



# WMA

Santa Ynez River Valley Groundwater Basin  
Western Management Area  
Groundwater Sustainability Agency

# August 2020 Status Update



**DUDEK**

Geosyntec   
consultants

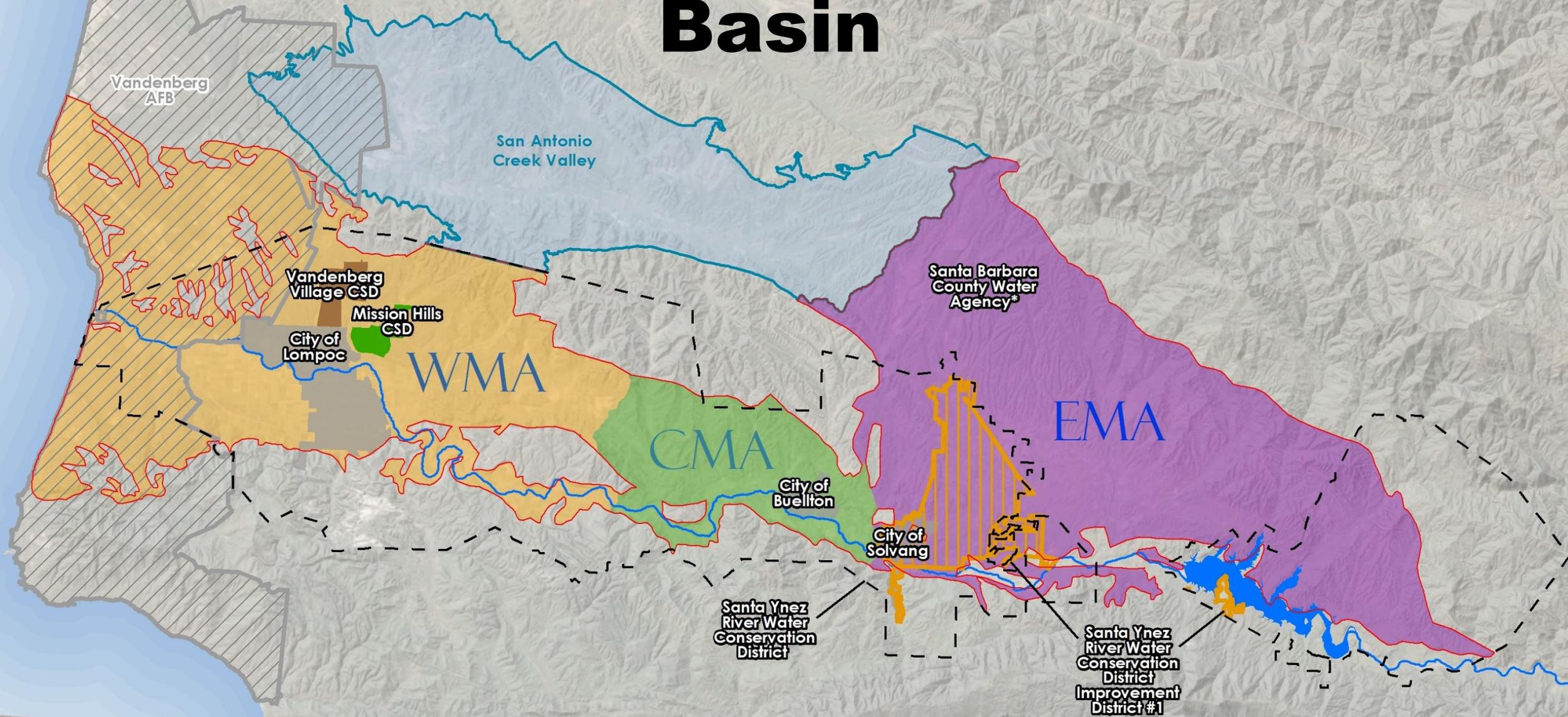
engineers | scientists | innovators



# Agenda

1. SGMA & GSA Overview
2. Timeline & Milestones
3. Consultant Team Progress Update
4. Next Steps
5. Schedule
6. Questions

# Santa Ynez River Valley Groundwater Basin

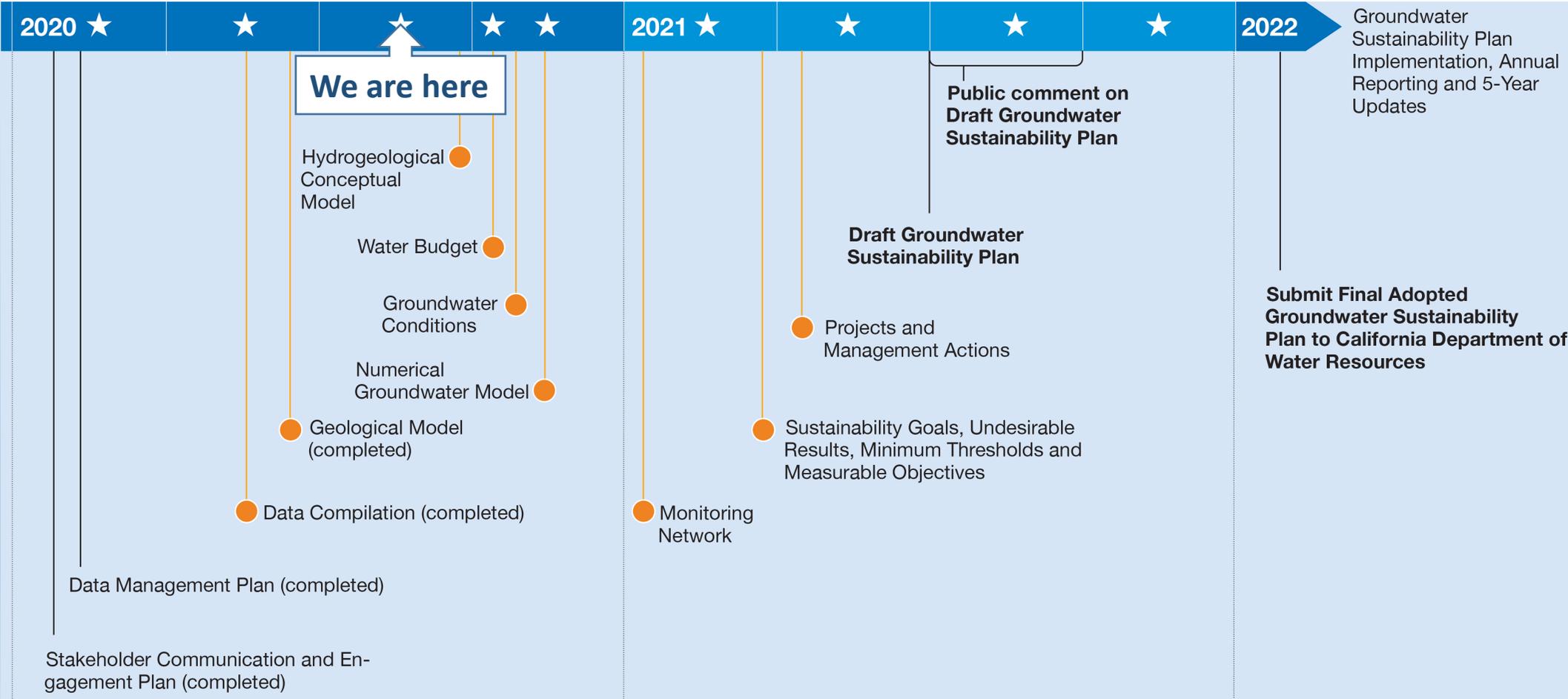


Updated Aug. 2020, includes WMA/CMA/EMA boundary updates.

