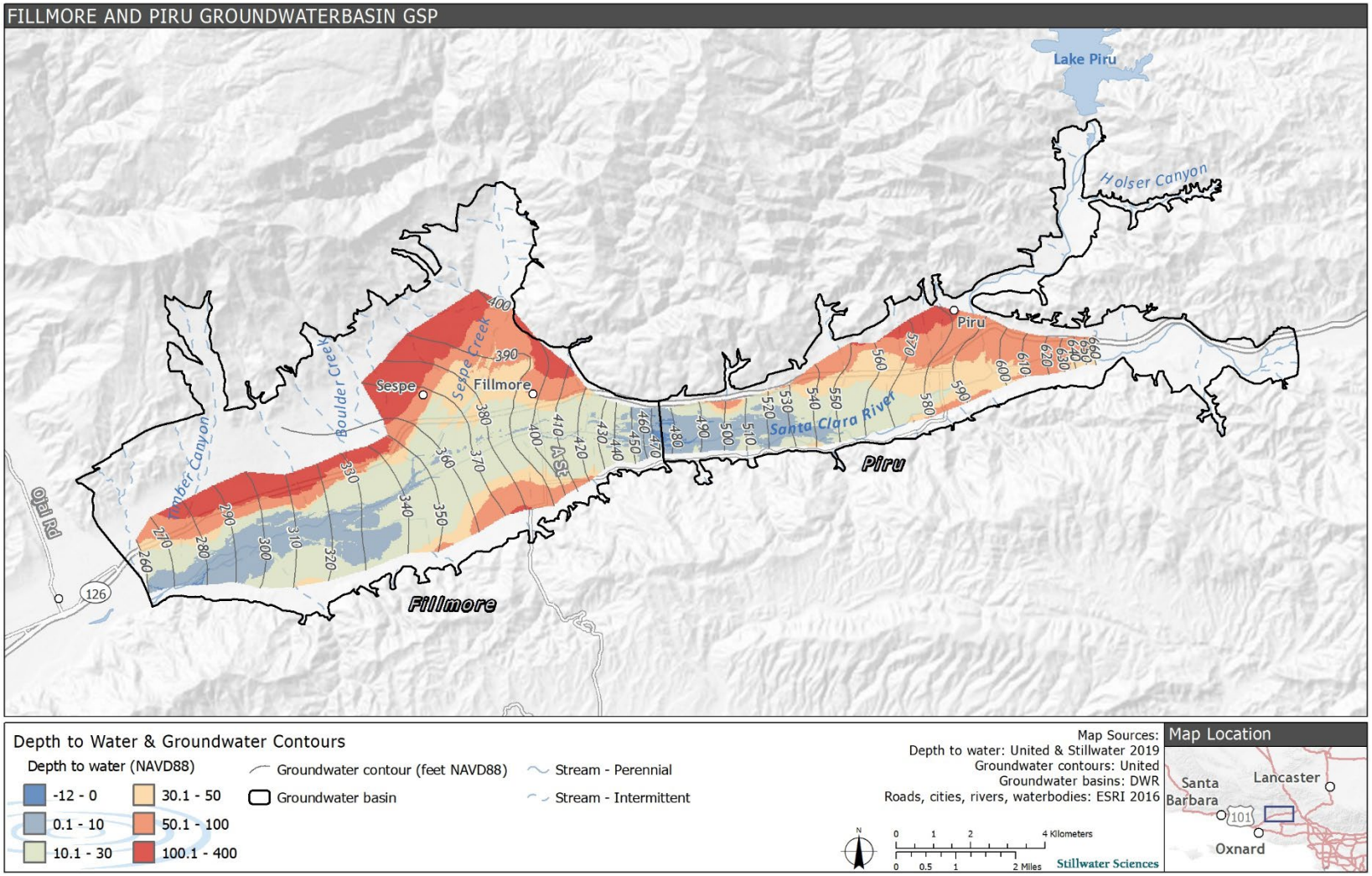


Figure 2.1-2. Fall 2011 depth to water and groundwater elevation contours.

2.1.3 Refine Potential GDE Map

To inform the assessment of GDE condition and potential effects (Sections 4 and 5), the basin-wide vegetation and wetland map was reviewed, and each community was assigned a groundwater dependence category (i.e., unlikely or likely; Figure 2.1-3). This determination was based on species composition and the groundwater dependency of dominant species, whether they were considered groundwater dependent by the iGDE database (DWR 2020) and wetland indicator status (Lichvar et al. 2016). Although Klausmeyer et al. (2018) includes species with upland facultative wetland indicator status (Lichvar et al. 2016) in their list of groundwater dependent mapping units, these upland facultative species were classified as unlikely to be groundwater dependent based on their typical elevation relative to the low-flow channel in the Santa Clara River watershed. Figure 2.1-4 shows the differences between the iGDE database and the potential GDE map. Section 4.1 discusses the vegetation communities that were identified as likely to depend on groundwater.

These potential GDEs were overlaid with the depth to water dataset (as discussed in Section 2.1.2) in GIS and any communities occurring outside of 30-ft depth to groundwater were removed. The depth to water modeling data did not cover the entire extent of both the Fillmore and Piru groundwater basins; in these areas, a manual review of potential GDEs was performed using aerial imagery. Coast live oak (*Quercus agrifolia*) communities were included as potential GDEs when they occurred in riparian areas or drainages; any mapped stands growing on a clear slope were excluded based on landscape position and improbable connection to groundwater. These stands typically occur on the upland fringes of the basin, where the non-water bearing Pico Formation bedrock outcrops (Fillmore Basin GSP Figure 2.2-3 and Piru Basin GSP Figure 2.2-3) and average slopes exceed 20%. It is therefore extremely unlikely that oaks in these areas are connected to groundwater-bearing alluvial or fluvial sedimentary formations.

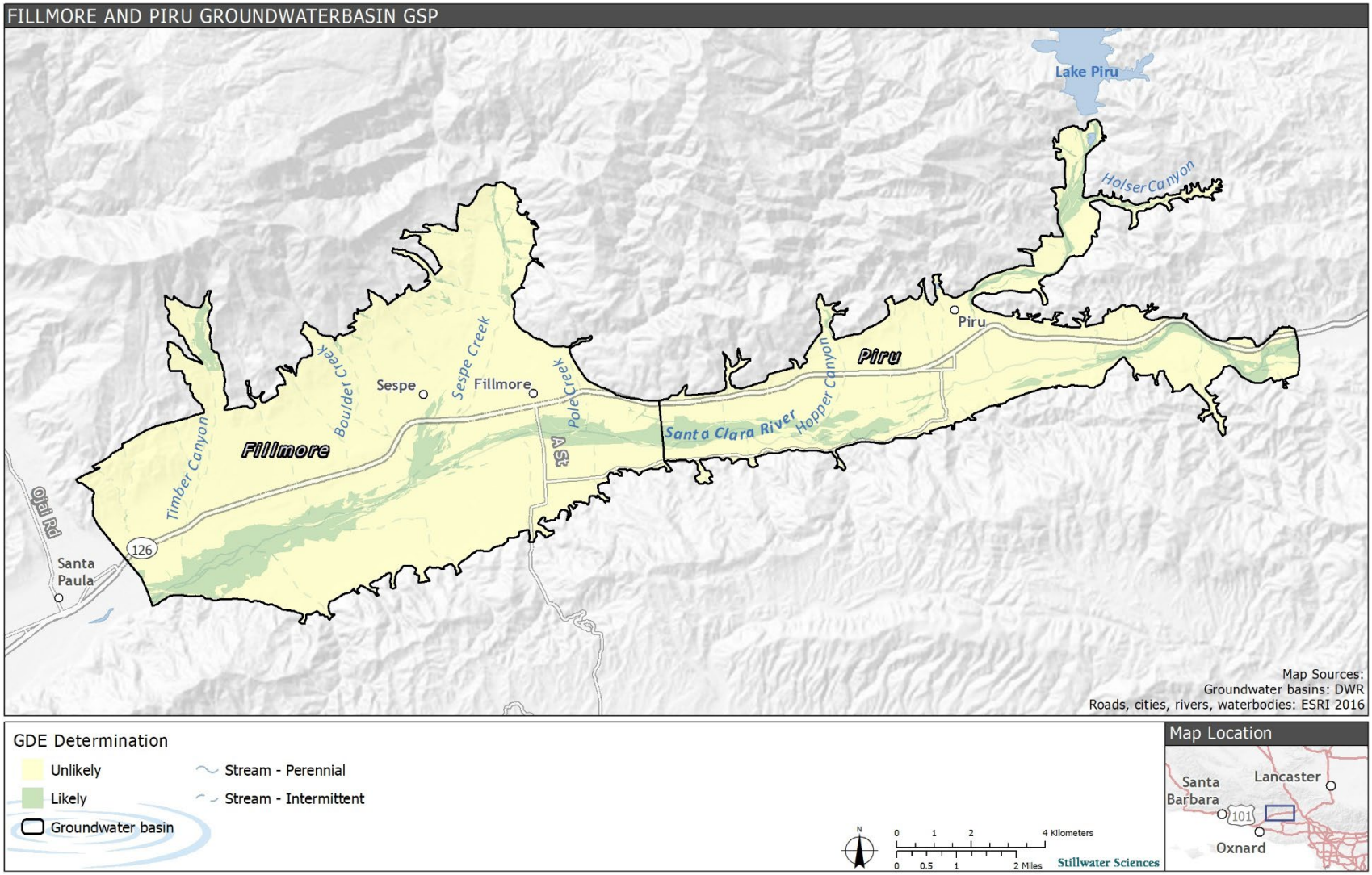
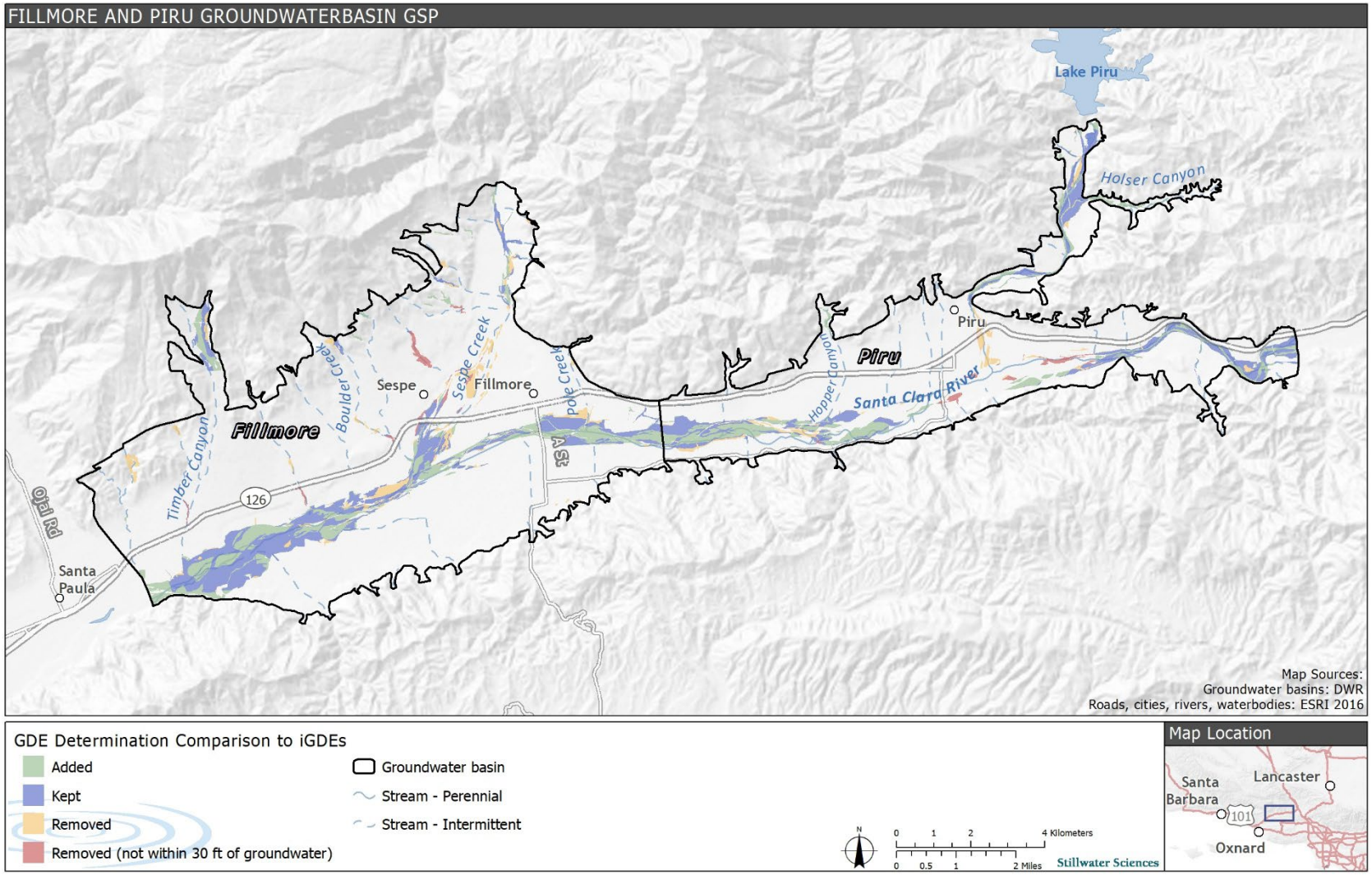


Figure 2.1-3. Potential GDE determination based on the methods outlined in Section 2.1.



2.1-4. Potential GDE determination compared to iGDE mapping (Klausmeyer et al. 2018). The final GDEs are indicated by kept and added classes.

2.2 Special-Status Species

As part of this analysis, special-status species and sensitive natural communities that are potentially associated with GDEs in the Fillmore and Piru groundwater basins were identified. Groundwater dependent special status species in the basin are beneficial users of groundwater. For the purposes of this document, special-status species are defined as those:

- listed, proposed, or under review as endangered or threatened under the federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA);
- designated by CDFW as a Species of Special Concern;
- designated by CDFW as Fully Protected under the California Fish and Game Code (Sections 3511, 4700, 5050, and 5515);
- designated as Forest Service Sensitive according to the Regional Forester's Sensitive Species Management Guidelines listed per USFS Memorandum 2670 (USFS 2011);
- designated as Bureau of Land Management (BLM) sensitive;
- designated as rare under the California Native Plant Protection Act (CNPPA); and/or
- included on CDFW's most recent Special Vascular Plants, Bryophytes, and Lichens List (CDFW 2020a) with a California Rare Plant Rank (CRPR) of 1, 2, 3, or 4.

Sensitive natural communities are defined as vegetation communities identified as critically imperiled (S1), imperiled (S2), or vulnerable (S3) on the most recent California Sensitive Natural Communities List (CDFW 2020b).

2.2.1 Data Sources

Stillwater ecologists queried databases on regional and local occurrences and spatial distributions of special-status species within the Fillmore and Piru groundwater basins. Spatial database queries included potential GDEs plus a 1-mile buffer. Databases queried included:

- California Natural Diversity Database (CNDDB) (CDFW 2019);
- Vegetation Mapping of the Santa Clara River, Ventura County and Los Angeles County, California, prepared for the Western Foundation of Vertebrate Zoology (Stillwater Sciences 2019);
- California Native Plant Society (CNPS) Manual of California Vegetation (2020);
- eBird (2021); and
- The Nature Conservancy (TNC) freshwater species lists generated from the California Freshwater Species Database (CAFSD) (TNC 2020).

2.2.2 Procedure

Stillwater reviewed the database query results and identified special-status species and community types with the potential to occur within or be associated with the vegetation and aquatic communities in or immediately adjacent to the potential GDEs. Stillwater ecologists then consolidated these special-status species and sensitive community types into a list along with summaries of habitat preferences, potential groundwater dependence, and reports of any known occurrences (Section 4.2.2 and Appendix A).

Wildlife species were evaluated for potential groundwater dependence using determinations from the Critical Species Lookbook (Rohde et al. 2019) or by evaluating known habitat preferences, life histories, and diets. Species GDE associations were assigned one of three categories:

- Direct—species directly dependent on groundwater for some or all water needs (e.g., cottonwood with roots in groundwater, juvenile steelhead in dry season).
- Indirect—species dependent upon other species that rely on groundwater for some or all water needs (e.g., riparian birds).
- No known reliance on groundwater.

Sensitive natural communities were classified as either likely or unlikely to depend on groundwater based on species composition using the same methodology as vegetation communities (Section 2.1.3). Plant species were evaluated for potential groundwater dependence based on their habitat (Jepson Flora Project 2020) and association with vegetation communities classified as GDEs. Special-status plant GDE associations were assigned one of three categories: likely, possible, or unlikely. The "possible" category was included to classify plant species with limited habitat data or where a species may have an association with a vegetation community identified as a GDE (e.g., Coast live oak, California sagebrush [*Artemisia californica*]).

Database query results for local and regional special-status species occurrences were combined with their known habitat requirements to develop a list of groundwater dependent special-status species (Section 4.2.2) that satisfy the following criteria: (1) documented to occur within the GDE unit, or (2) known to occur in the region and suitable habitat present in the GDE unit.

3 Potential GDE Units

Seven potential GDE units were identified based on hydrologic and ecological conditions of the GDEs identified using the methods outlined in Section 2.1.3 (Table 3.1-1 and Figure 3.1-1). Potential GDE units are units that may use groundwater but could also be using water from other sources (e.g., soil moisture, agricultural runoff, or surface flows). The likelihood of groundwater dependence for each potential GDE unit is explored in Section 6. The exterior boundaries of each unit were established using the extent vegetation communities. Adjacent GDE units were differentiated based on changes in the dominant vegetation community such as a transition from willows and cottonwoods to mulefat or the presence of interconnected surface water. Three of the units mostly coincide with areas of rising groundwater and thus contain interconnected surface water as part of the GDE.

Table 3.1-1. Potential GDE unit description.