# Timeline and Milestones

## Groundwater Sustainability Plan Development Milestones

★ Groundwater Sustainability Agency Committee Public Meeting ● Technical Memorandum



# Consultant Team Progress

**Geosyntec** consultants

1534 Avenida West, Suite 4A  
San Jose, CA 95128  
Tel: (415) 457-0700 Fax: (415) 457-1638

TO: Station Engineers  
SUBJECT: **DRAFT** Technical Memorandum Regional Geology and 3D Geologic Model for the Santa Ynez River Valley Groundwater Basin (SYRVGB).  
PREPARED BY: Eryn Torres, Senior Professional Megan Choe, Senior Geologist Mark Grivett, Senior Principal Hydrogeologist  
DATE: May 12, 2020

### I. INTRODUCTION

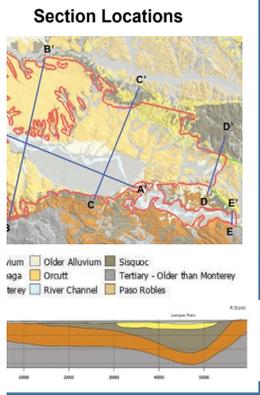
This technical memorandum is prepared as part of the hydrologic conceptual model (HCM) for the Western and Central Management Areas (WMA and CMA, respectively) Groundwater Sustainability Agency (GSA) within the larger Santa Ynez River Valley Groundwater Basin (SYRVGB). This technical memorandum focuses on the geologic units within the SYRVGB, and the subsurface geologic model built to visualize long-term. The geologic characteristics of these units are then considered in a separate study which correlates principal aquifers within the basin. This technical memo describes the modeled geologic units and existing literature that identifies the water-bearing tendency of each unit but does not include an in-depth principal aquifer analysis or discussion.

The HCM is the conceptual understanding of the physical characteristics related to the regional hydrology, land use, geologic units and structures, groundwater quality, principal groundwater aquifer, and principal aquifers of the WMA and CMA portions of the SYRVGB (basin). Understanding the regional geologic setting and structural configuration is integral to conducting subsequent technical analysis of the basin, including presence, absence and correlation of principal aquifers. Identification of an appropriate monitoring network, structural geologic modeling, and identification of projects and management actions in accordance with the Sustainable Groundwater Management Act (SGMA).

A detailed subsurface three-dimensional model of the geologic units and structures (model) that comprise the basin was developed from publicly available published reports and data sources from the WMA and CMA GSAs. The model is intended for use as a visualization tool to communicate the regional geologic setting to the WMA and CMA GSAs, as well as the public, in accordance with SGMA. Additionally, the model will be used in concert with the Water Budget and the Data Management System to identify potential data gaps within the basin where additional data is needed.

This technical memorandum does not include the Eastern Management Area (EMA) within the SYRVGB. The EMA GSA is supported by a different consulting team.

Appendix 1 | Appendix 2 | Appendix 3



**Sustainable Groundwater Management Quarterly Newsletter No. 1 June 2020**

### Santa Ynez River Valley Groundwater Basin (SYRVGB)

The Sustainable Groundwater Management Act (SGMA), signed into law in 2014, created a new framework for groundwater management in California. SGMA established a new structure for local groundwater management through Groundwater Sustainability Agencies (GSA). The SYRVGB has three management areas each with their own GSA Committee comprised of local participating Agencies:

- Western Management Area (WMA) GSA Committee**
  - Santa Ynez River Water Conservation District + City of Lompoc
  - Mission Hills CSD + Vandenberg Village CSD
  - Santa Barbara County Water Agency
- Central Management Area (CMA) GSA Committee**
  - Santa Ynez River Water Conservation District + City of Buellton
  - Santa Barbara County Water Agency
- Eastern Management Area (EMA) GSA Committee**
  - Santa Ynez River Water Conservation District + City of Solvang
  - Santa Barbara County Water Agency + Santa Ynez River Water Conservation District, Improvement District No. 1

Each GSA Committee is preparing its own Groundwater Sustainability Plan (GSP) that will describe the path to groundwater sustainability. The GSPs will determine how much groundwater can be used in the future and could include restrictions on pumping.

All three GSPs will be completed in early 2022. Progress updates will be given in each quarterly GSA Committee meeting and draft documents will be available for public review and comment on the website ([www.SantaYnezWater.org](http://www.SantaYnezWater.org)). Participation by members of the community in developing the GSP is important and each of the GSA Committees has adopted an outreach and engagement plan to guide the public participation process.

### Management Areas and Participating Local Agencies in the SYRVGB

For more information, please visit [www.SantaYnezWater.org](http://www.SantaYnezWater.org) or call (805) 693-1156 ext. 403

**DRAFT TECHNICAL MEMORANDUM**

2171 E. Francisco Blvd., Suite 4 - San Rafael, California • 94901  
Tel: (415) 457-0700 Fax: (415) 457-1638 e-mail: [mike@stneng.com](mailto:mike@stneng.com)

TO: GSA Agency Staff  
WMA Committee  
CMA Committee  
DATE: May 5, 2020

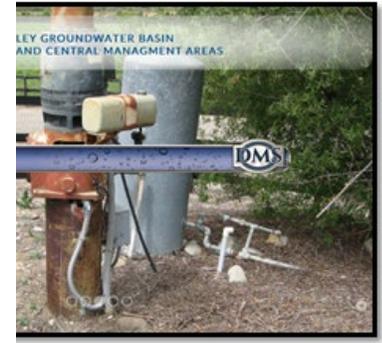
FROM: Station Engineers  
JOB NO: 2710-11 - Santa Ynez SGMA

RE: **DRAFT** Phase I Data Compilation for the Santa Ynez River Groundwater Basin Data Management System (DMS) and CMA

### INTRODUCTION

This memorandum describes the first phase of data compilation collected and entered into the data management system (DMS) developed for the Santa Ynez River Valley Groundwater Basin (SYRVGB) Western Management Area (WMA) and Central Management Area (CMA). This is a first step in developing and implementing a Sustainable Groundwater Management Act (SGMA) plan for these portions of the SYRVGB. It is anticipated that there will be additional phases of data that will be entered into the DMS. After each phase of data entry, this memorandum will be updated.

A description of the DMS was provided in the Data Management Plan (DMP), which included overall goals of the DMS, a description of the DMS platform, and how this addresses the needs of SGMA. This memorandum provides a snapshot view of data collected and entered into the DMS as of March 2020.



## Geological Model Tech Memo

**DRAFT TECHNICAL MEMORANDUM**

2171 E. Francisco Blvd., Suite 4 - San Rafael, California • 94901  
Tel: (415) 457-0700 Fax: (415) 457-1638 e-mail: [mike@stneng.com](mailto:mike@stneng.com)

TO: WMA GSA  
DATE: August 13, 2020

FROM: Station Engineers/Geosyntec/Dudak  
JOB NO: 2710-03

RE: **Hydrogeologic Conceptual Model (HCM)**

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Hydrogeologic Conceptual Model Page 1

## DRAFT HCM Tech Memo

## Outreach Newsletter

**DRAFT TECHNICAL MEMORANDUM**

2171 E. Francisco Blvd., Suite 4 - San Rafael, California • 94901  
Tel: (415) 457-0700 Fax: (415) 457-1638 e-mail: [mike@stneng.com](mailto:mike@stneng.com)

TO: GSA Agency Staff  
WMA Committee  
DATE: August 2020

FROM: Station Engineers  
JOB NO: 2710-04

RE: **DRAFT** Western Management Area Water Budget for the Santa Ynez River Valley Groundwater Basin Groundwater Sustainability Plan

This DRAFT Water Budget Technical Memorandum is written for inclusion in a chapter in the Santa Ynez River Valley Groundwater Basin Groundwater Sustainability Plan ("GSP") in accordance with the Sustainable Groundwater Management Act ("SGMA"). The GSP is an interagency collaboration of eight public agencies involved in water resources in Santa Ynez River Valley Groundwater Basin ("SYRVGB"). The SYRVGB is divided into three management areas: Western Management Area ("WMA"), Central Management Area ("CMA"), and Eastern Management Area ("EMA"). This WMA Water Budget Technical Memorandum is prepared by Station Engineers Project Team (Stetson, Geosyntec, and Dudak) for the WMA Groundwater Sustainability Agency ("GSA") in cooperation with CMA and EMA GSAs. Other chapters of the GSP will describe the hydrogeologic conceptual model, management coordination, past and previous management plans, and groundwater conditions in the SYRVGB.

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## DRAFT Water Budget

## DMS Tech Memo & Data Collection

**Progress Report**

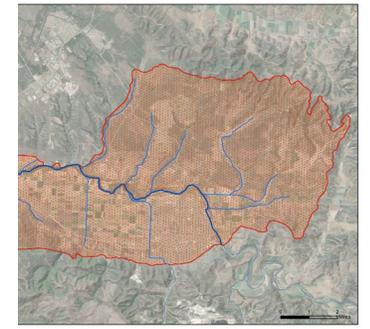
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Phone: (415) 457-0700 Fax: (415) 457-1638 Web Site: [www.stneng.com](http://www.stneng.com)

JN 2710 Lompoc Model Progress Report

The conceptualization and physical extents of the FEMFLOW3D groundwater flow model is being converted to the finite difference MODFLOW-LSG model code (LDMPCO-LSG). The modeling work completed through this billing period are summarized in the following bullet points. The attached table presents the LDMPCO-LSG model packages and model conversion progress.

- GIS was used to map the FEMFLOW3D model structure into polygons for the LSG model - developing six layers and 29,055 active cells. Cell discretization provided the horizontal extent and vertical elevation for each model cell. The grid system represents the geologic structure of the aquifers in the Lompoc Area.
- All model layers are coarsely specified which allow the model layer types to convert between confined and unconfined depending on the water level conditions.
- Model simulation period was extended from 357 monthly stress periods (January 1983 through September 2012) to 456 monthly stress periods (October 1982 and September 2020).
- FEMFLOW3D hydraulic properties (Kxy, S) and specified fluxhead (subflow beneath river, ligament) were transferred into MODFLOW-LSG.
- Using USGS hydrologic survey, the Santa Ynez River and 12 tributaries were mapped onto layer 1 model cells to develop the Streamflow Routing package for the model.
- Modeling conference calls were had to streamline model conversion from FEMFLOW3D into MODFLOW-LSG.
- Digital land use maps were compiled for 17 years (every two years from 1984 to 2016). Seven categories were delineated by model cell for assigning recharge and evapotranspiration. (Appendix 1)
- Pumping distribution was developed for 187 alluvial irrigation wells, 7 upland irrigation wells, and 4 residential wells. Assigned pumping by well was transferred for Lompoc, Mission Hills, and Vandenberg Village wells. (Figure 1)

Station Engineers Inc. 8/3/2020 Lompoc Model Status Page 1

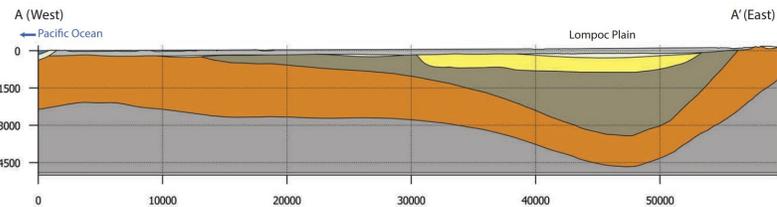
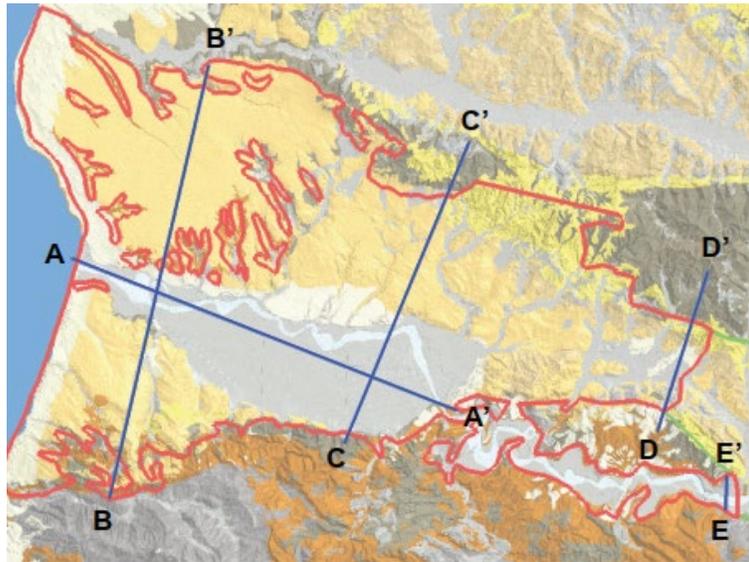


## Groundwater Modeling

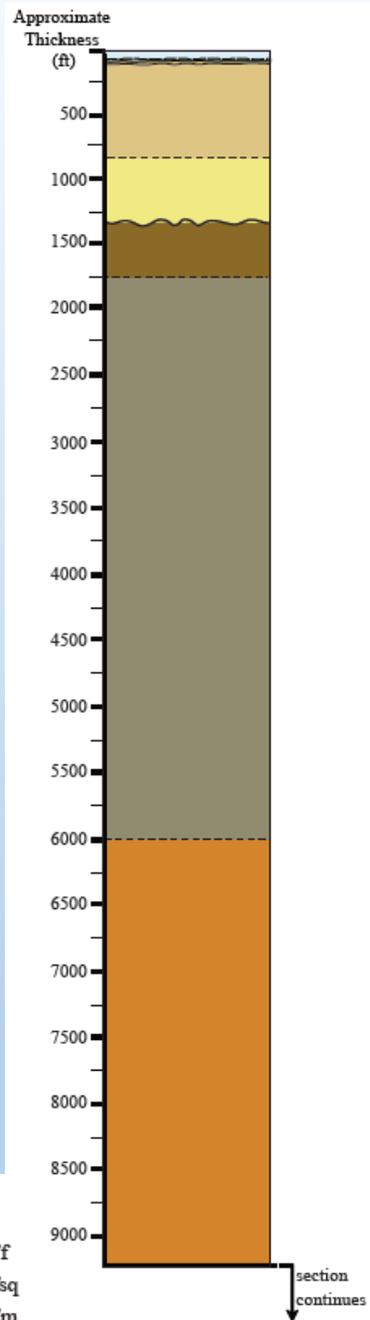
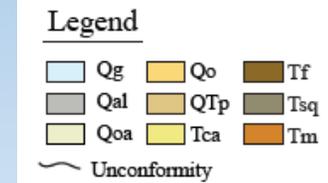
# Geologic Model

## Technical Memorandum

### Section Locations



- Released for CAG and public review
- Comments reviewed and considered
- Revised DRAFT Final submitted to the GSA committee
- SkyTEM data may be used later to refine the model



# Outreach & Engagement

## Sustainable Groundwater Management Quarterly Newsletter No. 1 June 2020

### Santa Ynez River Valley Groundwater Basin (SYRVGB)

The Sustainable Groundwater Management Act (SGMA), signed into law in 2014, created a new framework for groundwater management in California. SGMA established a new structure for local groundwater management through Groundwater Sustainability Agencies (GSAs). The SYRVGB has three management areas each with their own GSA Committee comprised of local participating Agencies:

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- Mission Hills CSD • Vandenberg Village CSD
- Santa Barbara County Water Agency

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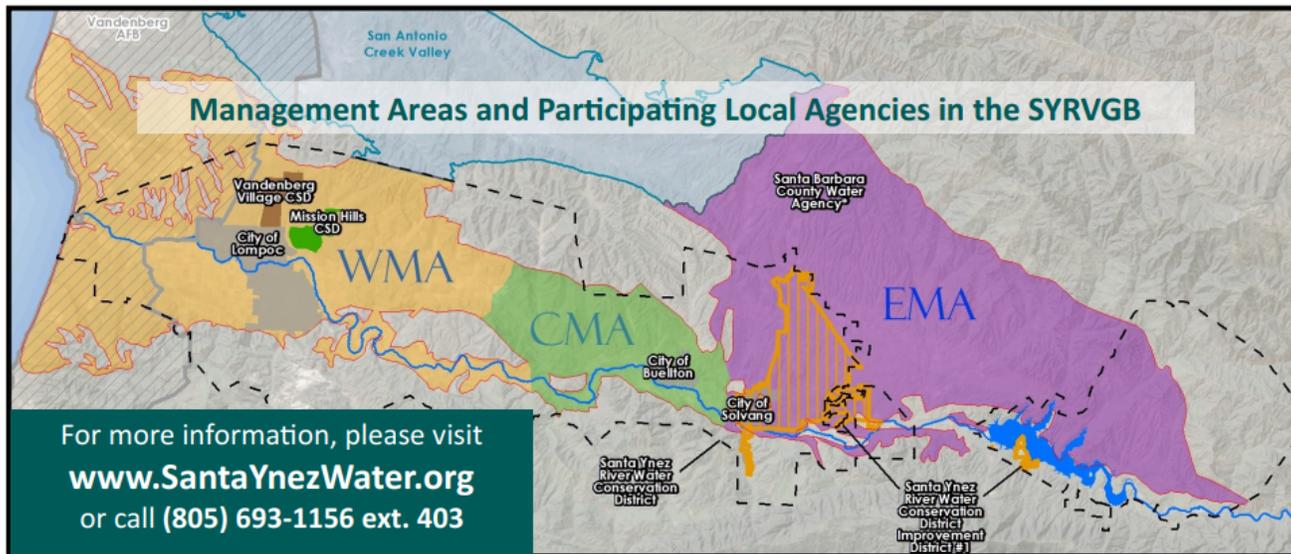
- Santa Ynez River Water Conservation District • City of Buellton
- Santa Barbara County Water Agency