Potential GDE units	Description
Del Valle	Historical Del Valle complex located at the upstream end of the Piru Groundwater Basin. Unit is predominantly dense riparian forest, with established Fremont cottonwood and red willow. This unit includes the interconnected surface water portions of the Santa Clara River, which extends from the basin boundary downstream to approximately Las Brisas Bridge.
Santa Clara River Riparian Shrubland	Riparian zone along the Santa Clara River; dominated by facultative phreatophytes and riparian shrubland habitat. Unit occupies both Fillmore and Piru groundwater basins. Unit is characterized by lower density and low-stature shrubs and is dominated by mulefat.
Cienega	Historical Cienega complex located near the Fillmore Fish Hatchery. Unit occurs in both Fillmore and Piru groundwater basins. Unit is dominated by mulefat and giant reed of variable density throughout. This unit includes interconnected surface water in the Santa Clara River.
East Grove	Historical East Grove complex located at the downstream end of the Fillmore Groundwater Basin. Unit is occupied by dense riparian forest dominated by mulefat, black cottonwood, and red willow. This unit includes interconnected surface water on the Santa Clara River.
Piru Creek Riparian	Riparian zone along Piru Creek from Santa Felicia Dam to Highway 126. Unit is characterized by a thin but dense riparian corridor, dominated by mulefat, Fremont cottonwood, and red willow.
Tributary Riparian	Riparian habitat within tributaries to both Fillmore and Piru groundwater basins. Predominantly located to the north of the Santa Clara River draining the Topa Topa mountain range. Unit is dominated by oaks and other hardwoods.
Sespe Creek Riparian	Riparian zone along Sespe Creek from the boundary of the Fillmore Groundwater Basin to Highway 126. Unit is dominated by mixed hardwood and low-stature willows.

Potential GDE units in the Fillmore and Piru groundwater basins contain 4,214.1 acres of GDE habitats, with the majority (62%) occurring in the Fillmore Groundwater Basin (Table 3.1-2). The Santa Clara River Riparian Shrubland and East Grove are the largest potential GDE units and together account for 84% of the GDE units in the Fillmore Groundwater Basin.

Table 3.1-2. Extent of potential GDEs by GDE unit by Groundwater Basin (acres).

GDE unit	Fillmore	Piru	Total
Cienega	133.6	159.6	293.2
Del Valle	-	502.9	502.9
Santa Clara River Riparian Shrubland	1,073.1	549.3	1622.4
East Grove	1,101.0	-	1,101.0
Piru Creek Riparian	-	336.5	336.5
Tributary Riparian	195.1	68.9	264.0
Sespe Creek Riparian	94.1	-	94.1
Total	**2,596.9**	**1,617.2**	**4,214.1**

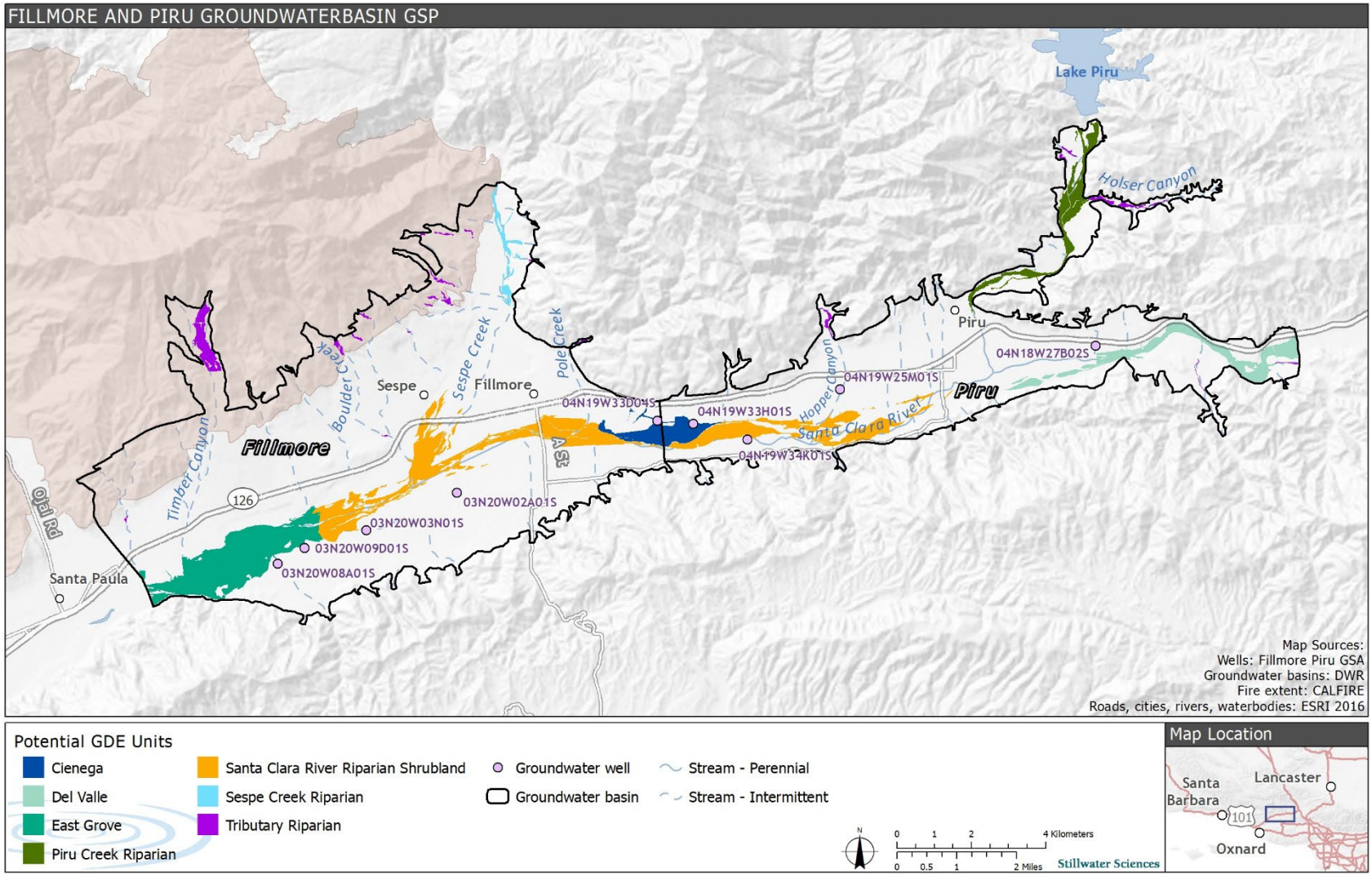


Figure 3.1-1. Potential GDE units and groundwater wells for the Fillmore and Piru groundwater basins.

4 Groundwater and Interconnected Surface Water Hydrology

Changes to groundwater elevations and interconnected surface water flows through time can lead to changes in GDE health and extent. This section uses available groundwater level data to assess temporal trends in the groundwater elevations for potential GDE units with well data (Section 4.1). Section 4.2 explores groundwater quality and its potential effect on GDEs. Finally, Section 4.3 explores the extent of interconnected surface water and spatial trends in interconnected surface water that can later be used to assess potential impacts of groundwater pumping to GDEs. These changes in groundwater levels and interconnected surface water are linked with changes to GDE health in Section 6.

4.1 Groundwater Levels

Historical dry periods and droughts play a major influence on groundwater elevations across the Fillmore and Piru groundwater basins. Droughts in 1974–1977, 1986–1991, and 2012–2016 had significant signatures in the hydrographs of shallow wells located beside the identified GDEs. Most recently, basins were near to full capacity in 2011 (i.e., groundwater levels very close to the surface) ahead of the 2012–2016 drought, which generally caused water levels in wells to decline. The largest drops were seen in wells in the central part of Piru Groundwater Basin the higher elevation portions of the basin along Sespe Creek (the Sespe Upland) and Pole Creek Fan area of Fillmore Groundwater Basin. The greatest seasonal fluctuations are seen in the same areas (central Piru Groundwater Basin, Sespe Upland, and Pole Creek Fan), where hydraulic gradients are relatively steep. In general, ground surface elevation in the Sespe Upland areas increases steeply to the north, unlike the relatively flat topography near to the Santa Clara River channel. As such, depths to groundwater tend to be greatest along the Sespe Upland.

Long-term records of shallow groundwater are relatively rare in the Fillmore and Piru groundwater basins. Below we use well data presented in the Monitoring Plan and Data Gaps Analysis Appendix (DBS&A 2020) to explore shallow groundwater trends for the GDE units shown in Figure 3.3-1 from east to west. We were unable to examine the groundwater levels in the Tributary Riparian GDE unit because there are no representative wells located in or near the unit.

Many of the wells considered in the analysis below are screened below the shallow groundwater used by GDEs (Table 3.1-1) and may not accurately represent the actual shallow groundwater elevation. Additionally, land surface elevation, and therefore depth to water, at a monitoring well site may differ from that at the GDEs it represents, particularly with distance from the river channel. GDEs are typically located closer to channels and at lower elevations than their representative well sites. We used a DEM to extract land surface elevations at GDEs along cross-channel transects at each well. The range of ground elevation for the GDEs is represented by the green shaded area in figures 4.1-1 through 4.1-5. In addition to depth to water data at each well site, we present the range of elevation of potential GDEs along each transect to provide rough constraints on depth to water at the potential GDEs.

The following sections analyze groundwater elevation changes for some of the GDE units. In light of the limitations of the monitoring well data, the groundwater elevation data presented in this section are intended to illustrate general trends within GDE units. The spring 2019 depth to water surface (Section 2.1.2), as opposed to monitoring well data, is used to establish GDE connectivity with shallow groundwater.

4.1.1 Piru Basin

Del Valle

Well 04N18W27B02S is an active agricultural well installed in 1932, with a screen depth of 140–255 feet (Table 4.1-1). The well is approximately 1,500 ft north of the downstream end of the Del Valle unit. The depth of groundwater in this well varies from about 19–160 feet below ground surface (ft bgs) (Figure 4.1-1). The shaded green areas in this and subsequent figures represent the range of elevation of the GDE along a transect perpendicular to the valley axis. After a period of low water elevation levels in the 1960s, the water level between droughts was generally within 10–30 ft bgs. During droughts, the water level dropped to greater than 100 ft bgs before recovering. The low water levels prior to the 1970s occurred before the effluent releases from Los Angeles County increased. Groundwater elevation has increased since the 2012–2016 drought but by early 2020 had not yet reached the long-term average depth. GDE elevations in this unit are 7 to 15 ft below the well site elevation, so depth to water at GDEs is likely to be shallower than at the well. (Figure 4.1-1).

Table 4.1-1. Characteristics for wells used for the groundwater quality and groundwater level assessment. The location of the wells is shown on Figure 2.3-1.

Well	Basin	GDE Unit	Screen depth (ft bgs)	Data type[1]	Water quality data available	Water level data available
04N18W27B02S	Piru	Del Valle	140–255	WQ, WL	1960–2004	1932–2020
04N19W34K01S	Piru	Santa Clara River Riparian Shrubland	5–120	WQ, WL	1931–2016	1972–2019
04N19W33H01S	Piru	Cienega	237–362	WQ	1954–1958	2007–2011**
04N19W33D04S	Fillmore	Cienega	140–486	WQ, WL	1951–1985	1972–2020
03N20W03N01S	Fillmore	Santa Clara River Riparian Shrubland	120–172	WQ, WL	1981–1994	1959–2020
03N20W09D01S	Fillmore	East Grove	210–310	WQ, WL	1969–2019	1988–2019

[1] WQ=groundwater quality, WL= groundwater level

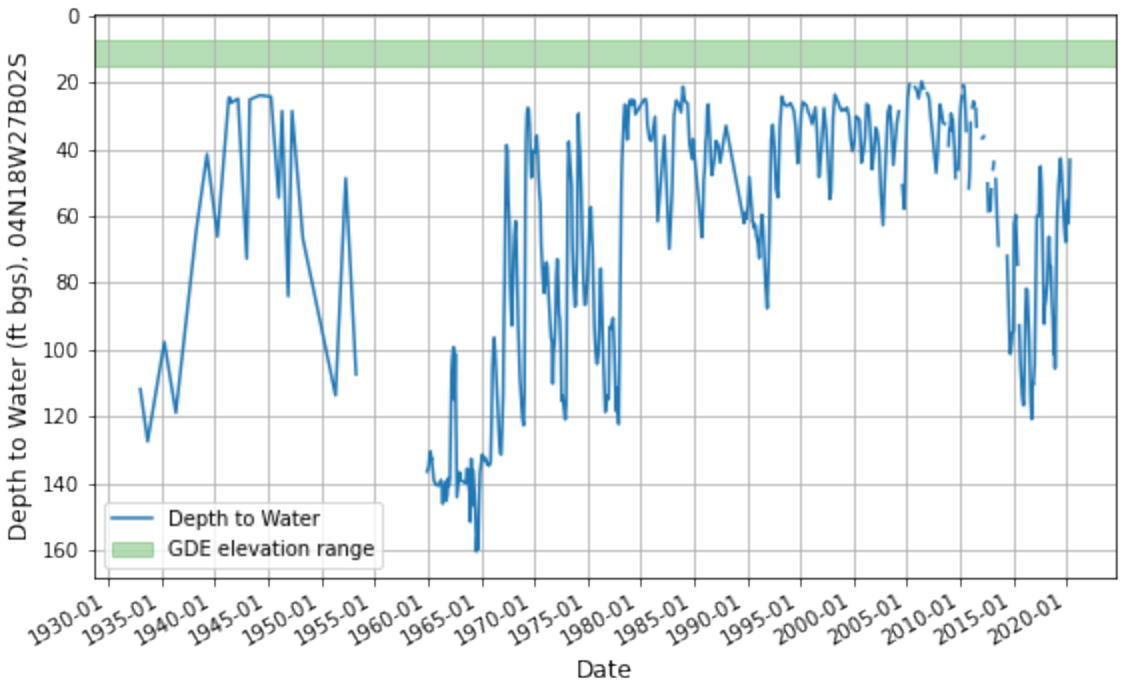


Figure 4.1-1. Depth to groundwater and potential GDE elevation range on well transect, Well 04N18W27B02S in the Del Valle GDE Unit. Well site elevation is assumed to be 0 ft bgs.

Santa Clara River Riparian Shrubland

Well 04N19W34K01S within the Santa Clara River Valley Riparian Shrubland GDE Unit in the Piru Basin and 0.45 miles east of the Cienega Riparian Complex boundary has a screen depth of 5–120 feet bgs and was installed in 1972. The average depth to groundwater over the period or record was 19.5 feet bgs. Groundwater levels in well declined sharply to 49–62 ft bgs during droughts (Figure 4.1-2), but quickly recovered to the long-term average values. Since 2016, water elevations have risen, but still had not fully recovered to a normal range of 15 feet bgs or less by fall 2019. GDE elevations in this unit range from 1.5 ft above to 12 ft below the well site elevation. In general, depth to water at GDEs is likely to be shallower than at the well (Figure 3.1-2).

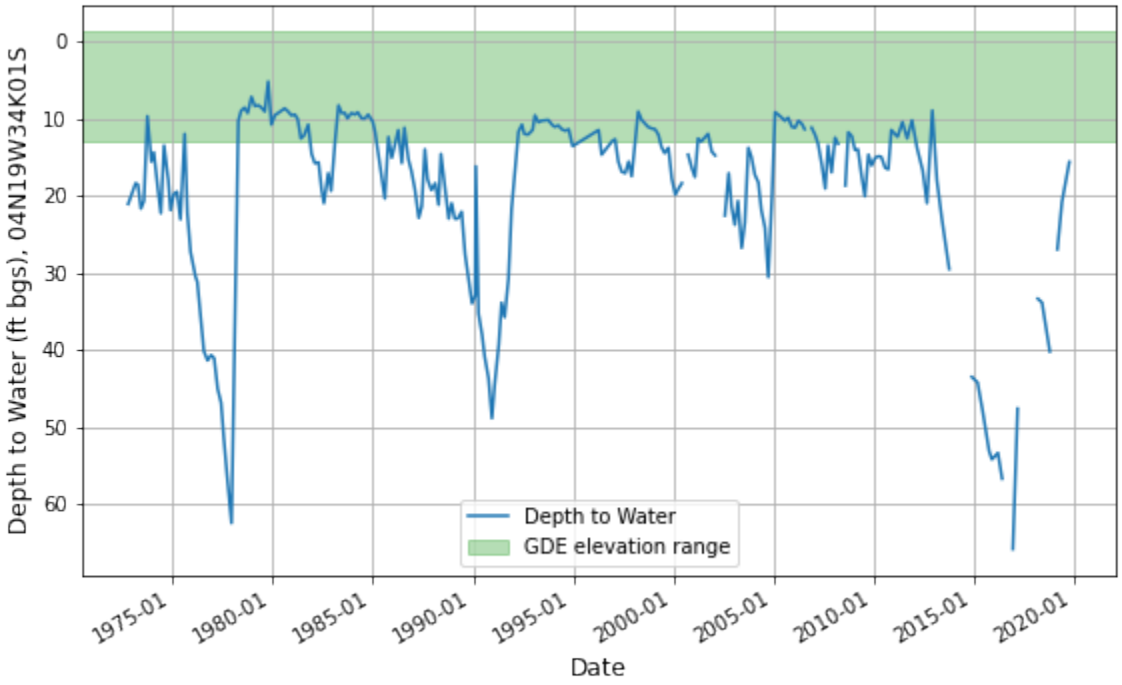


Figure 4.1-2. Depth to groundwater and potential GDE elevation range on well transect, Well 04N19W34K01S in the Santa Clara River Riparian Shrubland GDE Unit (Piru). Well site elevation is assumed to be 0 ft bgs.

4.1.2 Fillmore Basin

Cienega

Well 04N19W33D04S lies within the Cienega GDE Unit in the Fillmore Groundwater Basin and is screened at 140–486 feet (Table 4.1-1). It became operational in 1972 and the average depth to water from 1972–2019 was 5.4 feet bgs (Figure 4.1-3). The well data show significant declines during droughts, with groundwater level dropping to 25–33 feet during the droughts before returning to 5–10 ft bgs between the droughts. GDE elevations in this unit range from 2 feet above to 6 feet below the well site elevation (Figure 4.1-3).