#### Eastern Management Area (EMA) GSA Committee

- Santa Ynez River Water Conservation District • City of Solvang
- Santa Barbara County Water Agency • Santa Ynez River Water Conservation District, Improvement District No. 1

Each GSA Committee is preparing its own Groundwater Sustainability Plan (GSP) that will describe the path to groundwater sustainability. **The GSPs will determine how much groundwater can be used in the future and could include restrictions on pumping.**

All three GSPs will be completed in early 2022. Progress updates will be given in each quarterly GSA Committee meeting and draft documents will be available for public review and comment on the website ([www.SantaYnezWater.org](http://www.SantaYnezWater.org)). **Participation by members of the community in developing the GSPs is important and each of the GSA Committees has adopted an outreach and engagement plan to guide the public participation process.**



## First Newsletter Created

- English and Spanish versions
- CAG feedback
- Distributed in Water Bills
- Available online at: [SantaYnezWater.org](http://SantaYnezWater.org)

FAQs in development and will be available on [SantaYnezWater.org](http://SantaYnezWater.org)

# DMS Tech Memo and Data Update



## DRAFT TECHNICAL MEMORANDUM

2171 E. Francisco Blvd., Suite K • San Rafael, California • 94901  
TEL: (415) 457-0701 FAX: (415) 457-1638 e-mail: miles@stetsonengineers.com

TO: GSA Agency Staff  
WMA Committee  
CMA Committee

DATE: May 5, 2020

FROM: Stetson Engineers

JOB NO: 2710/11 - Santa Ynez  
SGMA

RE: **DRAFT** Phase I Data Compilation for the Santa Ynez River Groundwater Basin  
Data Management System (WMA and CMA)

### INTRODUCTION

This memorandum describes the first phase of data compilation collected and entered in to the data management system (DMS) developed for the Santa Ynez River Valley Groundwater Basin (SYRVGB) Western Management Area (WMA) and Central Management Area (CMA). This is a first step in developing and implementing a Sustainable Groundwater Management Act (SGMA) plan for these portions of the SYRVGB. It is anticipated that there will be additional phases of data that will be entered into the DMS. After each phase of data entry, this memorandum will be updated.

A description of the DMS was provided in the Data Management Plan (DMP), which included overall goals of the DMS, a description of the DMS platform, and how this addresses the needs of SGMA. This memorandum provides a snapshot view of data collected and entered into the DMS as of March 2020.



\*Lompoc Plain well pictured during field survey

- DMS Tech Memo released for CAG and public review.
- Comments considered and Revised DRAFT Final submitted to GSA.

### DMS Update:

- Collected field data incorporated
- Groundwater levels for USBR wells updated through June 2020
- Review data provided by the SYRWCD (Parent District)

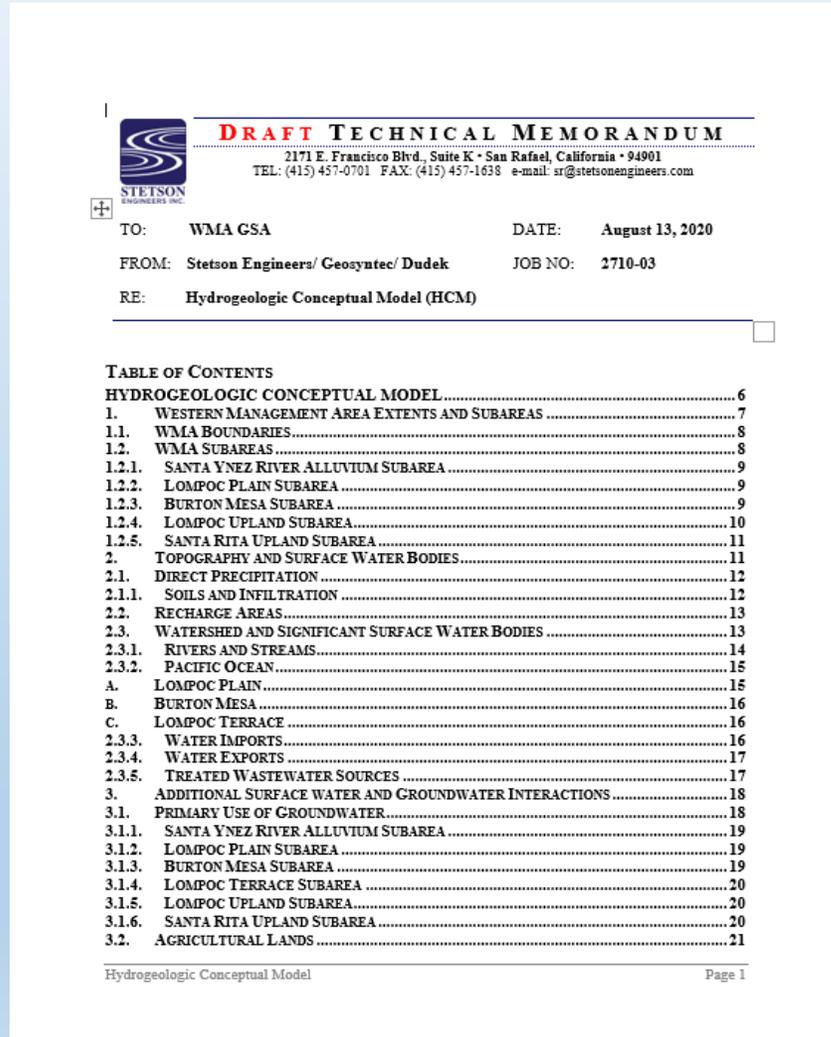
# Hydrogeologic Conceptual Model (HCM)

*Describes the conceptual understanding of the general physical characteristics of the groundwater basin.*

The Hydrogeological Conceptual Model consists of:

- Written narrative description
- Graphics that clearly portray the geographic and climatic setting, regional geology and structures, groundwater basin geometry, general groundwater water quality, and consumptive water uses in the basin.