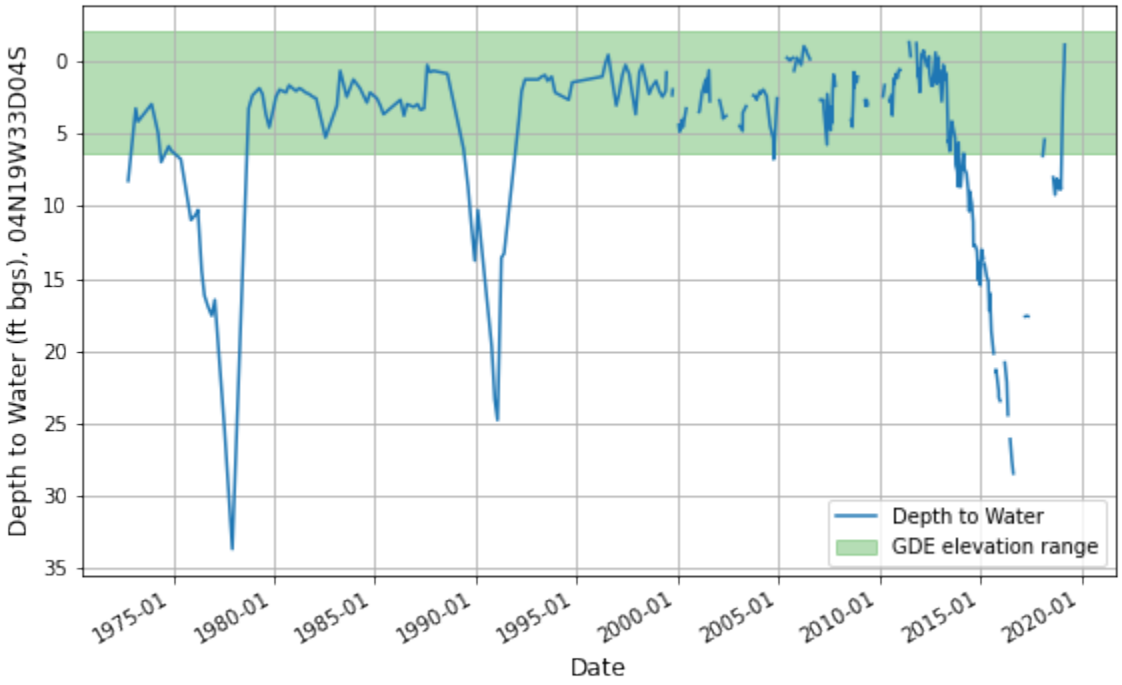


Figure 4.1-3. Depth to groundwater and potential GDE elevation range in well cross-section, Well 04N19W33D04S in the Cienega GDE Unit. Well site elevation is assumed to be 0 ft bgs.

Santa Clara River Riparian Shrubland

Well 03N20W03N01S is in the Fillmore Groundwater Basin, 0.1 miles outside of the Santa Clara River Valley Riparian Shrubland boundary (0.75 miles east of the East Grove GDE Unit) and has been operational since 1959. This well has a screen depth of 120–172 feet bgs (Table 4.1-1). Over the 60 years of recorded depths to groundwater, this well averages 14.7 feet bgs (Figure 4.1-4). Similar to the other wells in the basin, the water elevation drops during droughts, with the largest drop occurring in 2016, when the water elevation was greater than 40 ft bgs. Following the droughts, the water elevation recovers to its average long-term value. GDE elevations in this unit range from 1 ft above to 12.5 ft below the well site elevation. In general, depth to water at GDEs is likely to be shallower than at the well because groundwater depths are increasing downstream toward the area of rising groundwater in the East Grove.

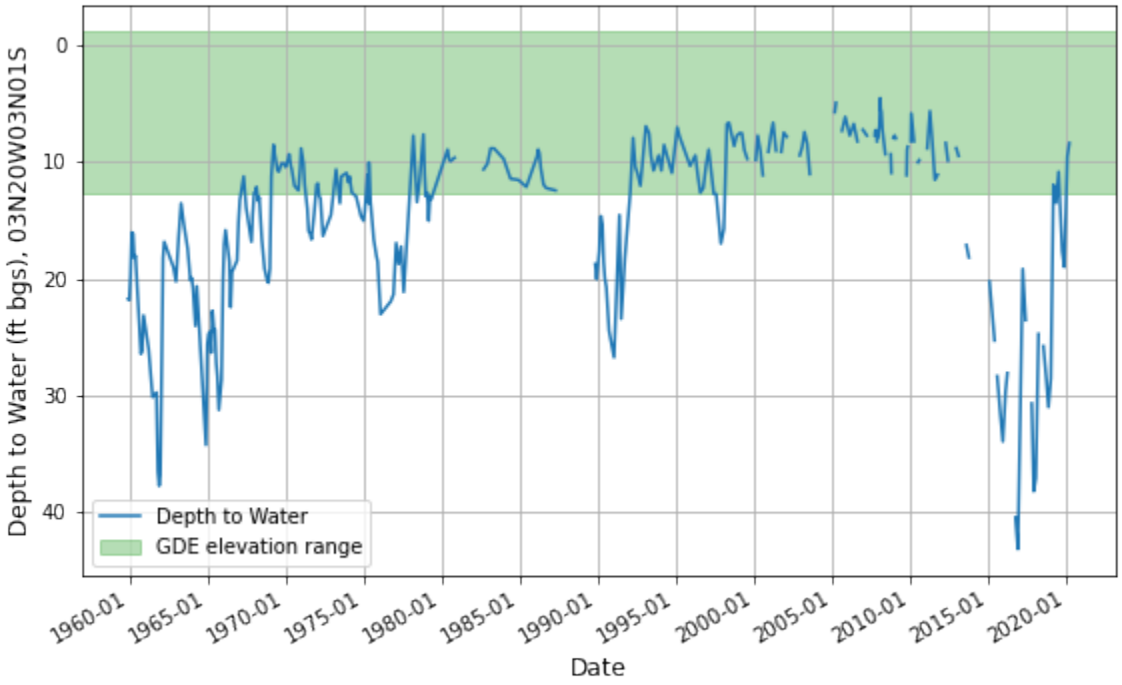


Figure 4.1-4. Depth to groundwater and potential GDE elevation range in well cross-section, Well 03N20W03N01S in the Santa Clara River Riparian Shrubland GDE Unit (Fillmore). Well site elevation is assumed to be 0 ft bgs.

East Grove

Well 03N20W09D01S, in operation since 1988, is an agricultural well that has a screen depth of 210–310 feet bgs (Table 4.1-1). The average water level from 1988–2019 was 8.7 feet bgs (Figure 4.1-5). Groundwater data are relatively sparse in this well, particularly after 2010. This well shows a similar pattern to other wells described above, with declines in groundwater elevation during droughts followed by recovery. During the 2012–2016 drought, recorded groundwater depths decreased to almost 25 ft bgs. Adam Lambert (UCSB) has established numerous groundwater monitoring points (<12 ft) in the East Grove GDE Unit. These wells show similar results to Figure 4.2-5, but the magnitude of changes varies based on the location and relative elevation. GDE elevations in this unit are up to 11 feet below the well site elevation. In general, depth to water at GDEs is likely to be shallower than at the well (Figure 4.1-5).

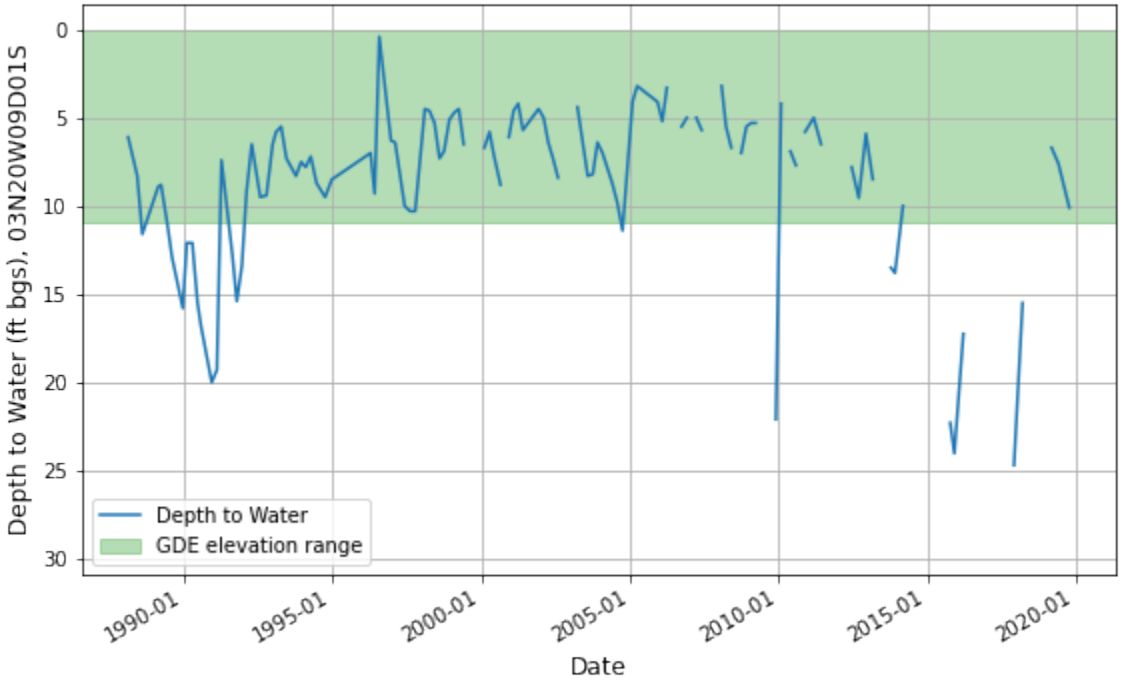


Figure 4.1-5. Depth to groundwater and potential GDE elevation range in well cross-section, Well 03N20W09D01S in the East Grove GDE Unit. Well site elevation is assumed to be 0 ft bgs.

4.2 Groundwater Quality

In general, groundwater in the Fillmore and Piru groundwater basins is high-quality with a few exceptions (DBS&A 2020). Between 1951 and 1968, elevated concentrations of TDS, sulfate, chloride, and boron near the Ventura/Los Angeles County line were generally connected to loosely regulated oil fields in Los Angeles County. Some of these elevated concentrations persisted after the Clean Water Act reduced impacts from the oil fields (DBS&A 2020). High chloride concentrations in the Santa Clara River originating in Los Angeles County cause the largest concern for water quality, particularly for agricultural uses in the Piru Groundwater Basin. Historically, water quality chemicals of concern (COCs) in the basins include:

- Total dissolved solids (TDS)
- Sulfate
- Chloride
- Nitrate
- Boron

The inter-quartile range of concentration for the five contaminants of concern and the EPA maximum contaminant level (MCL) in drinking water are shown in Table 4.2-1. In general, while concentrations for the contaminants of concern exceeded MCLs at times, they were not sufficiently high to impact GDEs. Moreover, shallow groundwater (used by GDEs) is usually younger and recharged by the surface waters of the Santa Clara watershed and has less legacy contamination than deeper groundwater (VCWPD 2016).

Table 4.2-1. Inter-quartile range and peak concentration (in square brackets) for selected contaminants observed in wells in the GDE units.

Well number	Basin	GDE unit	TDS (mg/l)	Chloride (mg/l)	Sulfate (mg/l)	Nitrate (mg/l)	Boron (mg/l)
04N18W27B02S	Piru	Del Valle	2413–2696 [3123]	150–151 [159]	365– 1412 [1536]	14–44 [66]	0.7–0.73 [1]
04N19W34K01S	Piru	Santa Clara River Riparian Shrubland	1366–1520 [1520]	41–55 [67]	616–339 [710]	9.2–13.6 [28]	0.6–0.8 [1.0]
04N19W33D04S	Piru	Cienega	966–1180 [1221]	31 to 47 [49]	458-522 [1332]	9.8–16 [32]	1–1.1 [1.1]
04N19W33H01S	Fillmore	Cienega	980 [n/a]	33–54 [54]	487–720 [720]	8.5–42 [42]	0.86–0.89 [0.89]
03N20W03N01S	Fillmore	Santa Clara River Riparian Shrubland	1048–1300 [1400]	41–62 [70]	476–580 [580]	17–41 [48]	0.8–0.9 [0.9]
03N20W09D01S	Fillmore	East Grove	1290–1516 [1516]	74–79 [81]	587–616 [650]	39.5–73 [73]	0.5–0.8 [0.9]
MCL (mg/l)			500[a]	250[a]	250[a]	45[b]	1[c]

[a] EPA secondary Maximum Contaminant Level
[b] EPA Maximum Contaminant Level
[c] California State Notification Level

4.3 Interconnected Surface Waters

Surface waters within the Piru and Fillmore groundwater basins have varying degrees of connection to groundwater. Three reaches of the Santa Clara River are connected to groundwater, as are the upper reaches of Piru and Sespe creeks (Figure 4.3-1). It is uncertain whether the lower reaches of Piru and Sespe creeks are connected to groundwater. It is unlikely that surface flows in the other intermittent tributaries tot the Santa Clara River are connected to groundwater (Figure 4.3-1).

Generally, surface waters can be categorized into three major surface water types: perennial reaches, intermittent reaches, and ephemeral reaches. For this discussion we define perennial reaches as those that have surface flow except during prolonged and severe droughts. For the Santa Clara River, perennial reaches are generally supported by rising groundwater and are areas of interconnected surface water (UCWD 2017). Surface flows occur for prolonged periods in intermittent reaches, but the reaches tend to go dry during most years. Ephemeral reaches occur in smaller tributaries within the basin and only support surface flow immediately after storm events.

As discussed in Section 1.4, the Santa Clara River has alternating perennial and intermittent reaches with perennial reaches occurring where rising interconnected groundwater contributes the vast majority of the surface water (except during storm events with significant runoff) and the intermittent reaches are losing reaches that are disconnected from groundwater during most of the year (Figure 4.3-1). Perennial reaches include the Del Valle, Cienega, and East Grove GDE units (Figure 3.1-1). Continuous surface water flow across the Fillmore and Piru basins can also occur due to effluent from Los Angeles County or dam releases, such as in the reach immediately downstream of Piru Dam.

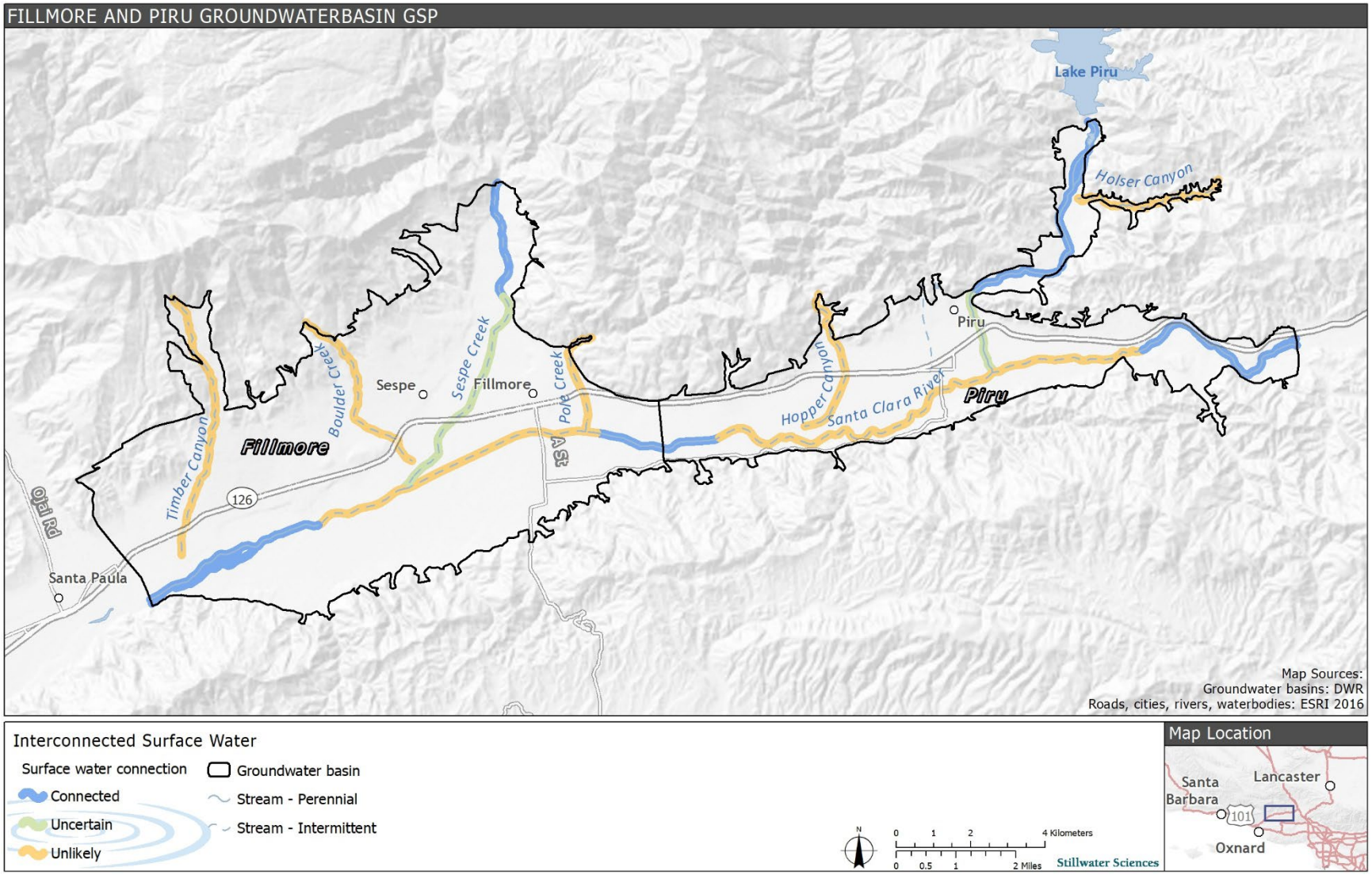


Figure 4.3-1. Interconnected surface water and perennial and intermittent stream reaches.

4.3.1 Piru Groundwater Basin

The Piru Groundwater Basin has three perennial reaches that generally co-occur with the Del Valle GDE Unit, the Cienega Riparian Complex GDE unit, and Piru Creek from Santa Felicia Dam to the confluence with the Santa Clara River. The Del Valle Reach occurs at the upstream end of the Piru Groundwater Basin where the valley width is still narrow, and the alluvial basin is shallow relative to downstream reaches. The Del Valle Reach was historically perennial (Beller et al. 2016) and flows are currently augmented by effluent releases in Los Angeles County. The extent of dry season surface flow in the Cienega Reach was mapped from 2011–2018 by United Water and is discussed below. Groundwater depths along Hopper Canyon Creek increase from about 10 ft bgs during wet years near the Santa Clara River to >30 ft bgs north of Highway 125. Hopper Canyon Creek is therefore unlikely to be connected to groundwater within the Piru Basin boundary. Several small ephemeral tributaries to the Santa Clara River and Piru Creek occur in the reach and are disconnected from groundwater (Figure 4.3-1). To our knowledge, there has not been a systematic exploration of the extent of surface water in lower Piru Creek or lower Hopper Canyon Creek.