# Hydrogeologic Conceptual Model (HCM)



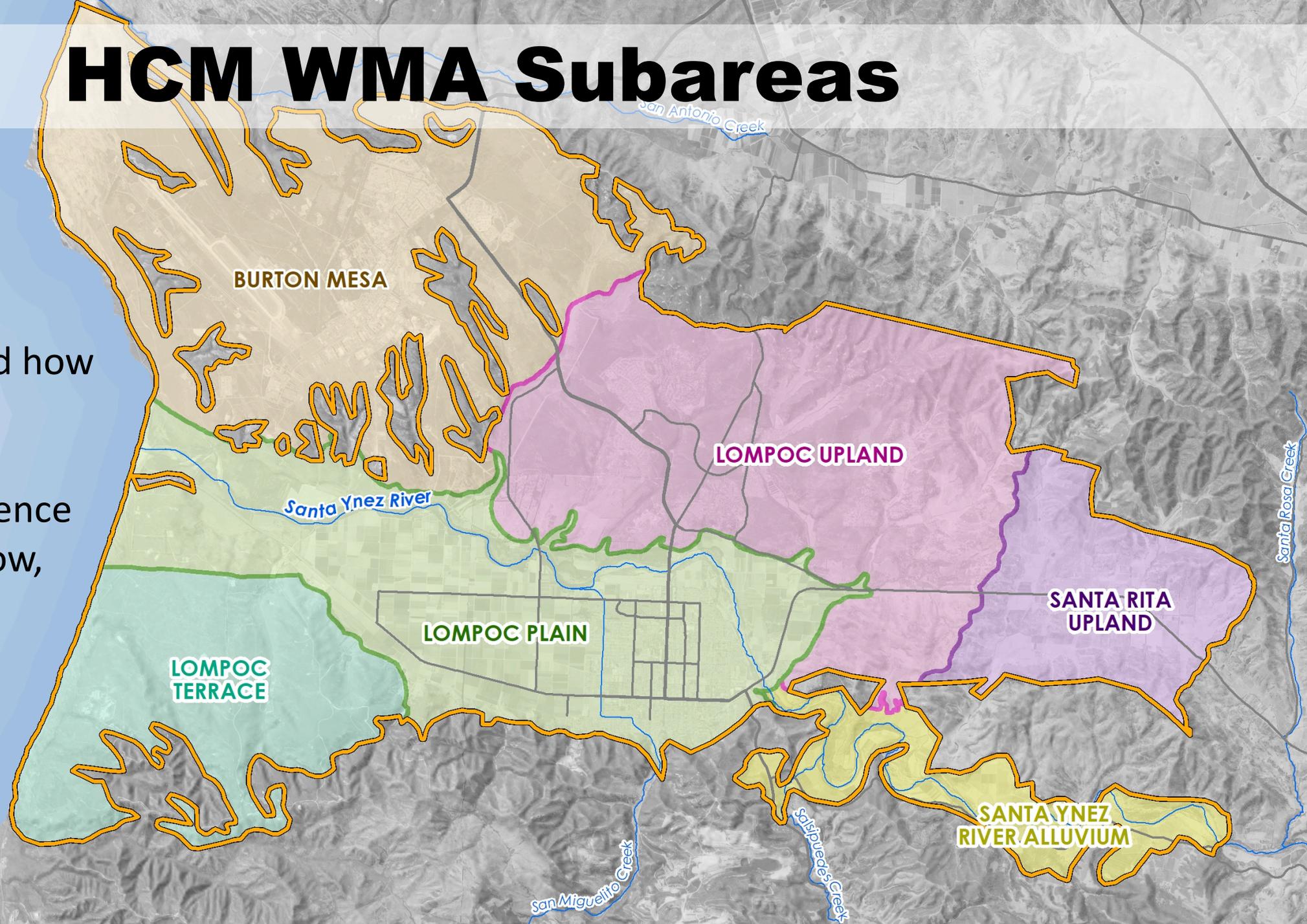
DRAFT HCM released to Staff

## HCM Sections:

- WMA Extents and Subareas
- Topography and Surface Water Bodies
- Surface Water and Groundwater Interactions
- Regional Geology
- Principal Aquifers & Aquitards

# HCM WMA Subareas

HCM provides descriptions of the WMA Subareas and how they contribute to groundwater and surface water presence and/or absence, flow, and storage

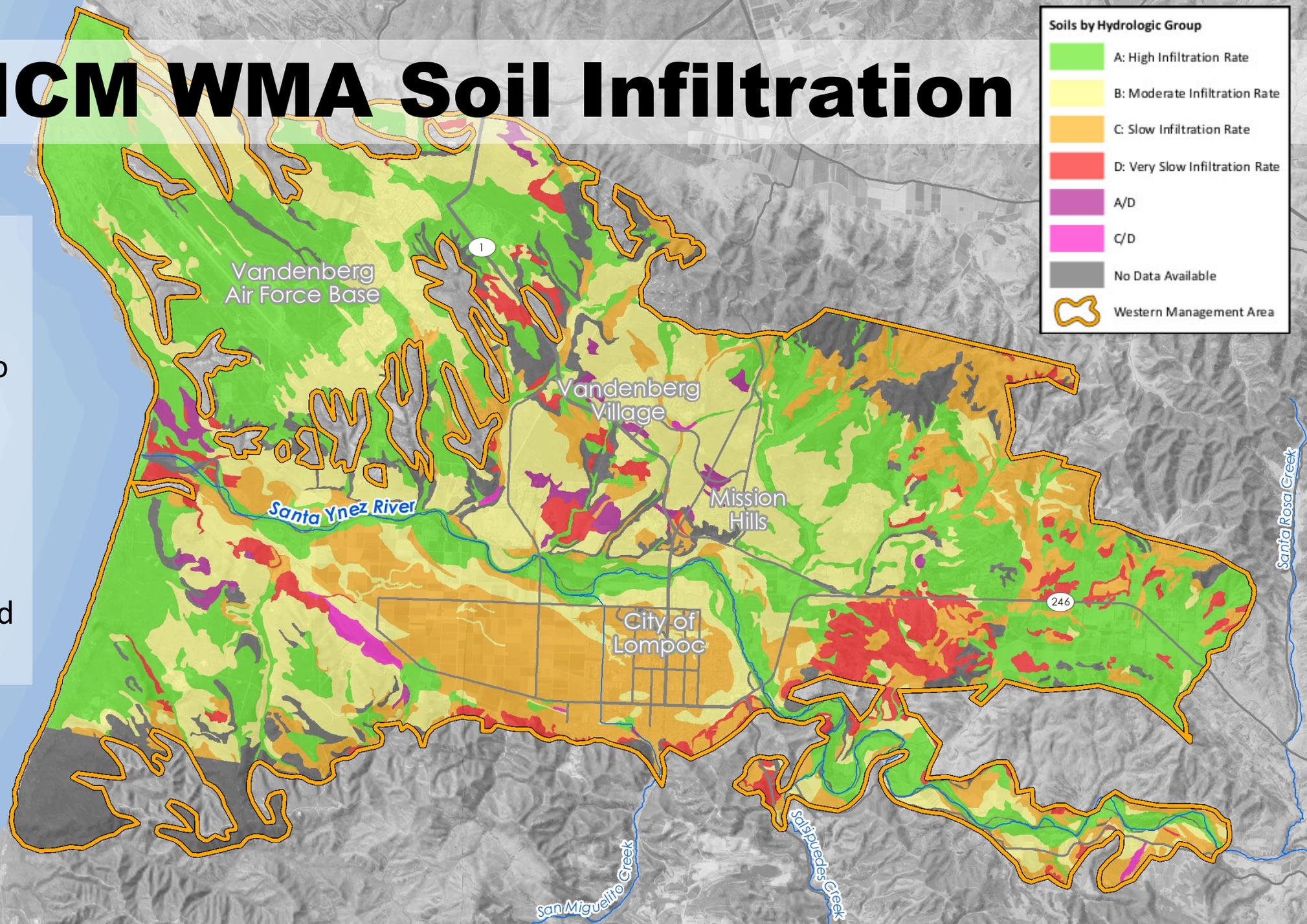


# HCM WMA Soil Infiltration

HCM presents the various soil types within the WMA and how they contribute to groundwater recharge and return flows.

PACIFIC OCEAN

The various soil types contributions to recharge are quantified in the Water Budget.



Soils by Hydrologic Group	
	A: High Infiltration Rate
	B: Moderate Infiltration Rate
	C: Slow Infiltration Rate
	D: Very Slow Infiltration Rate
	A/D
	C/D
	No Data Available
	Western Management Area