Flows in the Del Valle Reach were monitored at the Santa Clara River near Piru gage (USGS Gage Number 11109000) from 1928–1932 and since water year 1997 at the Las Brisas Bridge, and at the USGS gage at the Ventura County line (also known as Blue Cut, USGS Gage Number 11108500) from 1953–1996. These gage records show that this reach is perennial, but shallow groundwater levels are not monitored in this reach. Rising groundwater is thought to occur upstream of this reach, in the adjacent Santa Clara River Valley East groundwater basin. USGS Gage 111085000 is located on a bedrock high; from the gage downstream to the Las Brisas Bridge, surface flow is thought to be stable and sustained by rising groundwater upstream and effluent releases from Los Angeles County (Dan Detmer personal communication). Near the Las Brisas Bridge, the river transitions to a losing reach. Shallow groundwater commonly occurs in this area and is sustained by surface flow from upstream areas (Figure 4.3-1). The occurrence of shallow groundwater in this reach is not influenced by any known groundwater pumping in the Piru Basin (UWCD 2021).

A 6.5-mile-long intermittent, losing reach occurs between Del Valle and the Cienega Reach of the Santa Clara River in the Piru Groundwater Basin. The groundwater is relatively deep in this reach and when the Santa Clara River flows, the surface flow is disconnected from groundwater (Figure 4.3-1). During very wet years (e.g., 1998 and 2005), prolonged surface water releases from Santa Felicia Dam or Castaic Lake in combination with high recharge rates during storms cause high stream bed infiltration rates that replenish the groundwater beneath and near the river and can cause groundwater levels to reach the stream bed. This condition abates when the surface water flows cease (or decrease dramatically) and the mounded groundwater beneath the river declines and the surface water flow returns to a disconnected state with the aquifer.

Flow in lower Piru Creek is maintained by releases from Santa Felicia Dam, which likely also raises the groundwater level in this area. This reach of Piru Creek was historically intermittent (Beller et al. 2016) but there is currently perennial flow at least in the upper portion of the reach.

4.3.2 Fillmore Groundwater Basin

The Santa Clara River in the Fillmore Groundwater Basin has two reaches with rising groundwater (i.e., interconnected surface water) that correspond to the Cienega and the East Grove GDE units (Figure 4.3-1). Surface flows in both reaches are typically dominated by rising groundwater except during storm flows. The rising groundwater flows can be supplemented by

man-made releases from Santa Felicia Dam or Castaic Lake. The extent of rising groundwater (the source of the perennial flow) varies based on water year type (see section 4.3.3 for a discussion). Between these two reaches the Santa Clara River is an intermittent, losing reach for approximately 5 miles.

Sespe Creek is perennial at the USGS gage near the Fillmore Groundwater Basin boundary (where the creek exits the mountains) but the downstream extent of perennial flow is not known, although the lower portion of Sespe Creek is intermittent (Figure 4.3-1). Other tributaries within the Fillmore Groundwater Basin, including Pole Creek, Boulder Creek, and Timber Creek, are typically ephemeral or intermittent (i.e., disconnected from groundwater). United Water mapped the extent of surface water from 2011–2017 and that is explored below.

4.3.3 Variations in the extent of surface water 2011-2017 in the western Piru and Fillmore basins

United Water used field observations and photographs to map the extent of dry-season surface water in the Santa Clara River from 2011–2017 (UCWD 2017, Figure 4.3-1). This period includes relatively wet 2011 and the 2012–2016 drought and subsequent recovery in 2017. The wetted area was mapped as extending downstream to the Freeman Diversion (red triangles on the west end of the images in Figure 4.3-1) if a diversion occurred according to the diversion rate operations log. Santa Clara River flow rates were measured at the Fillmore Fish Hatchery (eastern circle in Figure 4.3-1, downstream end of Piru Groundwater Basin) and Willard Road (the western circle in Figure 4.3-1, downstream end of Fillmore Groundwater Basin). Sespe Creek flow was measured at the USGS gage (northernmost circle in August 2011 and June 2012). Castaic Lake and Santa Felicia Dam releases were absent for six months prior to the measurements shown on Figure 3.3-1 and the flows are therefore assumed to be entirely groundwater dependent.

Figure 4.3-1 shows that the extent of surface water and the magnitude of surface flows both decreased during the drought. The total length of the wetted stream channel in the Ventura County portion of the Santa Clara River decreased from approximately 17 miles in Fall 2012 to less than 5 miles in Fall 2016 (Figure 4.3-1). Streamflow at the Fillmore Fish Hatchery declined from 25 cfs in 2011 to 6 cfs in fall 2013. Surface flows were absent near the fish hatchery from 2014 to 2016 before returning in 2017. Streamflow at the downstream end of the Fillmore Groundwater Basin declined from 42 cfs in August 2011 to 1 cfs in October 2016. Subsequent dry-season flow measurements at Willard Road in 2018 and 2019 (not shown) ranged up to 16 cfs. Lower Sespe Creek remained dry from spring 2013 through November 2017. Surface flows at both the fish hatchery and Willard Road are linked with groundwater elevation (UCWD 2017, UCWD 2021a).

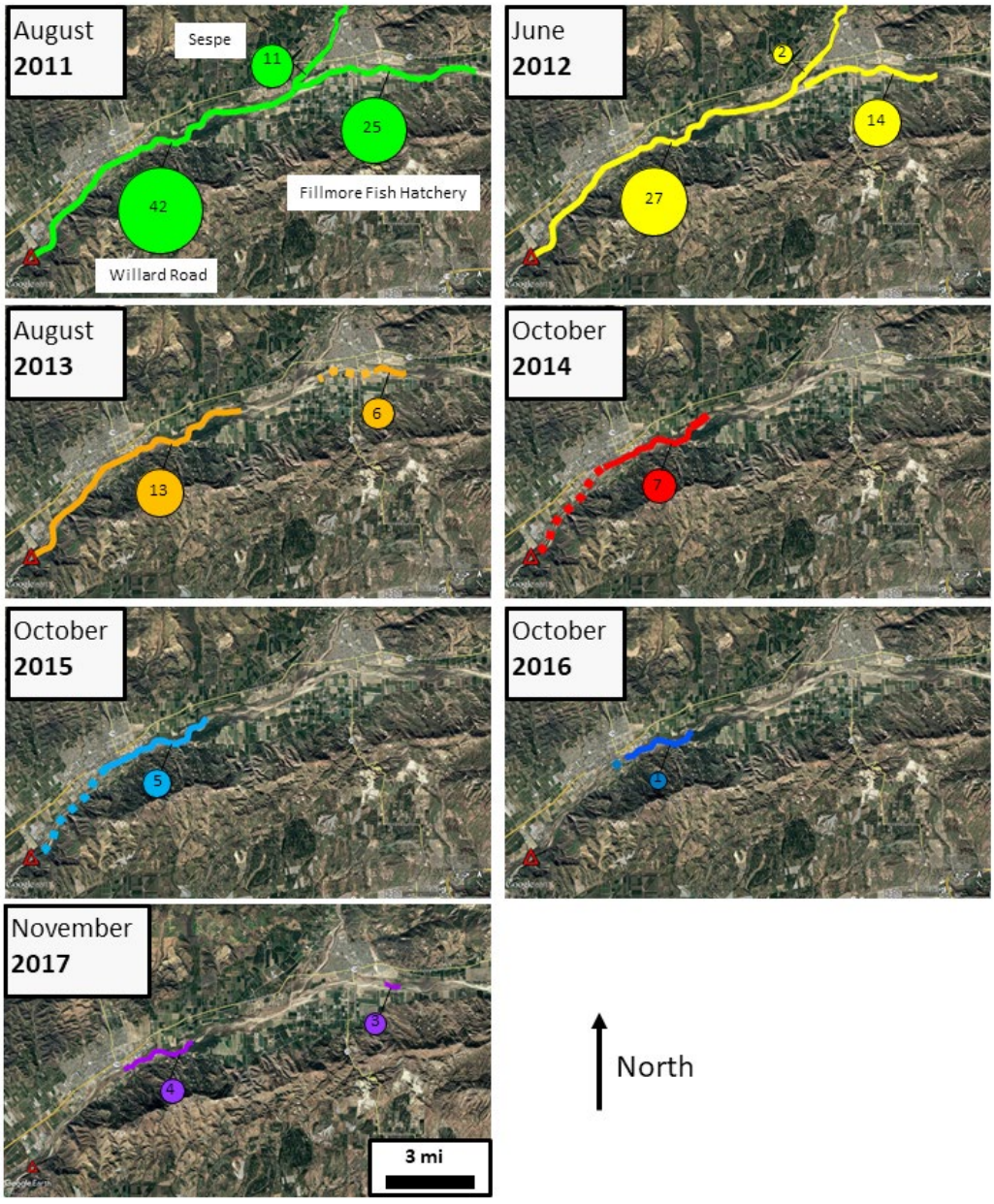


Figure 4.3-2. Dry season surface flow extent measured in the Fillmore Groundwater Basin and the downstream portion of the Piru Groundwater Basin. The solid-colored lines correspond to the extent of surface flow with the flow in cfs indicated in bubbles. The red triangle is the Freeman Diversion Dam, downstream of the Fillmore and Piru groundwater basins. Reaches where the downstream extent of surface water flow is inferred based on diversion at Freeman Dam are indicated by dotted lines. Figure from UWCD (2017).

5 GDE CONDITION

This section characterizes the potential GDE units based on their hydrologic and ecological conditions and assigns a relative ecological value to each unit by evaluating its ecological assets and its vulnerability to changes in groundwater (Rohde et al. 2018).

5.1 Ecological Conditions

GDEs include terrestrial, riparian, wetland, and aquatic habitats. There are few shallow groundwater wells (wells screened within the rooting zone of GDEs) in the Fillmore and Piru groundwater basins. In the absence of shallow wells, deeper wells, which may or may not reflect shallow groundwater conditions, coupled with observations of surface flow and ecological observations can be used to assess the extent of shallow groundwater. These data suggest that there continues to be shallow groundwater and interconnected surface water at the basin boundaries at the historical Del Valle, Cienega, and East Grove riparian woodlands (compare Figure 1.4-1 with Figure 3.1-1). The Cienega and East Grove riparian woodlands are located at sites of rising groundwater due to constrictions in the valley width. The beneficial uses of interconnected surface waters are discussed in Section 5.2.1. The role of shallow groundwater elsewhere in the basin is less certain and will be assessed based on interpolated groundwater elevation and vegetation.

The GDE determination (i.e., likely or unlikely) is shown in Figure 3.1-2.

5.1.1 Vegetation communities and GDE habitats

Piru

The Piru Groundwater Basin contains 1,617 acres of mapped GDEs, which compose 15% of the total area of the basin. The Del Valle GDE Unit contains the largest area of GDEs within the Piru Groundwater Basin along with the Santa Clara River Riparian Shrubland and Piru Creek Riparian GDE units. GDEs within the basin are predominately riparian communities. The most prevalent vegetation community across all GDE units is mulefat thickets, which makes up 41% of all mapped area of GDEs in the basin. Red willow riparian woodland and forest (*Salix laevigata* Woodland Alliance) and Fremont cottonwood woodland and forest (*Populus fremontii* Forest Alliance) are present in 16% and 14% of the GDE extent across the Piru Basin, respectively.

The Del Valle GDE Unit contains 31% (502.9 acres) of the mapped extent of GDE within the Piru Basin and is predominantly riparian habitat. Fremont cottonwood woodland and forest (127.7 acres) and red willow riparian woodland and forest (120.8 acres) are the dominant vegetation types within this unit, with mulefat thickets (90.3 acres) also present throughout (Figure 5.1-1). These dominant vegetation communities are associated with the riparian zone on the mainstem Santa Clara River The maximum rooting depth reported in the literature for the cottonwood and willows is 6.9 ft, while mulefat has maximum reported rooting depths of about 2 ft (Appendix C). The shallowest depth to groundwater at monitoring well 04N18W27B02S is just less than 30 ft, but this well is located downstream of the Del Valle GDE Unit and likely records deeper groundwater than what occurs under the GDE.

As discussed in Section 4.3.1, the Del Valle GDE Unit has perennial flow from the basin boundary downstream to Blue Cut (Las Brisas Bridge). This flow is supported by upstream releases and rising groundwater and therefore supports aquatic GDEs. Groundwater dependent special-status aquatic species discussed in Section 5.2.

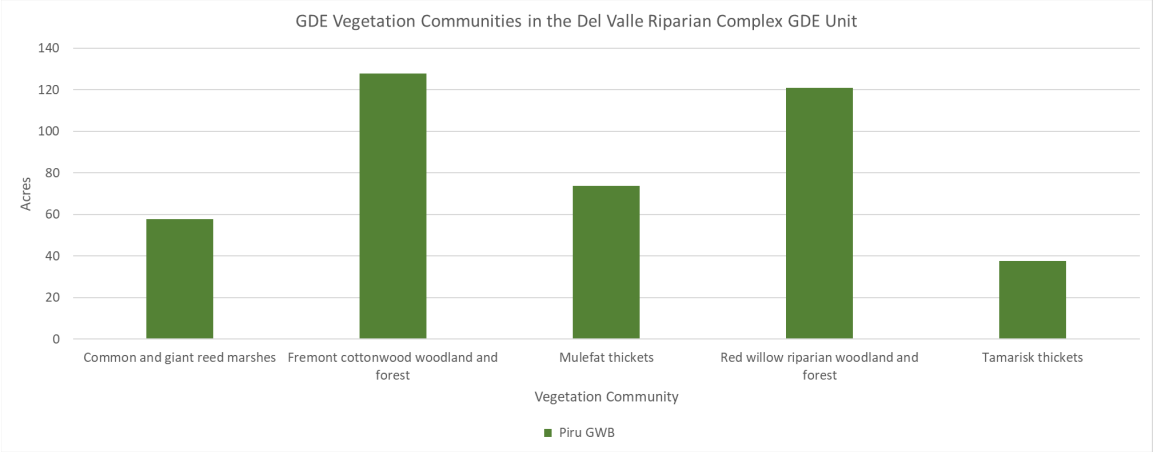


Figure 5.1-1. Five most common vegetation communities in the Del Valle GDE Unit, by acreage.

The Santa Clara River Riparian Shrubland GDE Unit represents 34% (549.2 acres) of mapped GDE extent within the Piru basin and is predominantly riparian habitat. Mulefat thickets (371.9 acres) are the dominant GDE type within this unit, with common and giant reed marshes (51.0 acres) and big sagebrush (50.4 acres) also present throughout (Figure 5.1-2). These herbaceous and shrub communities, which are associated with the riparian zone of the mainstem Santa Clara River, are more tolerant of the drier conditions in this unit.

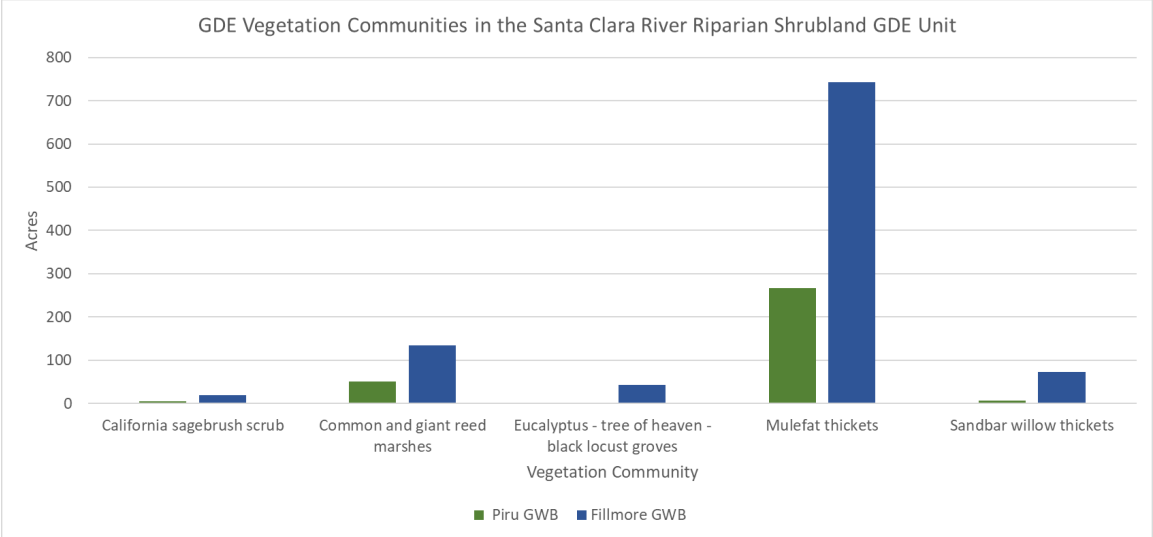


Figure 5.1-2. Five most common vegetation communities in the Santa Clara River Riparian Shrubland GDE Unit, by acreage.

During parts of wetter years, interconnected surface waters may occur in the downstream end of Santa Clara River Riparian Shrubland in both the Fillmore and Piru basins, where groundwater levels are shallower than upstream portions of the unit. The extent of interconnected surface water relative to surface water derived from upstream is not known. Because interconnected surface waters likely only cover a portion of the Santa Clara River in this unit, and are likely

short-lived, this unit may provide short-term habitat for aquatic species. Additional details for aquatic species are discussed in Section 4.2.

The Cienega GDE Unit contains 10% (159.6 acres) of the mapped GDE units within the basin and is predominantly riparian habitat. Mulefat thickets (84.7 acres) and red willow riparian woodland and forest (44.0 acres) and are the dominant GDE types within this unit (Figure 5.1-3). These dominant vegetation communities are associated with the riparian zone and the historical Cienega wetland complex on the mainstem Santa Clara River. Prior to the 2012–2016 drought, cottonwoods and willows were much more common in this unit. Similar to the East Grove GDE Unit, the maximum rooting depths range from 2 ft for mulefat to 6.9 ft for the cottonwood and willow forests.

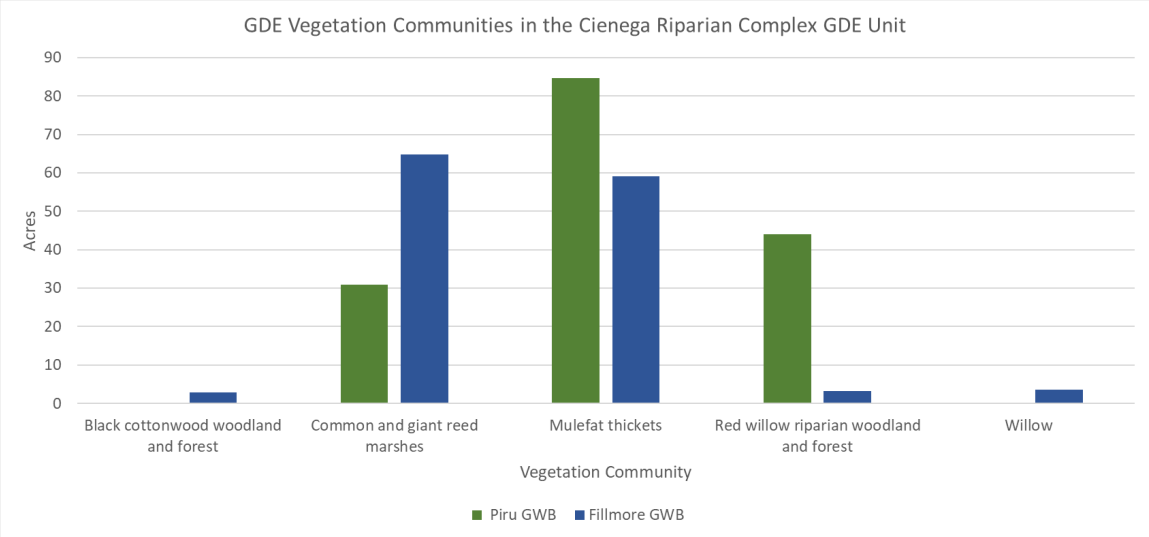


Figure 5.1-3. Five most common vegetation communities in the Cienega GDE Unit, by acreage.

The Cienega GDE unit supports interconnected surface water except for drought periods. Outside of drought periods, aquatic species use this reach of the Fillmore and Piru basins. Aquatic special-status species in the Cienega GDE unit are discussed in Section 4.2.

The Piru Creek Riparian GDE Unit contains 21% (336.5 acres) of the mapped GDE units within the basin and is predominantly riparian habitat. Mulefat thickets (118.9 acres), Fremont cottonwood woodland and forest (92.8 acres), and red willow riparian woodland and forest (81.8 acres) are the dominant GDE types within this unit (Figure 5.1-4). These dominant vegetation communities are associated with the riparian zone of Piru Creek, which is a tributary to the Santa Clara River. Similar to the East Grove Riparian Complex, the maximum rooting depths range from 2 ft for mulefat to 6.9 ft for the cottonwood and willow forests. Perennial flow in Piru Creek may sustain some of the plants.

Piru Creek is typically a losing reach downstream of Santa Felicia Dam. The presence and extent of interconnected surface water in Piru Creek is not known. Aquatic special-status species in the Piru Creek Riparian GDE unit are discussed in Section 4.2.

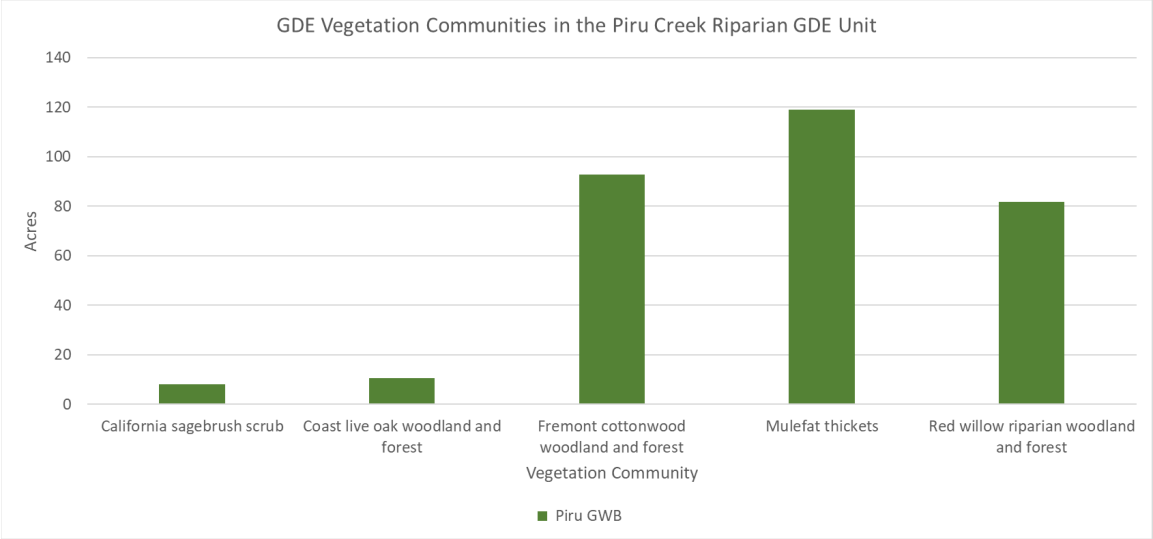


Figure 5.1-4. Five most common vegetation communities in the Piru Creek GDE Unit, by acreage.

The Tributary Riparian GDE Unit contains 4% (68.9 acres) of the mapped GDE units within the basin and is predominantly composed of Riparian Mixed Shrub Alliance (26.0 acres) and Baccharis (Riparian) Alliance (18.5 acres) (Figure 5.1-5). These vegetation communities are associated with drainages to Piru Creek and the Santa Clara River, including Holser and Hopper canyons. Vegetation along Holser Canyon is primarily comprised of Riparian Mixed Shrub Alliance, while the vegetation along Hopper Canyon is a mixture of Riparian Mixed Shrub Alliance and Riparian Mixed Hardwood. Maximum rooting depths for these vegetation types are not well documented but likely range from 2.0 ft for *Baccharis* species (i.e., Riparian Mixed Scrub Alliance) to 6.9 ft or deeper for the cottonwood and willow species present in Riparian Mixed Hardwood Alliance. This GDE unit contains no shallow groundwater data to assess groundwater linkages, but the vegetation is likely not tied to the aquifer.

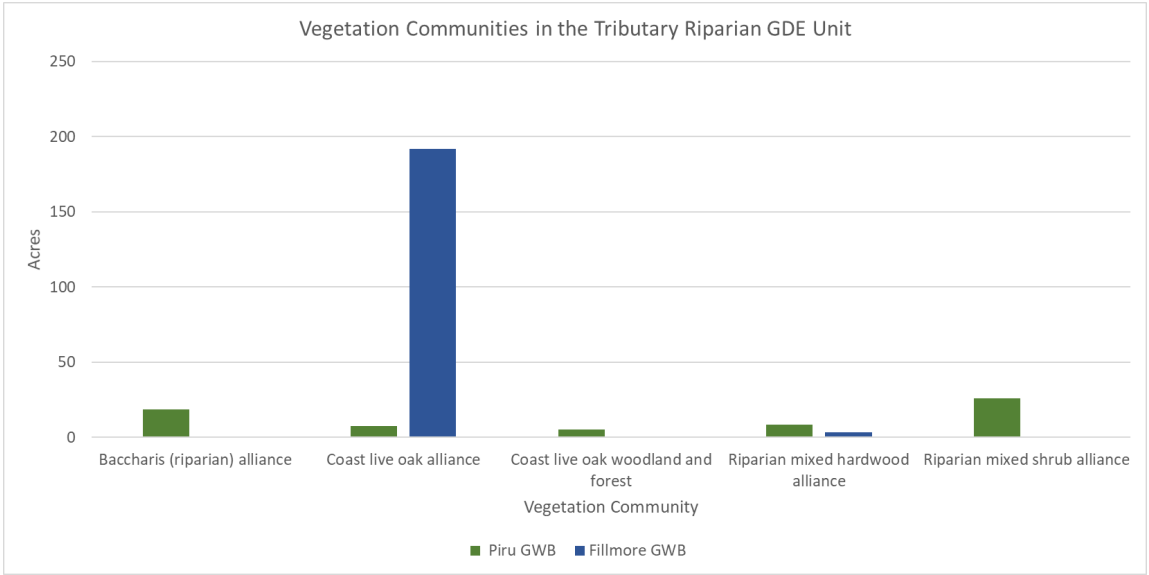


Figure 5.1-5. Five most common vegetation communities in the Tributary Riparian GDE Unit, by acreage.

Most of the streams within the Tributary Riparian unit are ephemeral or intermittent. Hopper Canyon Creek is intermittent at its downstream end, but the degree to which it is connected to groundwater in the upstream reaches within the Piru Basin is unknown. Pole Creek may sustain perennial flows in its uppermost reaches within the Fillmore Basin, but it is intermittent downstream and disconnected from groundwater. The degree to which either of these tributaries were historically connected to groundwater within the basin is unknown.

Fillmore

The Fillmore Groundwater Basin contains 2,597 acres of mapped GDEs, comprising 11% of the total area of the basin. The East Grove and Santa Clara River Riparian Shrubland GDE are the largest units within the Fillmore Groundwater Basin, and vegetation types within the basin are predominately riparian communities. The most prevalent vegetation community across all GDE units is mulefat thickets (*Baccharis salicifolia* Shrubland Alliance), which makes up 47% of the mapped extent of GDEs in the basin. Red willow riparian woodland and forest (*Salix laevigata* Woodland Alliance) and black cottonwood woodland and forest (*Populus trichocarpa* Forest Alliance) are present in 13% and 12% of the GDE, respectively.

The East Grove GDE Unit contains 42% (1,101.0 acres) of mapped GDE units within the basin and is predominantly riparian habitat. Mulefat thickets (357.5 acres), red willow riparian woodland and forest (317.0 acres), and black cottonwood woodland and forest (317.0 acres) are the dominant GDE types within this unit (Figure 5.1-6). These dominant vegetation communities are associated with the riparian zone and the historical East Grove wetland complex on the mainstem Santa Clara River. Similar to the Del Valle GDE Unit, the maximum rooting depths range from 2 ft for mulefat to 6.9 ft for the cottonwood and willow forests. The groundwater elevation in the East Grove GDE Unit is within the rooting depth of the vegetation types that make up the GDE unit during most years.

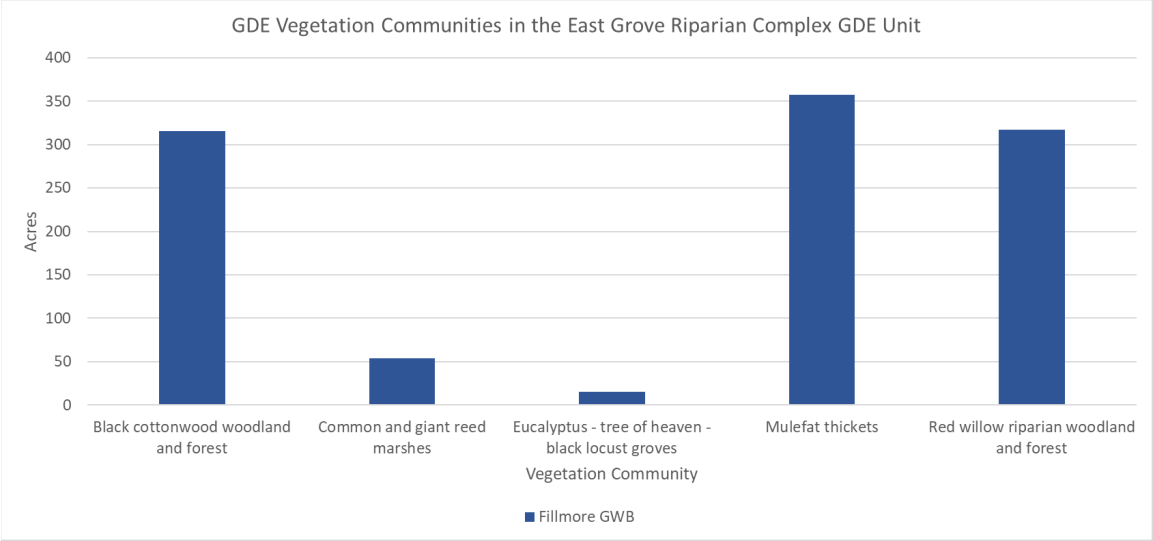


Figure 5.1-6. Five most common vegetation communities in the East Grove GDE Unit, by acreage.

Due to rising groundwater, the East Grove GDE unit supports interconnected surface water. As shown in Section 3.3, the discharge and extent of interconnected surface water decreased during

the drought from 2012–2016 in this unit. Because rising groundwater allowed surface discharge to persist over at least part of this reach during the drought, this GDE likely acted as a refuge for aquatic species during this period. Aquatic special-status species in the East Grove GDE unit are discussed in Section 4.2.

The Santa Clara River Riparian Shrubland GDE Unit contains 41% (1,073 acres) of mapped GDE units within the basin and is also predominantly riparian habitat. Mulefat thickets (783.7 acres) and the common and giant reed marshes association (*Phragmites australis - Arundo donax* Herbaceous Semi-Natural Alliance; 135.2 acres) are the dominant GDE types within this unit (Figure 5.1-2). These herbaceous and shrub communities, which are associated with the riparian zone of the mainstem Santa Clara River, are more tolerant of the drier conditions in this unit. Mulefat has maximum reported rooting depths of about 2 ft and Arundo (*Arundo donax*), the dominant plant species of the common and giant reed marshes Herbaceous Semi Natural Alliance, has rooting depths up to 16 ft (Appendix C). Comparing the rooting depths to the range of groundwater depths in Figure 3.2-2 shows that groundwater elevations are often within the maximum root depth of arundo and may be within the rooting depth of mulefat at lower relative elevations during particularly wet years, although such years were not common.

The Cienega GDE Unit contains 5% (133.6 acres) of the mapped GDE units within the basin and is predominantly riparian habitat. Common and giant reed marshes (64.8 acres) and mulefat thickets (59.0 acres) are the dominant GDE types within this unit (Figure 5.1-3). These dominant vegetation communities are associated with the riparian zone and the historical Cienega wetland complex on the mainstem Santa Clara River. The rooting depth ranges from 2 ft for mulefat to 16 ft for arundo (Appendix C). Mulefat thickets typically occur at higher relative elevation in the Santa Clara River despite their shallow rooting depth, suggesting that they are often disconnected from groundwater. Prior to the 2012–2016 drought, Fremont cottonwoods and willows (both with maximum rooting depths of 6.9 ft) were common. Kibler et al. (2019) have shown that much of the cottonwood and willow species died out during the drought where the drop in groundwater was 16.4 ft or greater. The mean relative elevation of willows in the Santa Clara River ranges from 4.8 to 12.4 ft, while Fremont cottonwoods have a mean relative elevation of 9.7 ft (Appendix C, Table C–2). Common and giant reed (*Arundo*) have a maximum reported rooting depth of 16 ft and occur at a mean relative elevation of 7.6 ft (Appendix C).

The Tributary Riparian GDE Unit contains 8% (195.1 acres) of the mapped GDE units within the basin and is predominantly composed of Coast Live Oak Alliance (191.9 acres), with Riparian Mixed Hardwood Alliance also present (3.2 acres) (Figure 5.1-5). These vegetation communities are associated with drainages from the mountain range to the north of the basin (i.e., Santa Paula Ridge and San Cayetano Mountain). Coast Live Oak has a rooting depth up to 35.1 ft, while the Riparian Mixed Hardwood Alliance has rooting depths up to 6.9 ft (Appendix C). Neither the groundwater depth nor the source of water for vegetation in this GDE is known. The tributaries are not perennial, which suggests that a combination of surface water and groundwater may support the riparian hardwood. The Coast Live Oak Alliance may tap other water sources.

The Sespe Creek Riparian GDE Unit contains 4% (94.1 acres) of the mapped GDE units within the basin and is predominantly riparian habitat. Willow (shrub) Alliance (19.6 acres) and Riparian Mixed Hardwood Alliance (19.2 acres) are the dominant GDE types within this unit (Figure 5.1-7). These dominant vegetation communities are associated with the riparian zone of Sespe Creek, which is a tributary to the Santa Clara River. Maximum rooting depths for both willows and cottonwoods in the literature is 6.9 ft (Appendix C, Table C–2). The mean relative elevation of willows ranges from 4.8 to 12.4 ft in the Santa Clara River, while Fremont

cottonwoods have a mean relative elevation of 9.7 ft (Appendix C, Table C–2). Data on the depth to groundwater are sparse but can exceed 30 ft in places.

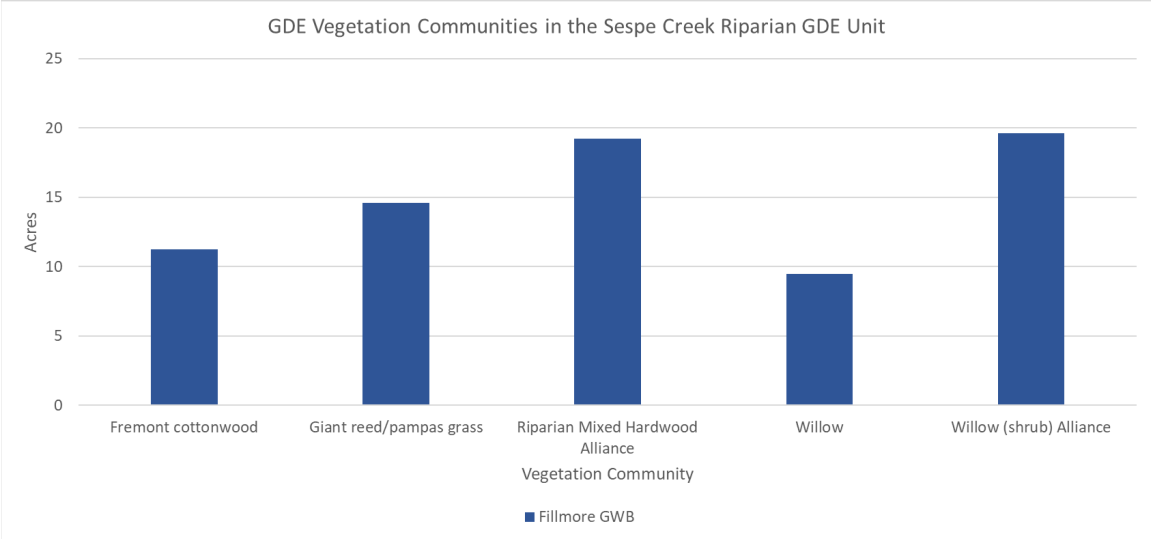


Figure 5.1-7. Five most common vegetation communities in the Sespe Creek Riparian GDE Unit, by acreage.