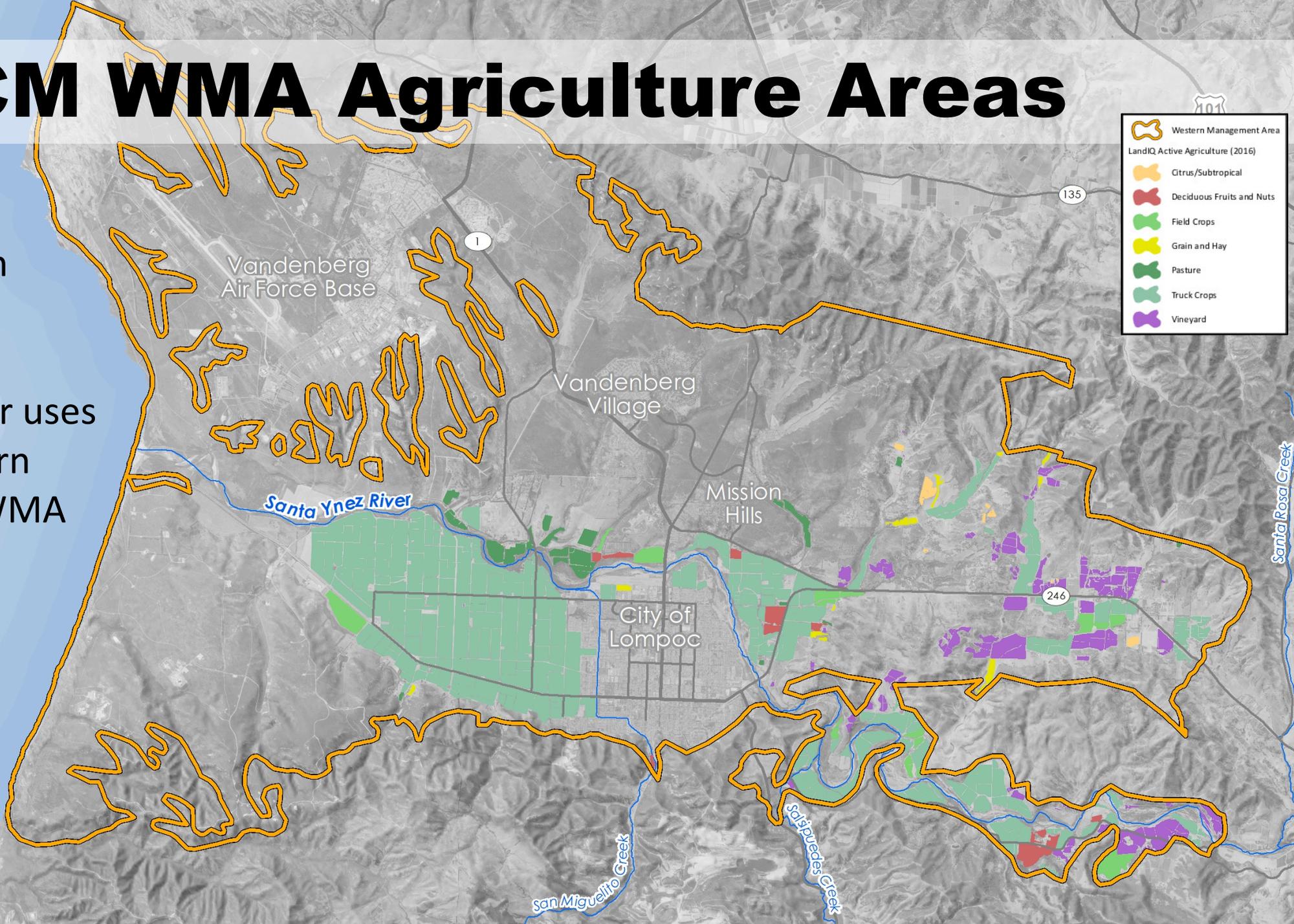
# HCM WMA Agriculture Areas

In accordance with SGMA, the HCM evaluates various consumptive water uses and potential return flows within the WMA

Western Management Area

LandIQ Active Agriculture (2016)

- Citrus/Subtropical
- Deciduous Fruits and Nuts
- Field Crops
- Grain and Hay
- Pasture
- Truck Crops
- Vineyard



\*2016 agriculture areas shown as provided by DWR

# Hydrogeologic Conceptual Model (HCM)

 **DRAFT TECHNICAL MEMORANDUM**  
2171 E. Francisco Blvd., Suite K • San Rafael, California • 94901  
TEL: (415) 457-0701 FAX: (415) 457-1638 e-mail: sr@stetsonengineers.com

TO: WMA GSA DATE: August 13, 2020  
FROM: Stetson Engineers/ Geosyntec/ Dudek JOB NO: 2710-03  
RE: Hydrogeologic Conceptual Model (HCM)

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Hydrogeologic Conceptual Model Page 1

- DRAFT HCM released to Staff in Aug
- Release to GSA committee at next meeting
- Plan to workshop the information for the GSA, public and CAG

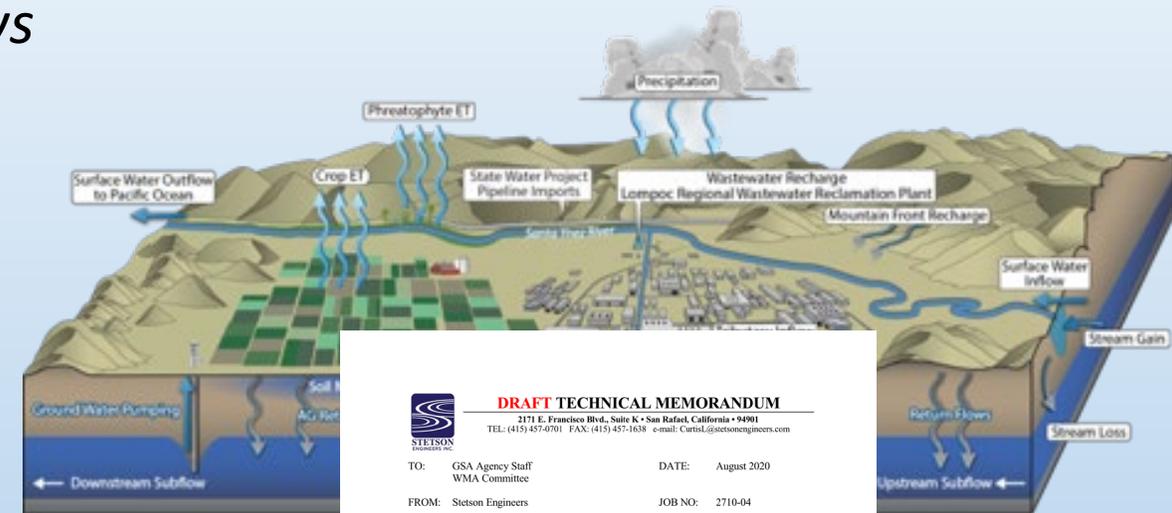
# Water Budget Technical Memo (TM)

*The accounting and characterization of spatial and temporal distribution of inflows and outflows to a watershed, groundwater basin, or management area.*

## Key Water Budget components:

- Total surface water entering and leaving the basin
- Inflows and outflows to the groundwater system
- The annual change in groundwater storage volume

**DRAFT**  
WESTERN MANAGEMENT AREA OF THE  
SANTA YNEZ RIVER VALLEY GROUNDWATER BASIN



**DRAFT TECHNICAL MEMORANDUM**

2171 E. Francisco Blvd., Suite K • San Rafael, California • 94901  
TEL: (415) 457-0701 FAX: (415) 457-1638 e-mail: [Carl@stetsonengineers.com](mailto:Carl@stetsonengineers.com)

TO: GSA Agency Staff  
WMA Committee

DATE: August 2020

FROM: Stetson Engineers

JOB NO: 2710-04

RE: **DRAFT** Western Management Area Water Budget for the Santa Ynez River Valley Groundwater Basin Groundwater Sustainability Plan

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# Water Budget TM

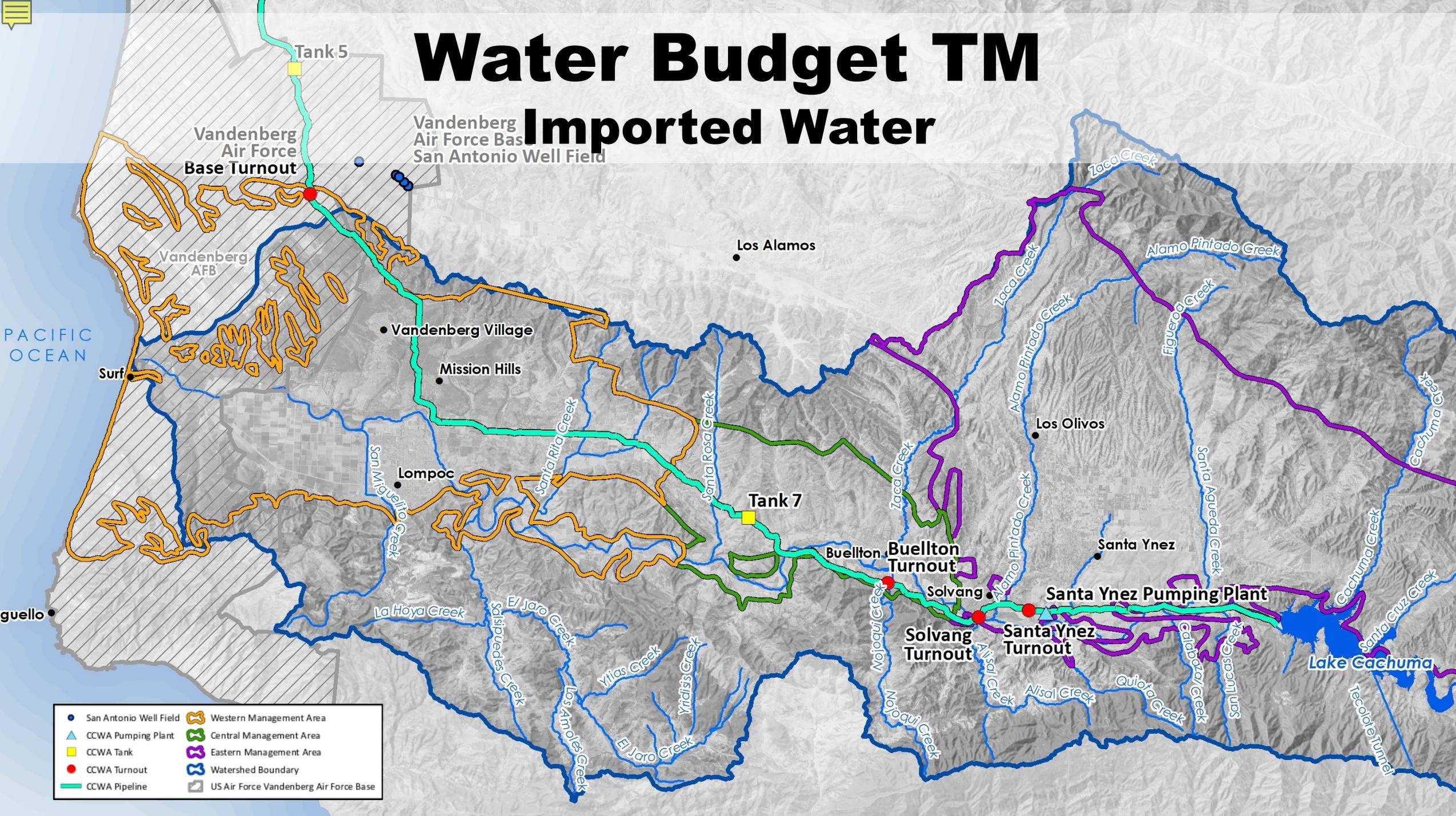
## Watershed and Water Exports



Water deliveries to South County via Tecolote, Mission and Daulton Tunnels considered in water budget

# Water Budget TM

## Imported Water



- |                          |  |
|--------------------------|--|
| ● San Antonio Well Field | Western Management Area                |
| ▲ CCWA Pumping Plant     | Central Management Area                |
| ■ CCWA Tank              | Eastern Management Area                |
| ● CCWA Turnout           | Watershed Boundary                     |
| — CCWA Pipeline          | US Air Force Vandenberg Air Force Base |

# Water Budget TM



## DRAFT TECHNICAL MEMORANDUM

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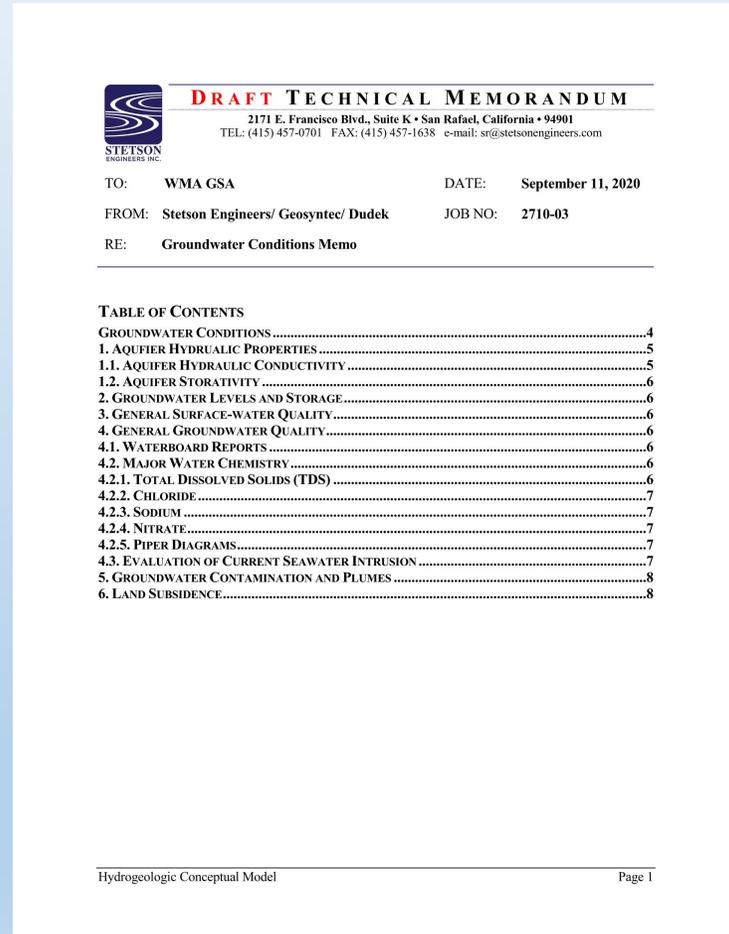
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FROM: Stetson Engineers/ Geosyntec/ Dudek JOB NO: 2710-03  
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- Plan to release DRAFT Water Budget TM to Staff in Sep
- Plan to release to GSA committee at Oct meeting
- Plan to workshop the information for the GSA, public and CAG

# Groundwater Conditions TM

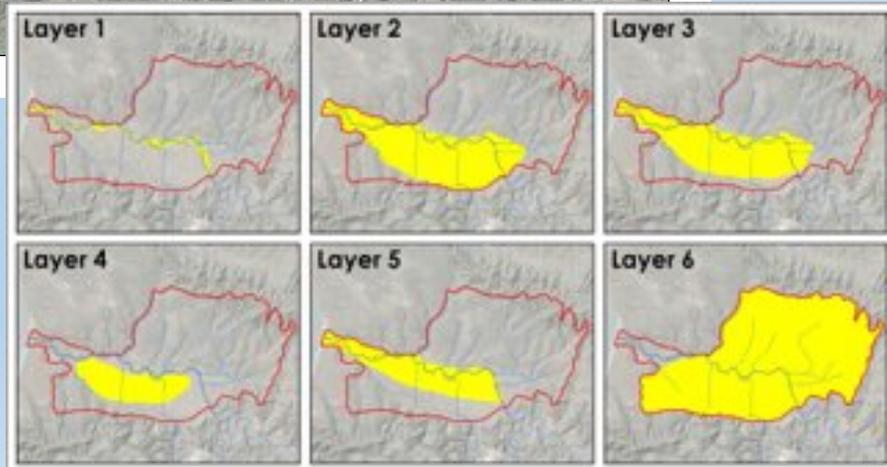
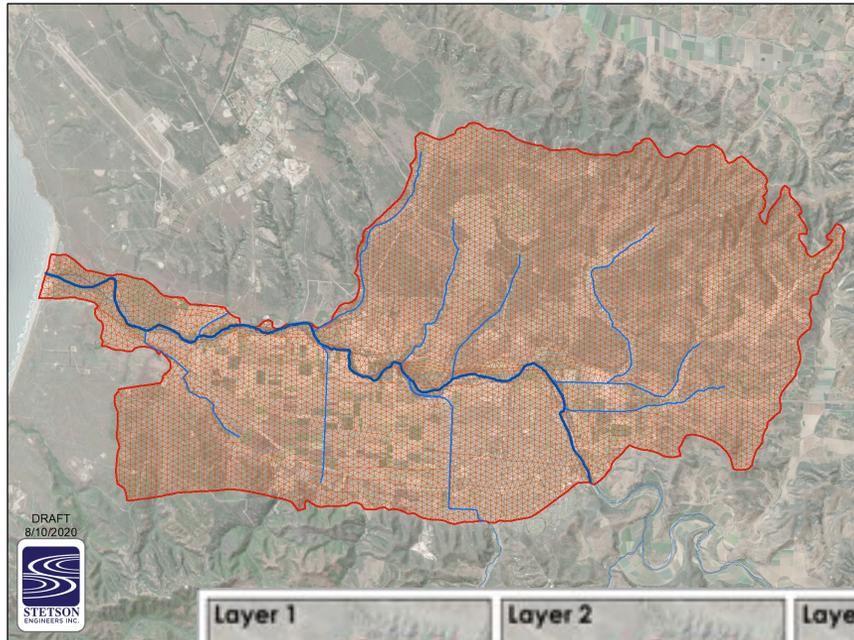


DRAFT document in progress, discusses:

- Principal aquifers and water levels
- Aquifer properties and storage
- Groundwater quality
- Surface water
- Seawater intrusion
- Land subsidence

**"description of current and historical groundwater conditions in the basin [...], based on the best available information"  
23 CCR § 354.14(a)**