As discussed above, Sespe Creek is a losing reach in its downstream section and has perennial flow in its upstream section. The degree of interconnected surface water is not known in this reach. Aquatic special-status species in this unit are discussed in Section 5.2.

5.2 Beneficial Uses and Groundwater Dependent Special-status Species

5.2.1 Beneficial uses

The Water Quality Control Plan (Basin Plan) for the Los Angeles Region (LARWQCB 2014) identifies the surface waters in the GDE units as having a variety of beneficial uses pertaining to fish, wildlife, and GDEs. These beneficial uses apply to aquatic features that are fed by groundwater within the Fillmore and Piru groundwater basins. The beneficial uses for aquatic features and groundwater vary between aquatic features and include:

- Groundwater recharge (GWR);
- Freshwater replenishment (FRSH);
- Warm freshwater habitat (WARM);
- Cold freshwater habitat (COLD);
- Wildlife habitat (WILD);
- Preservation of biological habitats of special significance (BIOL);
- Support of habitat for rare, threatened, or endangered species (RARE);
- Warm and cold migration habitat (MIGR);
- Warmwater spawning habitat (SPWN); and
- Wetland habitat (WET).
- Aquaculture (AQUA).

Beneficial uses include those that directly benefit groundwater conditions (e.g., groundwater recharge [GWR]), those supported directly by groundwater via interconnected surface waters (e.g., freshwater replenishment [FRSH]; support of rare, threatened, or endangered species [e.g., Southern California steelhead, California condor] [RARE]), and those that apply to groundwater beneficial uses (i.e., aquaculture [AQUA]).

5.2.2 Special-status species

The Fillmore and Piru groundwater basins are ecologically important and provide habitat for numerous wildlife species that are groundwater dependent. Within the two groundwater basins, five plants, 11 natural communities, 10 wildlife, and four fish species were identified as indirectly or directly groundwater dependent and may occur within the Fillmore and Piru groundwater basins. Appendix B provides information for special-status terrestrial and aquatic wildlife species from the database queries that are not groundwater dependent and/or unlikely to occur in the GDE units, including each species' regulatory status, habitat associations, and documented occurrences in the groundwater basins.

The Fillmore and Piru groundwater basins include designated critical habitat for four federally listed species: California condor (*Gymnogyps californianus*), least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), and southern California steelhead (*Oncorhynchus mykiss irideus*) (USFWS 1976, USFWS 1977, USFWS 1994, USFWS 2013, NMFS 2005). The amount of critical habitat for each species within the Fillmore and Piru groundwater basins is shown in Table 5.2-1 and locations are shown in Figure 5.2-1. Critical habitat for the California condor occupies a 2-acre patch on the upland edge of the Fillmore Basin and is not associated with any GDEs.

Table 5.2-1. U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) designated critical habitat[1] within the Fillmore and Piru groundwater basins.

Common name *Scientific name*	USFWS critical habitat (acres)			NMFS critical habitat (miles)		
	Fillmore	**Piru**	**Total**	**Fillmore**	**Piru**	**Total**
California condor *Gymnogyps californianus*	2	-	2	-	-	-
Least Bell's vireo *Vireo bellii pusillus*	-	1,443	1,443	-	-	-
Southwestern willow flycatcher *Empidonax traillii extimus*	2,472	2,612	5,083	-	-	-
Southern California steelhead *Oncorhynchus mykiss*	-	-	-	15.4	15.3	30.7
All species	**2,474**	**4,055**	**6,528**	**15.4**	**15.3**	**30.7**

[1] Data sources: USFWS 1976, USFWS 1977, USFWS 1994, USFWS 2013, NMFS 2005

Habitat management and special-status species recovery plans have been implemented in the Fillmore and Piru groundwater basins and include protections for special-status species and associated habitats. These plans include *United Water Conservation District Multiple Species Habitat Conservation Plan* (UWCD 2018), *Southern California Gas Company Multi-Species Habitat Conservation Plan* (SoCalGas 2020), *Santa Clara River Upper Watershed Conservation Plan* (TNC 2006), *Conservation Plan for the Lower Santa Clara River Watersheds and Surrounding Areas* (TNC 2008), and *Santa Clara River Enhancement and Management Plan* (VCWPD and LADPW 2005).

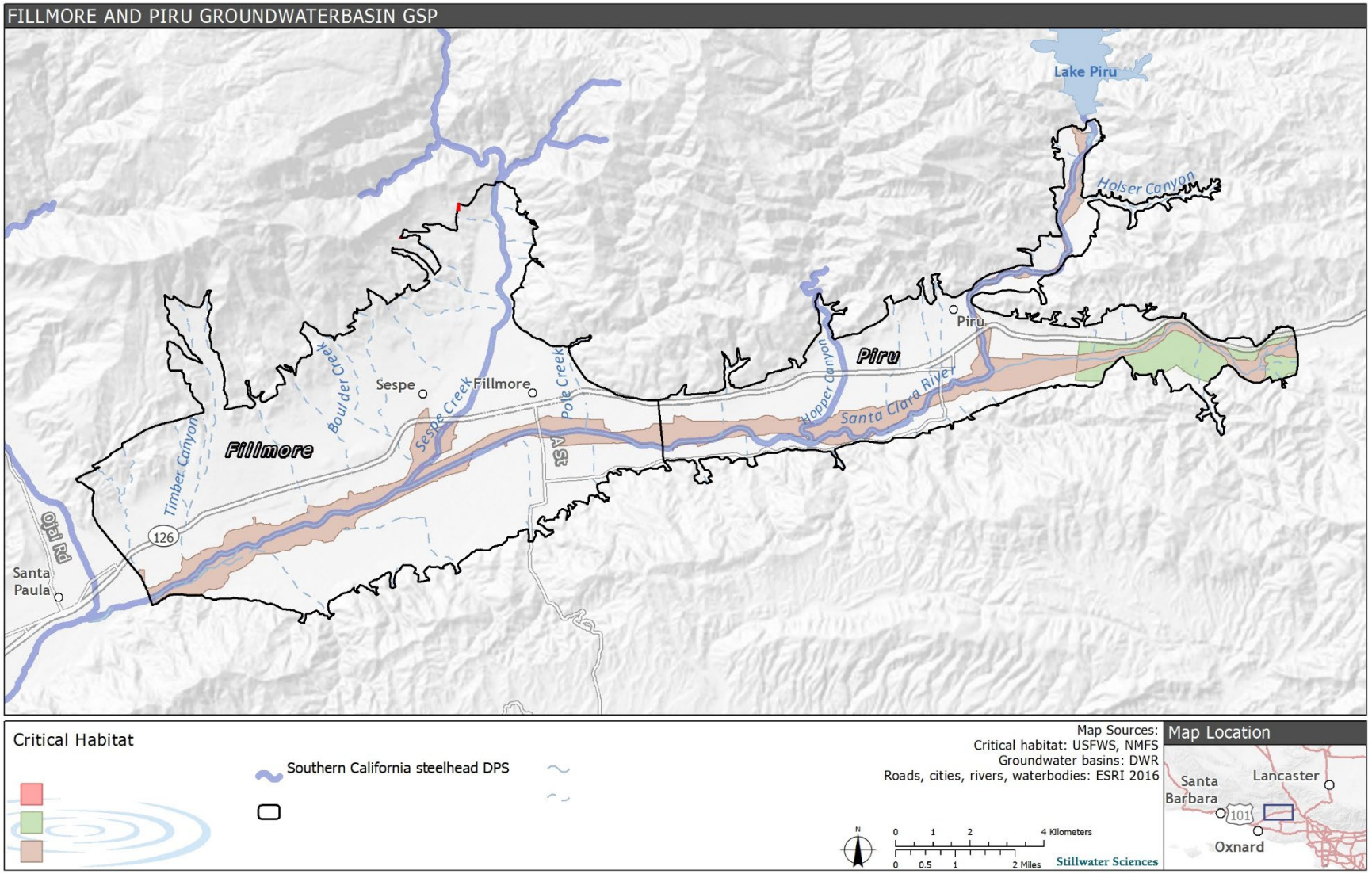


Figure 5.2-1. Critical habitat within the Fillmore and Piru groundwater basins.

Piru

Plants and natural communities

Four potentially groundwater dependent special-status plant species were documented in the Piru Groundwater Basin (Table 5.2-2). One species, white rabbit-tobacco, was identified as likely to depend on groundwater and has been observed in the open rock and sand wash bed of the Santa Clara River within the Del Valle and Cienega GDE units. Three species were identified as possibly dependent on groundwater and are predominantly associated with the Tributary Riparian GDE Unit. Slender mariposa lily (*Calochortus clavatus* var. g*racilis*) and Greata's aster are both associated with Foothill Canyon habitats, and San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*), which has been observed directly upstream of the Piru Groundwater Basin, is associated with coastal sage scrub habitat.

Ten potentially groundwater dependent sensitive natural communities were documented with the potential to occur in the Piru Groundwater Basin (Table 5.2-2). Seven of these communities are identified as likely to depend on groundwater; these GDEs are predominantly riparian habitats (e.g., southern cottonwood willow riparian forest, southern willow scrub, and California sycamore woodlands [*Platanus racemosa – Quercus agrifolia* Woodland Alliance]) and occur throughout the basin in all of the GDE units present within the Piru Groundwater Basin (i.e., Del Valle, Santa Clara River Riparian Shrubland, Cienega, Piru Creek Riparian, and Tributary Riparian). Additional potentially groundwater dependent sensitive natural communities include arrow weed thickets [*Pluchea sericea* Shrubland Alliance], which is a shrubland community associated with intermittent or seasonally flooded washes and is documented in the Del Valle GDE Unit.

Table 5.2-2. Special-status plant species and sensitive natural communities with known occurrence within the Piru Groundwater Basin.

Common name *Scientific name*	Status[1]	Association with GDE	Occurrence location	Source[2]	Habitat and occurrence
Plants					
Slender mariposa lily *Calochortus clavatus* var. *gracilis*	1B.2, S2S3, G4T2T3, not state or federally listed	Possible	Del Valle, Piru Creek Riparian, Tributary Riparian	CNDDB	Shaded foothill canyons, chaparral; eight regional CNDDB observations, primarily in sagebrush on north-facing slopes and ridges of Newhall Ranch area.
San Fernando Valley spineflower *Chorizanthe parryi* var. *fernandina*	1B.1, S1, G2T1, SE, FPT	Possible	Tributary Riparian	CNDDB	Sandy coastal scrub, valley and foothill grassland; single CNDDB record from 2011 in Potrero Canyon near its confluence with the Santa Clara River.
Payne's bush lupine *Lupinus paynei*	1B.1, S1, G1Q, not state or federally listed	Unlikely	Piru Creek Riparian	CNDDB	Coastal and riparian scrub, valley and foothill grassland, generally on sandy soils; single CNDDB record from 2008 in Rancho Temescal.
Ojai navarretia *Navarretia ojaiensis*	1B.1, S2, G2, not state or federally listed	Unlikely	Del Valle, Tributary Riparian	CNDDB	Openings in chaparral or coastal scrub, valley and foothill grassland, generally on clay soils; four CNDDB records on clay soil in grasslands of Ventura Homestead and Newhall Ranch areas.
White rabbit-tobacco *Pseudognaphalium leucocephalum*	2B.2, S2, G4, not state or federally listed	Likely	Cienega, Del Valle	CNDDB	Sandy or gravelly benches, dry stream or canyon bottoms; CNDDB records in sandy, rocky washes.
Greata's aster *Symphyotrichum greatae*	1B.3, S2, G2, not state or federally listed	Possible	Tributary Riparian	CNDDB	Mesic areas in broadleafed upland forest, chaparral, cismontane and riparian woodland; CNDDB records in Hopper and Pine canyons.

Common name ***Scientific name***	**Status**[1]	**Association with GDE**	**Occurrence location**	**Source**[2]	**Habitat and occurrence**
Sensitive Natural Communities					
Arrow weed thickets *Pluchea sericea* shrubland alliance	S3, G4	Likely	Del Valle	VMSCR	Around springs, seeps, irrigation ditches, canyon bottoms, stream borders, and seasonally flooded washes; occur in the Central Valley and desert areas of southern California.
California sycamore woodlands *Platanus racemosa – Quercus agrifolia* woodland alliance	S3, G3	Likely	Piru Creek Riparian	VMSCR	Riparian woodlands along intermittent streams, springs, seeps, riverbanks, and floodplain terraces; occur in scattered stands along California's central and southern Coast Ranges, the Sierra Nevada foothills, the Peninsular and Transverse ranges, and the western Mojave and Colorado deserts.
California walnut groves *Juglans californica* forest and woodland alliance	S3, G3	Unlikely	Piru Creek Riparian, Tributary Riparian	CalVeg, CNDDB, VMSCR	Riparian corridors, but most stands cover all hillslopes; occur along southern California coast and in Peninsular and Transverse ranges.
Fremont cottonwood forest and woodland *Populus fremontii – Fraxinus velutina – Salix gooddingii* forest and woodland alliance	S3, G4	Likely	Del Valle, Piru Creek Riparian, Santa Clara River Riparian Shrubland	CalVeg, VMSCR	On floodplains, along low-gradient rivers and streams, and in alluvial fans and valleys with a dependable subsurface water supply; occur throughout much of California except the Sierra Nevada and Modoc Plateau.
Scale broom scrub *Lepidospartum squamatum* shrubland alliance	S3, G3	Unlikely	Piru Creek Riparian, Santa Clara River Riparian Shrubland	CalVeg, VMSCR	Intermittently or rarely flooded, low-gradient alluvial deposits along streams, washes, and fans; occur in southern California in the inner central Coast Ranges, Transverse and Peninsular ranges, and the Mojave Desert.
Southern cottonwood willow riparian forest	S3.2, G3	Likely	Piru Creek Riparian	CNDDB	Frequently flooded lands along rivers and streams; occur in the Transverse and Peninsular ranges from Santa Barbara County south and east to the edge of the deserts.
Southern mixed riparian forest	S2.1, G2	Likely	Tributary Riparian	CNDDB	Frequently flooded lands along rivers and streams; sand and gravel bars close to river channels; occur along and at the mouths of perennial and intermittent streams of the southern Coast Ranges.
Southern riparian scrub	S3.2, G3	Likely	Santa Clara River Riparian Shrubland	CNDDB	Sand and gravel bars close to river channels; occur along and at the mouths of perennial and intermittent streams of the southern Coast Ranges.

Common name ***Scientific name***	**Status**[1]	**Association with GDE**	**Occurrence location**	**Source**[2]	**Habitat and occurrence**
Southern willow scrub	S2.1, G3	Likely	Del Valle, Piru Creek Riparian, Santa Clara River Riparian Shrubland	CNDDB	Generally on alluvium deposited near stream channels during floods; occur along major rivers of coastal southern California.
Valley oak riparian	S2.1, G3	Unlikely	Tributary Riparian	CNDDB	Valley bottoms and gentle slopes that are intermittently flooded; occur in the Coast Ranges, Central Valley, and foothills of the Sierra Nevada, Cascade, and Klamath ranges.

[1] Status codes:

G = Global
T = Subspecies or variety

Federal
FT = Listed as threatened under the federal Endangered Species Act
FPT = Proposed as threatened under the federal Endangered Species Act
FD = Federally delisted

State
S = Sensitive
SE = Listed as Endangered under the California Endangered Species Act
ST = Listed as Threatened under the California Endangered Species Act
SSC = CDFW species of special concern
SFP = CDFW fully protected species

Rank
1 Critically Imperiled—At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
2 Imperiled—At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
3 Vulnerable—At moderate risk of extinction or elimination due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
4 Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
5 Demonstrably Secure—Common; widespread and abundant.
Q Taxonomic questions associated with this name
Ranks such as S2S3 indicate a ranking between S2 and S3

California Rare Plant Rank (CRPR)
1B Plants rare, threatened, or endangered in California and elsewhere
2B Plants rare, threatened, or endangered in California, but more common elsewhere
4 More information needed about this plant, a review list
4 Plants of limited distribution, a watch list

CRPR Threat Ranks:
0.1 Seriously threatened in California (high degree/immediacy of threat)
0.2 Fairly threatened in California (moderate degree/immediacy of threat)
0.3 Not very threatened in California (low degree/immediacy of threats or no current threats known)

[2] Sources: CNDDB (CDFW 2019), CalVeg (USDA 2014), VMSCR (Vegetation Map of the Santa Clara River; Stillwater Sciences 2019).

Terrestrial and aquatic wildlife

Ten potentially groundwater dependent special-status terrestrial and aquatic wildlife species were identified as having the potential to occur within the Piru Groundwater Basin: one amphibian species, six bird species, and two reptile species (Table 5.2-3). Additional information on these species, including regulatory status, habitat associations, and documented occurrences in the groundwater basin, is provided in Table 5.2-3.

Southwestern pond turtle (*Actinemys pallida*) and two-striped gartersnake (*Thamnophis hammondii*) the only wildlife species likely present (i.e., documented occurrences) in the Piru Groundwater Basin classified as directly groundwater dependent due to their association with riverine and lentic habitats. Southwestern pond turtles likely use habitat within the Del Valle, Cienega, and Piru Creek GDE units for foraging (e.g., open water), nesting (e.g., grasses and forbs alliance), and/or overwintering (e.g., mixed riparian and willow scrub and cottonwood or willow alliance). Two-striped gartersnake likely use freshwater (e.g., perennial riverine) and riparian (e.g., riparian mixed hardwood and/or shrub) habitats within the Del Valle, Cienega, and Piru Creek Riparian GDE units for capturing prey. One special-status species, arroyo toad (*Anaxyrus californicus*), was not documented in the Piru Groundwater Basin but is an included species that could possibly occur along the Santa Clara River and within the Del Valle, Cienega, and Piru Creek Riparian GDE units (VCWPD and LADPW 2005, Stillwater Sciences 2007c).

Indirectly groundwater dependent bird species use riparian habitat (e.g., willow/willow shrub, cottonwood, mixed riparian alliances) within the Del Valle GDE Unit, Santa Clara River Riparian Shrubland, Cienega GDE Unit, and Piru Creek Riparian GDE units for foraging, nesting, and migratory habitat. These GDE units include designated critical habitat for southwestern willow flycatcher (Del Valle [433 acres], Santa Clara River Riparian Shrubland [316 acres], Cienega [154 acres], and Piru Creek Riparian [246 acres]), and least Bell's vireo (Del Valle [436 acres] and Tributary Riparian [6 acres]). In general, least Bell's vireo requires smaller vegetation patches than southwestern willow flycatcher and western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) (see Table 5.2-3).

Table 5.2-3. Groundwater dependent special-status terrestrial and aquatic wildlife species with known occurrence or suitable habit in the Piru Groundwater Basin.

Common name *Scientific name*	Status[1] Federal/State	Potential to occur in Piru Groundwater Basin[2]	Documented occurrences in GDE units	Query source[3]	GDE association[4]	Habitat and documented occurrences in Piru Groundwater Basin
Amphibian						
Arroyo toad *Anaxyrus californicus*	FE/SSC	Possible (suitable habitat)	No documented occurrences	CAFSD	Direct	Washes, arroyos, sandy riverbanks, riparian areas with willows, sycamores, oaks, cottonwoods; needs exposed sandy streamsides with stable terraces for burrowing, with scattered vegetation for shelter, and areas of quiet water or pools free of predatory fishes with sandy or gravel bottoms without silt for breeding. Arroyo toads depend on groundwater for breeding in shallow still pools and riparian vegetation that provides foraging habitat (Rohde et al. 2019). Historically found in the upper and lower Santa Clara River basin and currently persists in Middle/Upper Piru Creek upstream of Lake Piru (Santa Clara River Trustee Council 2008). A habitat assessment conducted by Stillwater Sciences (2007c) estimated that there were 893 acres of potential habitat along Piru Creek below Santa Felicia Dam and the Santa Clara River upstream of the confluence with Piru Creek.
Reptile						
Two-striped gartersnake *Thamnophis hammondii*	BLMS, FSS/SSC	Likely	Cienega, Del Valle, Piru Creek Riparian	CNDDB, CAFSD	Direct	Highly aquatic snake species. Found in or near permanent fresh water, often along streams with rocky beds and riparian vegetation. Prey includes fish, fish eggs, tadpoles, newt larvae, small frogs and toads, leeches, and earthworms. Commonly found in the Santa Clara River watershed (UWCD 2018). Occurrences on Santa Clara River between Salt Creek and Summer Four Crossing in 2000; in spillway ponds downstream of Lake Piru in 2016, along Piru Creek near Piru Canyon Road in 2009 (CDFW 2019).

Common name ***Scientific name***	**Status[1] Federal/State**	**Potential to occur in Piru Groundwater Basin[2]**	**Documented occurrences in GDE units**	**Query source[3]**	**GDE association[4]**	**Habitat and documented occurrences in Piru Groundwater Basin**
Southwestern pond turtle *Actinemys pallida*[5]	BLMS, FSS/SSC	Likely	Cienega, Del Valle, Piru Creek Riparian	CNDDB, CAFSD	Direct	Ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches with basking sites. Feeds on aquatic plants, invertebrates, worms, frog and salamander eggs and larvae, crayfish, and occasionally frogs and fish. Relies on surface water that may be supported by groundwater (Rhode et al. 2019). Documented throughout the Santa Clara River and in parts of the Piru Creek watersheds. Occurrences include Santa Clara River upstream of Piru in 2000, spillway ponds and downstream of Lake Piru in 2016 (CDFW 2019).
Bird						
Least Bell's vireo *Vireo bellii pusillus*	FE/SE	Likely	Cienega, Del Valle, East Grove, Piru Creek Riparian, Sespe Creek Riparian	CNDDB, CAFSD	Indirect	Nests in dense vegetative cover of riparian areas; often nests in willow or mulefat; forages in dense, stratified canopy. This species relies on groundwater dependent vegetation in riparian areas, particularly during breeding periods (Rohde et al. 2019). Eats insects, fruits, and berries. Documented throughout the Santa Clara River and Piru Creek in the Piru Groundwater Basin (CDFW 2019, eBird 2021, WFVZ 2020c). Documented breeding occurs on the TNC Sespe Cienega property (WFVZ 2020c, eBird 2021). Critical habitat located along the Santa Clara River in the Del Valle Riparian Complex GDE Unit (USFWS 1994).

Common name ***Scientific name***	**Status[1] Federal/State**	**Potential to occur in Piru Groundwater Basin[2]**	**Documented occurrences in GDE units**	**Query source[3]**	**GDE association[4]**	**Habitat and documented occurrences in Piru Groundwater Basin**
Southwestern willow flycatcher *Empidonax traillii extimus*	FE/SE	Likely	Del Valle	CNDDB, CAFSD	Indirect	Dense brushy thickets within riparian woodland often dominated by willows and/or alder, near permanent standing water. Reliant on groundwater dependent riparian vegetation, including for nest sites that are typically located near slow-moving streams, or side channels and marshes with standing water and/or wet soils (Rohde et al. 2019). Feeds on insects, fruits, and berries. Occurrences throughout the Santa Clara River (CDFW 2019, eBird 2021). Critical habitat located along the Santa Clara River in the Del Valle Riparian Complex and Piru Creek GDE units between the confluence with Santa Clara River and Lake Piru (USFWS 2013).
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	BLMS, FSS, FT/SE	Likely	Del Valle	CNDDB	Indirect	Summer resident of valley foothill and desert riparian habitats; nests in open woodland with clearings and low, dense, scrubby vegetation. Reliant on groundwater dependent riparian vegetation for habitat (Rhode et al. 2019). Historical populations documented along the Santa Clara River 3.5 miles east of Piru in 1979 are possibly extirpated (CDFW 2019).
White-tailed kite *Elanus leucurus*	BLMS/SFP	Likely	Cienega, Del Valle, Piru Creek Riparian, Santa Clara River Riparian Shrubland	CNDDB	Indirect	Lowland grasslands and wetlands with open areas; nests in trees near open foraging area. Predominately preys on small mammals, but its diet also includes birds, and lizards. Occurrences along Santa Clara River and Piru Creek (CDFW 2019, eBird 2021, WFVZ 2020c).

Common name ***Scientific name***	**Status[1] Federal/State**	**Potential to occur in Piru Groundwater Basin[2]**	**Documented occurrences in GDE units**	**Query source[3]**	**GDE association[4]**	**Habitat and documented occurrences in Piru Groundwater Basin**
Yellow warbler *Setophaga petechia*	–/SSC	Likely	Cienega, Del Valle, Piru Creek Riparian, Santa Clara River Riparian Shrubland	CNDDB	Indirect	Open canopy, deciduous riparian woodland close to water, along streams or wet meadows. Reliant on groundwater dependent riparian vegetation for breeding habitat (e.g., willows, alders, and cottonwoods). Typically eats insects. Occurrences along Santa Clara River and Piru Creek (CDFW 2019, eBird 2021, WFVZ 2020c).
Yellow-breasted chat *Icteria virens*	–/SSC	Likely	Cienega, Del Valle, Piru Creek Riparian	CNDDB, CAFSD	Indirect	Early successional riparian habitats with a dense shrub layer and an open canopy. Occurrences along Santa Clara River (CNDDB 2019, eBird 2021, WFVZ 2020c). Occurrences along Santa Clara River and Piru Creek (CDFW 2019, eBird 2021).

[1] Status codes:

Federal
FE = Listed as endangered under the federal Endangered Species Act
FT = Listed as threatened under the federal Endangered Species Act
FSS = Forest Service Sensitive Species
BLMS = Bureau of Land Management Sensitive Species

StateSE = Listed as Endangered under the California Endangered Species Act
SSC = CDFW species of special concern
SFP = CDFW fully protected species

[2] Potential to Occur:
Likely: the species *has* documented occurrences and the habitat is high quality or quantity
Possible: no documented occurrences and the species' required habitat is moderate to high quality or quantity
Unlikely: no documented occurrences and the species' required habitat is of low to moderate quality or quantity
None: no potential to occur due to lack of habitat and/or the population is assumed extirpated

[3] Query source:
CAFSD: California Freshwater Species Database (TNC 2020)
CNDDB: California Natural Diversity Database (CDFW 2019)
eBird: (eBird 2021)

[4] Groundwater Dependent Ecosystem (GDE) association:
Direct: Species directly dependent on groundwater for some or all water needs
Indirect: Species dependent upon other species that rely on groundwater for some or all water needs

[5] Formerly *Emys marmorata marmorata*

Fish

The Santa Clara River in the Piru Groundwater Basin likely supports limited native fish populations because of the presence of sub-optimal water quality conditions (e.g., high temperature, low summer flows, low dissolved oxygen), poor habitat quality (e.g., low amounts of cover that provides refuge from predators and high flows), insufficient surface water connectivity (e.g., the watershed is 'flashy' during and following storm events (NMFS 2012) and this reach loses surface flow quickly following storms or drought conditions), and the presence of non-native fish (Stoecker and Kelley 2005), although there is limited peer-reviewed literature regarding fish populations within the subbasin (Kelley 2004). Piru Creek supports more diverse native and non-native fish species assemblages than the Santa Clara River because it has more instream cover and more riparian vegetation (Stoecker and Kelley 2005). Throughout the basin, instream cover is an important condition for rearing habitat for fish. Disconnected ephemeral tributaries in the Piru Groundwater Basin can be used by fish species seasonally, but do not contain surface water year-round and are not connected to groundwater.

Four special-status fish species (southern California steelhead, Pacific lamprey *[Entosphenus tridentatus]*, arroyo chub *[Gila orcutti]*, and unarmored three-spine stickleback [*Gasterosteus aculeatus williamsoni]*) have the potential to occur in the interconnected reaches of the Piru Groundwater Basin (Table 5.2-4). The interconnected reaches include the Santa Clara River from the upstream boundary of the Piru Basin to near Las Brisas Bridge, within the Del Valle GDE Unit, and the downstream boundary of the Piru Basin near the Cienega GDE Unit. The extent of interconnected surface water near the Cienega GDE Unit varies seasonally and with the water year type. An additional species, the Santa Ana sucker *(Catostomus santaanae)*, occurs in the Piru Groundwater Basin and is listed as threatened under the federal Endangered Species Act, but those occurring in the Santa Clara River and tributaries have no special status due to uncertainties at the time of its listing regarding whether it is native to the Santa Clara River watershed.

Due to the life history complexities, steelhead is the term used to describe the anadromous life history type and rainbow trout are the non-anadromous life history type. Because life history types between steelhead and rainbow trout are often indistinguishable, such as juveniles that have not yet exhibited a life history strategy, juvenile steelhead and rainbow trout are collectively referred to as *O. mykiss*. Anadromous O. mykiss (southern California steelhead) are listed as endangered under the federal Endangered Species Act and the California Endangered Species Act, while resident *O. mykiss* (rainbow trout) are not.

In the Piru Groundwater Basin, designated critical habitat for southern California steelhead includes the mainstem Santa Clara River upstream to the Piru Creek confluence, the lower 3 miles of Hopper Canyon Creek, and Piru Creek upstream to Santa Felicia Dam (Figure 5.2-1). (NMFS 2008, Kelley 2004, NMFS 2012, Stoecker and Kelley 2005). The mainstem Santa Clara River contains sub-optimal water quality and quantity and abundant non-native fish species, which limits rearing opportunities for native fish (NMFS 2012, Kelley 2004, Stoecker and Kelley 2005). Hopper Canyon Creek is intermittent within the Piru Basin and *O. mykiss* habitat on Hopper Canyon Creek is primarily upstream of the basin boundary (Francis 2010). *O. mykiss* may also use these tributaries and may travel between them.

Anadromous adult and juvenile steelhead passage in Santa Clara River within Piru Basin requires sufficient magnitude and duration of flows for steelhead to safely pass upstream or downstream. A range of flows required for passage has been identified using different approaches and at different locations in the Santa Clara River. TRPA (2005) used field measurements in 2004 and 2005 to conclude that for critical riffles (sites that are the most likely to impede passage) near Highway 118, upstream passage of adults required 120 cfs (providing a minimum depth of 0.6 ft)

while downstream passage of juveniles required about 80 cfs. These riffles were about 17 miles downstream of the boundary between the Fillmore and Piru basins. Gard (2021) used remotely sensed data coupled with a hydraulic model to explore fish passage at critical riffles from Highway 1 to about 1 mile upstream the TRPA sites. Gard (2021) used a larger depth requirement for passage than TRPA (0.7 ft rather than 0.5 ft), and found that flows needed to be at least 500 cfs to provide passage for adult steelhead. Harrison et al. (2006) used 5 ft contour topographic maps and a 1-dimensional model along the mainstem Santa Clara River between the confluences with Sespe Creek and Piru Creek (which includes the reaches of the Santa Clara River in the Piru Groundwater Basin). They found that passage in this reach would require flows above approximately 700 cfs (Harrison et al. 2006). Flows of this magnitude occur for a few days per year during average and above average water year types (Harrison et al. 2006). These three studies identify a range of flows at which passage is likely to occur. Some temporal variation in minimum passage flows is expected given the dynamic, sandy braided morphology of the Santa Clara River, but the range of flows suggests that different methodologies play some role in the range of results.

Only a small portion of the reach in the Piru Subbasin used for anadromous upstream and downstream steelhead passage (near the Cienega GDE Unit) has rising groundwater (see Figure 4.3-1). The maximum flow of rising groundwater measured in the Cienega GDE Unit in Figure 4.3-1 was 25 cfs. This corresponds to 5-21% of the total flow required for passage for the studies described above, although the contribution of rising groundwater to fish passage has not been explicitly explored. The area of rising groundwater near the Cienega GDE Unit goes dry during droughts. Groundwater modeling coupled with the observed relationship between flow and groundwater levels finds that reducing pumping by 50% would not be sufficient to maintain surface flows through the Cienega GDE unit during drought. Moreover, rising groundwater only occurs over a limited extent of the reach between the Fillmore Basin boundary and Piru Creek and is downstream of the main passage barrier identified by Harrison et al. (2006) near the Santa Clara River confluence with Hopper Canyon Creek. Under its FERC license, United Water currently releases water downstream of Santa Felicia Dam from Lake Piru to support southern California steelhead passage through the Santa Clara River when criteria for instream flows are triggered. Rising groundwater is therefore likely not a critical component of upstream anadromous steelhead passage.

In general, downstream passage of steelhead smolts requires connected surface water and 0.4 feet of water depth (CDFW 2017). However, the flow required to support 0.4 ft depth in the Piru Basin has not been studied and is unknown. Downstream passage for smolts was predicted to occur at flows greater than 80 cfs between Highway 118 and Highway 1 (TRPA 2005). Juvenile downstream emigration may occur between January and June (Booth 2020), although the majority of smolts captured in the Santa Clara River at the Freeman Diversion downstream of Piru Groundwater Basin occurred between mid-March and late May (Booth 2020). In general, smolt emigration requires spatially continuous surface flow including reaches outside of the zones of rising groundwater. However, migrating fish that become stranded or choose to do so may hold within the lower Santa Clara River between flow events. Given the lack of information on both the flow requirement for emigrating smolts and the effect of rising groundwater on flows during emigration, the reliance on groundwater for smolt emigration within this reach is unknown.

There is no evidence of current summer juvenile rearing within the Santa Clara River or its tributaries in the Piru Basin, although summer fish surveys in the reach are almost non-existent. Stoecker and Kelley (2005) used an aerial survey of the Santa Clara River mainstem and did not observe rearing *O. mykiss*. Juvenile *O. mykiss* rearing conditions in the Piru Basin are thought to be poor mainly due to high water temperatures, shallow water depths, low flows, and limited

instream cover. Some limited juvenile rearing habitat for *O. mykiss* is possible where rising groundwater occurs near the Cienega GDE Unit or downstream of the water releases from Lake Piru in Piru Creek, possibly supporting cooler stream temperatures, but rearing juvenile *O. mykiss* have not been observed in these locations. It is therefore assumed that steelhead use the mainstem Santa Clara River from the boundary with the Fillmore Basin upstream to Piru Creek primarily as a migration corridor for passage to and from suitable spawning areas in tributaries potentially including Hopper and Piru Creeks due to a lack of conditions suitable for summer freshwater rearing in the mainstem Santa Clara River.

Most of the fish species listed in Table 5.2-4 are likely to occur in perennial reaches within the basin. The anadromous species (i.e., steelhead and Pacific lamprey), non-migratory species, and other native aquatic species may occur in the intermittent reaches seasonally.

Table 5.2-4. Groundwater dependent special-status fish with known occurrence or suitable habit in the Piru Groundwater Basin.

Common name ***Scientific name***	**Native or introduced**	**Status[1] Federal/ State**	**Occurrence in interconnected reaches**	**Source(s)**	**Habitat and occurrence within the Piru Groundwater Basin**
Southern California steelhead *Oncorhynchus mykiss irideus*	Native	SE, FE	Santa Clara River upstream to Piru Creek (likely migration, unlikely spawning and rearing), Piru Creek (possible migration, spawning, and rearing)	Howard et al. 2015, Howard and Booth 2016, ACS 2002, Stoecker and Kelley 2005	Occur in freshwater systems and require adequate water conditions suitable for migration (i.e., flow, dissolved oxygen levels within the surface water, and water temperature suitable for passage) and suitable substrate (i.e., gravels) for spawning. Juvenile *O. mykiss* require suitable cover, flow, foraging conditions, and cool temperatures for rearing. Juvenile emigration (i.e., outmigration to the ocean) requires water conditions suitable for migration. *O. mykiss* migration (both upstream and downstream) can occur in all surface water reaches of the Piru Groundwater Basin when flows are sufficiently high (Stoecker and Kelley 2005). *O. mykiss* spawning and rearing likely occurs in Piru Creek. Rearing could occur in the Santa Clara River, but is unlikely due to poor habitat and temperature conditions (Stoecker and Kelley 2005).

Common name ***Scientific name***	**Native or introduced**	**Status[1] Federal/ State**	**Occurrence in interconnected reaches**	**Source(s)**	**Habitat and occurrence within the Piru Groundwater Basin**
Pacific lamprey *Entosphenus tridentatus*	Native	SSC	Santa Clara River (possible migration, pre-spawning holding, rearing), Piru Creek (possible migration, pre-spawning holding, spawning, rearing)	Reid 2015, United 2018	Occurs in freshwater systems and requires adequate flows for migration, suitable substrate (i.e., gravels) for spawning, and adequate cover for pre-spawning holding. Juveniles (called ammocoetes) spend an extended period of time (between four and 10 years) rearing while burrowed in sediments filter feeding on organic material and require suitable cover, flow, foraging conditions, and cool temperatures. Juvenile migrant (called macropthalmia) emigration (i.e., outmigration to the ocean) requires water conditions suitable for migration (i.e., water velocity and water depth, dissolved oxygen levels within the surface water, and water temperature suitable for passage). No Pacific lamprey have been observed in the main stem Santa Clara River upstream of Freeman Diversion or in Piru Creek, however anywhere with perennial habitat can be considered potential habitat for Pacific lamprey with actual distribution and use subject to the constraints of suitable habitat and barriers to passage (Reid 2015; United 2018).
Unarmored threespine stickleback *Gasterosteus aculeatus williamsoni*	Native	SE, FE, SFP	Possible in the Santa Clara River and Piru Creek	ACS 2002, Swift et al. 1993, Richmond et al. 2014, CDFW 2019, USFWS 2021	Occurs in freshwater rivers and streams. There is a 'non-specified bounded area' unarmored threespine stickleback population occurrence within the within the interconnected mainstem Santa Clara River (CDFW 2019). However, the species is not known to occur currently or to have occurred historically downstream of the Ventura/Los Angeles County line (Richmond et al. 2014, USFWS 2021). Because of difficulty with identification between similar subspecies, identification via genetic and/or plate counts is needed to confirm subspecies. Migration is largely localized and opportunistic; this species does not exhibit defined migration.

Common name ***Scientific name***	**Native or introduced**	**Status[1] Federal/ State**	**Occurrence in interconnected reaches**	**Source(s)**	**Habitat and occurrence within the Piru Groundwater Basin**
Santa Ana sucker *Catostomus santaanae*	Native	FT (not in Santa Clara River watershed)[3]	Likely in the Santa Clara River and Piru Creek	Howard and Booth 2016, United 2018, ACS 2002, Swift et al. 1993, CDFW 2019	Occurs in freshwater rivers and streams. The species has been observed within all surface water reaches (i.e., perennial tributaries, perennial mainstem, and ephemeral reaches) in the Piru Groundwater Basin (CDFW 2019, United 2018, Howard and Booth 2016). Recent genetics studies documented Santa Ana and Owens sucker hybrids (*Catostomus santaanae* x *fumeiventris*) within the Piru Groundwater Basin.
Arroyo chub *Gila orcutti*	Introduced (but native to other nearby watersheds)	SSC	Likely in Santa Clara River, likely in Piru Creek	Howard et al. 2015, United 2018, ACS 2002, CDFW 2019	Occurs in freshwater rivers and streams. Although arroyo chub, a CDFW SSC, is not native to the Santa Clara River watershed, CDFW protects the species within the watershed. Arroyo chub has been observed in the Del Valle ISW reach within the Piru Groundwater Basin and is likely to occur in the perennial tributary reaches and ephemeral reaches when conditions are conducive to passage (CDFW 2019, Howard et al. 2015, United 2018). Arroyo chub does not exhibit defined migration and the species' movement is largely localized and opportunistic.

[1] Federal
FE = Listed as endangered under the federal Endangered Species Act
FT = Listed as threatened under the federal Endangered Species Act
FSS = Forest Service Sensitive Species
BLMS = Bureau of Land Management Sensitive Species

State
SE = Listed as Endangered under the California Endangered Species Act
SSC = CDFW species of special concern
SFP = CDFW fully protected species

[2] Potential to Occur:
Likely: the species *has* documented occurrences and the habitat is high quality or quantity
Possible: no documented occurrences and the species' required habitat is moderate to high quality or quantity
Unlikely: no documented occurrences and the species' required habitat is of low to moderate quality or quantity
None: no potential to occur due to lack of habitat and/or the population is assumed extirpated

[3] The Santa Ana sucker is federally threatened; however, because of previous uncertainty regarding whether it is native to the SCR watershed, United States Fish and Wildlife Service (USFWS) does not currently consider the species federally threatened within the SCR watershed (USFWS 2017).

Fillmore

Plants and natural communities

Four potentially groundwater dependent special-status plant species have been documented in the Fillmore Groundwater Basin (Table 5.2-5). One species, white rabbit-tobacco (*Pseudognaphalium leucocephalum*), was identified as likely to depend on groundwater. Multiple populations of white rabbit-tobacco have been observed in the open rock and sand wash bed of the Santa Clara River (East Grove GDE Unit), and at least one population has been documented within more densely wooded areas. Two species were identified as possibly dependent on groundwater, umbrella larkspur (*Delphinium umbraculorum*) and Greata's aster (*Symphyotrichum greatae*), both of which were observed in the mountain range to the north of the basin and are associated with moist oak forests and cismontane and riparian woodland, respectively. The fourth species, late-flowered mariposa lily (*Calochortus fimbriatus*) is unlikely to depend on groundwater.

Ten potentially groundwater dependent sensitive natural communities were documented with the potential to occur in the Fillmore Groundwater Basin (Table 5.2-5). Eight of these communities are identified as likely to depend on groundwater; these GDEs are predominantly within riparian habitats (e.g., black cottonwood woodland and forest, southern mixed riparian forest, southern riparian scrub) and occur in the East Grove and Sespe Creek Riparian GDE units. Additional potentially groundwater dependent sensitive natural communities include herbaceous communities associated with wetlands and marsh margins (e.g., hardstem and California bulrush marshes [*Schoenoplectus* (*acutus*, *californicus*) Herbaceous Alliance] and ashy ryegrass – creeping ryegrass turfs [*Leymus cinereus – Leymus triticoides* Herbaceous Alliance]), which were documented in the East Grove GDE Unit.

Table 5.2-5. Special-status plant species and natural communities with known occurrence within the Fillmore Groundwater Basin.

Common name *Scientific name*	Status[1]	Association with GDE	Documented occurrences in GDE units	Source[2]	Habitat and occurrence
Plants					
Late-flowered mariposa lily *Calochortus fimbriatus*	1B.3, S3, G3, not state or federally listed	Unlikely	Santa Clara River Riparian Shrubland, Tributary Riparian	CNDDB	Dry, open coastal and foothill woodland, chaparral; two CNDDB occurrences in the vicinity of Santa Paula Peak and Sespe Creek.
Umbrella larkspur *Delphinium umbraculorum*	1B.3, S3, G3, not state or federally listed	Possible	Tributary Riparian	CNDDB	Moist oak forest, foothill woodland; single CNDDB record from 1999 on the north side of Santa Paula Peak.
White rabbit-tobacco *Pseudognaphalium leucocephalum*	2B.2, S2, G4, not state or federally listed	Likely	Cienega, East Grove	CNDDB	Sandy or gravelly benches, dry stream or canyon bottoms; CNDDB records in sandy, rocky washes.
Greata's aster *Symphyotrichum greatae*	1B.3, S2, G2, not state or federally listed	Possible	Tributary Riparian	CNDDB	Mesic areas in broadleafed upland forest, chaparral, cismontane and riparian woodland; CNDDB records in Hopper and Pine canyons.
Sensitive Natural Communities					
Ashy ryegrass – creeping ryegrass turfs *Leymus cinereus – Leymus triticoides* herbaceous alliance	S3, G3	Likely	East Grove	VMSCR	Poorly drained floodplains, playas, drainage and valley bottoms, and marsh margins; occur throughout much of California at elevations below 10,000 ft.
Black cottonwood forest and woodland *Populus trichocarpa* forest and woodland alliance	S3, G5	Likely	Cienega, East Grove, Santa Clara River Riparian Shrubland, Sespe Creek Riparian	VMSCR	Seasonally flooded and permanently saturated soils on stream banks and alluvial terraces; occur throughout much of California except the Central Valley, Sacramento-San Joaquin Delta, and Mojave and Sonoran deserts.

Common name ***Scientific name***	**Status**[1]	**Association with GDE**	**Documented occurrences in GDE units**	**Source**[2]	**Habitat and occurrence**
California walnut groves *Juglans californica* forest and woodland alliance	S3, G3	Unlikely	Sespe Creek Riparian, Tributary Riparian, Santa Clara River Riparian Shrubland	CalVeg, CNDDB, VMSCR	Riparian corridors, but most stands cover all hillslopes; occur along southern California coast and in Peninsular and Transverse ranges.
Fremont cottonwood forest and woodland *Populus fremontii – Fraxinus velutina – Salix gooddingii* forest and woodland alliance	S3, G4	Likely	Santa Clara River Riparian Shrubland	CalVeg, VMSCR	On floodplains, along low-gradient rivers and streams, and in alluvial fans and valleys with a dependable subsurface water supply; occur throughout much of California except the Sierra Nevada and Modoc Plateau.
Hardstem and California bulrush marshes *Schoenoplectus* (*acutus*, *californicus*) herbaceous alliance	S3S4, not globally ranked	Likely	East Grove	VMSCR	Brackish to freshwater marshes, stream banks and bars of river mouth estuaries, ponds and lake shores, sloughs, and roadside ditches; occur throughout most of California at elevations below 8,200 ft.
Scale broom scrub *Lepidospartum squamatum* shrubland alliance	S3, G3	Unlikely	Santa Clara River Riparian Shrubland, Sespe Creek Riparian	CalVeg, VMSCR	Intermittently or rarely flooded, low-gradient alluvial deposits along streams, washes, and fans; occur in southern California in the inner central Coast Ranges, Transverse and Peninsular ranges, and the Mojave Desert.
Southern cottonwood willow riparian forest	S3.2, G3	Likely	Sespe Creek Riparian	CNDDB	Frequently flooded lands along rivers and streams; occur in the Transverse and Peninsular ranges from Santa Barbara County south and east to the edge of the deserts.
Southern mixed riparian forest	S2.1, G2	Likely	Tributary Riparian	CNDDB	Typically, a younger successional stage of riparian forest due to disturbance or more frequent flooding.

Common name *Scientific name*	Status[1]	Association with GDE	Documented occurrences in GDE units	Source[2]	Habitat and occurrence
Southern riparian scrub	S3.2, G3	Likely	East Grove, Santa Clara River Riparian Shrubland	CNDDB	Sand and gravel bars close to river channels; occur along and at the mouths of perennial and intermittent streams of the southern Coast Ranges.
Southern willow scrub	S2.1, G3	Likely	Santa Clara River Riparian Shrubland	CNDDB	Generally, on alluvium deposited near stream channels during floods; occur along major rivers of coastal southern California

[1] Status codes:

G = Global
T = Subspecies or variety

Federal
FT = Listed as threatened under the federal Endangered Species Act
FD = Federally delisted

State
S = Sensitive
SE = Listed as Endangered under the California Endangered Species Act
ST = Listed as Threatened under the California Endangered Species Act
SSC = CDFW species of special concern
SFP = CDFW fully protected species

Rank
1 Critically Imperiled—At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
2 Imperiled—At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
3 Vulnerable—At moderate risk of extinction or elimination due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
4 Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
5 Demonstrably Secure—Common; widespread and abundant.
Q Taxonomic questions associated with this name
Ranks such as S2S3 indicate a ranking between S2 and S3

California Rare Plant Rank (CRPR)
1B Plants rare, threatened, or endangered in California and elsewhere
2B Plants rare, threatened, or endangered in California, but more common elsewhere
4 More information needed about this plant, a review list
4 Plants of limited distribution, a watch list

CRPR Threat Ranks:
0.1 Seriously threatened in California (high degree/immediacy of threat)
0.2 Fairly threatened in California (moderate degree/immediacy of threat)
0.3 Not very threatened in California (low degree/immediacy of threats or no current threats known)

[2] Sources: CNDDB (CDFW 2019), CalVeg (USDA 2014), VMSCR (Vegetation Map of the Santa Clara River; Stillwater Sciences 2019).

Terrestrial and aquatic wildlife

Ten potentially groundwater dependent special-status terrestrial and aquatic wildlife species were identified as having the potential to occur within the Fillmore Groundwater Basin: one amphibian species, seven bird species, and two reptile species (Table 5.2-6). Additional information on these species, including regulatory status, occurrences in GDE units, habitat associations, and documented occurrences in the groundwater basin, is provided in Table 5.2-6.

Southwestern pond turtle (*Actinemys pallida*) and two-striped gartersnake (*Thamnophis hammondii*) are the only wildlife species likely present (i.e., documented occurrences) in the Fillmore Groundwater Basin classified as directly groundwater dependent due to their association with riverine and lentic habitats. Southwestern pond turtles likely use habitat within the Santa Clara River GDE units (i.e., Santa Clara River Riparian Shrubland, Cienega, and East Grove) and Sespe Creek Riparian GDE for foraging (e.g., open water), nesting (e.g., grasses and forbs alliance), and/or overwintering (e.g., mixed riparian and willow scrub and cottonwood or willow alliance). Two-striped gartersnake likely use freshwater (e.g., perennial riverine) and riparian (e.g., riparian mixed hardwood and/or shrub) habitats within the Santa Clara Riparian Shrubland, Sespe Creek Riparian GDEs for capturing prey. The arroyo toad was not documented within the Fillmore Groundwater Basin; however, suitable habitat within the East Grove and Sespe Creek Riparian GDE units (e.g., freshwater wetland; riverwash; and cottonwood, willow, or mixed riparian alliances) could potentially support all the toad's life history stages (breeding, larval juvenile rearing, juvenile and adult foraging).

Indirectly groundwater dependent bird species (i.e., least Bell's vireo, southwestern willow flycatcher, western yellow-billed cuckoo, white-tailed kite [*Elanus leucurus*], yellow warbler [*Setophaga petechia*], and yellow-breasted chat [*Icteria virens*]) use riparian habitat (e.g., willow/willow shrub, cottonwood, mixed riparian alliances) within the Santa Clara River GDE units (i.e., Santa Clara River Riparian Shrubland, Cienega, and East Grove) for foraging, nesting, and migrating. These GDE units include designated critical habitat for the southwestern willow flycatcher (Santa Clara River Riparian Shrubland [952 acres], Cienega Riparian Complex [116 acres], and East Grove [923 acres]). The California condor's designated critical habitat is not located within a GDE unit; habitat use in the Fillmore Basin GDE Units (e.g., Sespe Creek Riparian) may be limited to foraging.

Table 5.2-6. Groundwater dependent special-status terrestrial and aquatic wildlife species with known occurrence or suitable habit in the Fillmore Groundwater Basin.

Common name *Scientific name*	Status[1] Federal/State	Potential to occur in Fillmore Groundwater Basin[2]	Documented occurrences in GDE units	Query source[3]	GDE association[4]	Habitat and documented occurrences in Fillmore Groundwater Basin
Amphibian						
Arroyo toad *Anaxyrus californicus*	FE/SSC	Possible	No documented occurrences	CAFSD	Direct	Washes, arroyos, sandy riverbanks, riparian areas with willows, sycamores, oaks, cottonwoods; needs exposed sandy streamsides with stable terraces for burrowing, with scattered vegetation for shelter, and areas of quiet water or pools free of predatory fishes with sandy or gravel bottoms without silt for breeding. The arroyo toad depends on groundwater for breeding in shallow still pools and riparian vegetation that provides foraging habitat (Rohde et al. 2019). It was historically found in the upper and lower Santa Clara River basin and currently persists in along Sespe Creek from Hot Springs Canyon upstream to the mouth of Tule Creek (Sweet 1992 as cited in USFWS 1999). Low potential to occur along the Santa Clara River (VCWPD and LADPW 2005).
Reptile						
Two-striped gartersnake *Thamnophis hammondii*	BLMS, FSS/SSC	Likely	Santa Clara Riparian Shrubland, Sespe Creek Riparian	CNDDB, CAFSD	Direct	Highly aquatic snake species. Found in or near permanent fresh water, often along streams with rocky beds and riparian vegetation. Prey includes fish, fish eggs, tadpoles, newt larvae, small frogs and toads, leeches, and earthworms. Commonly found in the Santa Clara River watershed (UWCD 2018). Occurrences along Santa Clara River bank on the south edge of Fillmore and on Sespe Creek (<1 mile upstream of the Sespe Creek Riparian GDE) unit in 2011 (CDFW 2019).

Common name ***Scientific name***	**Status[1] Federal/State**	**Potential to occur in Fillmore Groundwater Basin[2]**	**Documented occurrences in GDE units**	**Query source[3]**	**GDE association[4]**	**Habitat and documented occurrences in Fillmore Groundwater Basin**
Southwestern pond turtle *Actinemys pallida*[5]	PFT,BLMS, FSS/SSC	Likely	East Grove, Sespe Creek Riparian	CNDDB, CAFSD	Direct	Ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches with basking sites. Feeds on aquatic plants, invertebrates, worms, frog and salamander eggs and larvae, crayfish, and occasionally frogs and fish. Relies on surface water that may be supported by groundwater (Rhode et al. 2019). Documented throughout the Santa Clara Rivera and Sespe Creek watersheds. Occurrences include Santa Clara River approximately 3 miles downstream of the confluence with Sespe Creek in 2016 and Sespe Creek between 2 and 4 miles north of Fillmore (CDFW 2019).
Bird						
Least Bell's vireo *Vireo bellii pusillus*	FE/SE	Likely	Cienega, East Grove, Santa Clara River Riparian Shrubland	CNDDB, CAFSD	Indirect	Nests in dense vegetative cover of riparian areas; often nests in willow or mulefat; forages in dense, stratified canopy. This species relies on groundwater dependent vegetation in riparian areas, particularly during breeding periods (Rohde et al. 2019). Eats insects, fruits, and berries. Documented throughout the Santa Clara River and Sespe Creek in the Fillmore Groundwater Basin (CDFW 2019, eBird 2021, WFVZ 2020c). Documented breeding occurrences in the TNC properties listed: Sespe Cienega (Cienega) (eBird 2021), the Taylor property, and the Hedrick Ranch Nature Area (East Grove Riparian Complex); CDFW's Cienega Springs Ecological Preserve (Cienega and Santa Clara River Riparian Shrubland) (WFVZ 2020a, WFVZ 2020b).