# Groundwater Model



Utilize existing data to prepare MODFLOW-USG groundwater model:

- MODFLOW-USG model grid (architecture) under construction
- Model inputs include precipitation, evapotranspiration, subflow, recharge, stream-flow, conductivity, aquifer properties
- Model groundwater years 1982 - 2018

# Next Steps



Special GSA Meeting / Workshop in October to review DRAFT documents:

- Hydrogeologic Conceptual Model Technical Memo
- Water Budget Technical Memo

Regularly scheduled GSA Meeting / Workshop in November to review:

- Groundwater Conditions Technical Memo
- Groundwater Modeling Technical Memo

Groundwater modeling construction, calibration and simulations

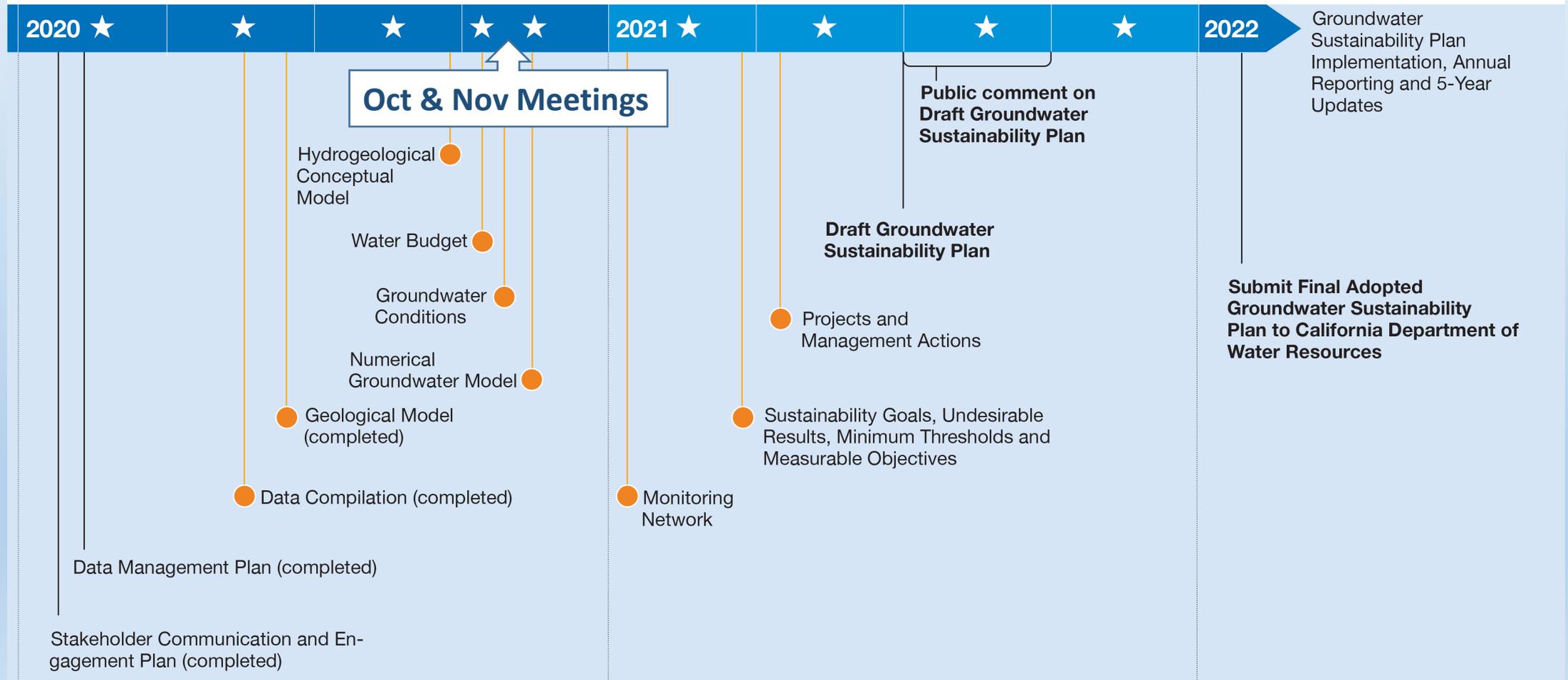


Stars denote items for public engagement and opportunities to review and provide comment

# The Way Ahead

## Groundwater Sustainability Plan Development Milestones

★ Groundwater Sustainability Agency Committee Public Meeting ● Technical Memorandum



**Questions?**



# CMA

Santa Ynez River Valley Groundwater Basin  
Central Management Area  
Groundwater Sustainability Agency

# August 2020 Status Update



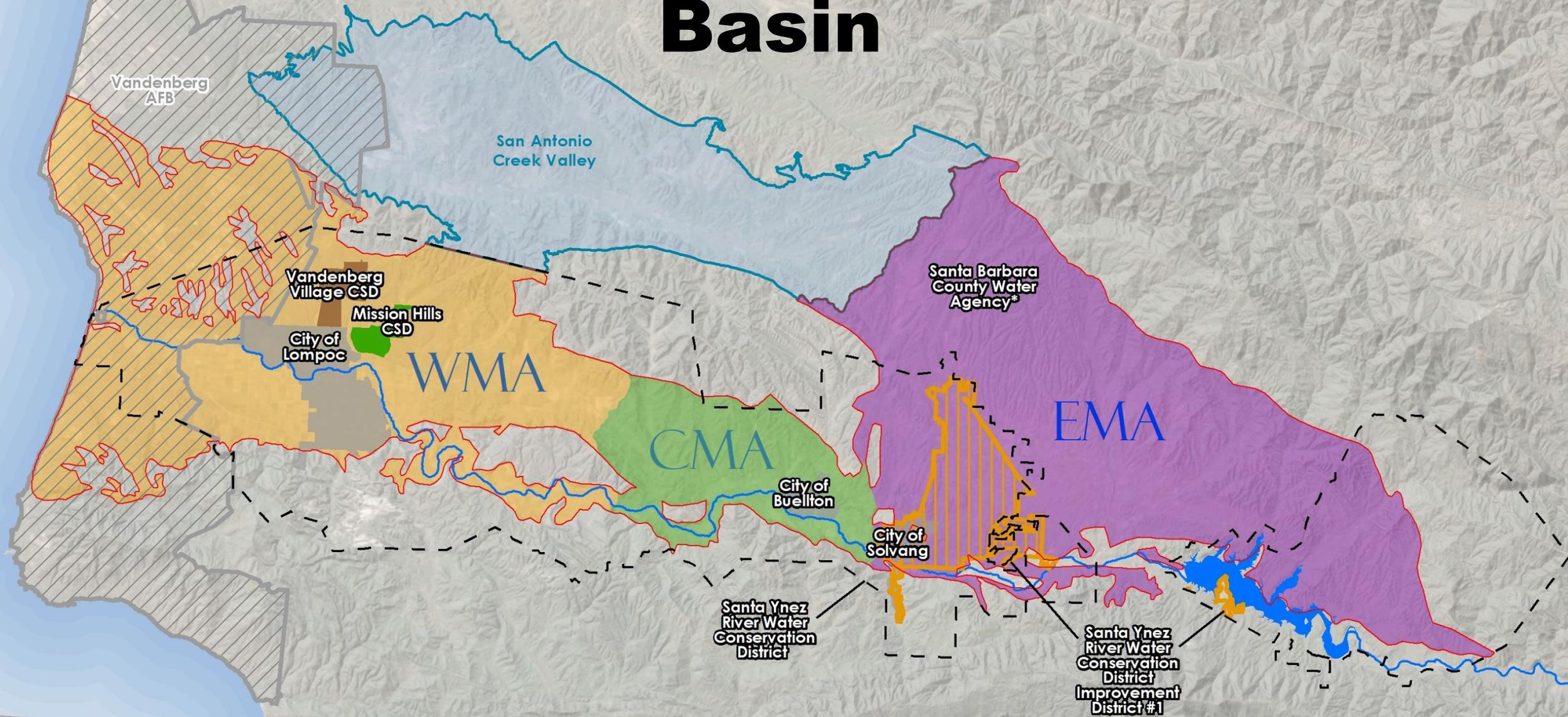
engineers | scientists | innovators



# Agenda

1. SGMA & GSA Overview
2. Timeline & Milestones
3. Consultant Team Progress
4. Next Steps
5. Schedule
6. Questions

# Santa Ynez River Valley Groundwater Basin

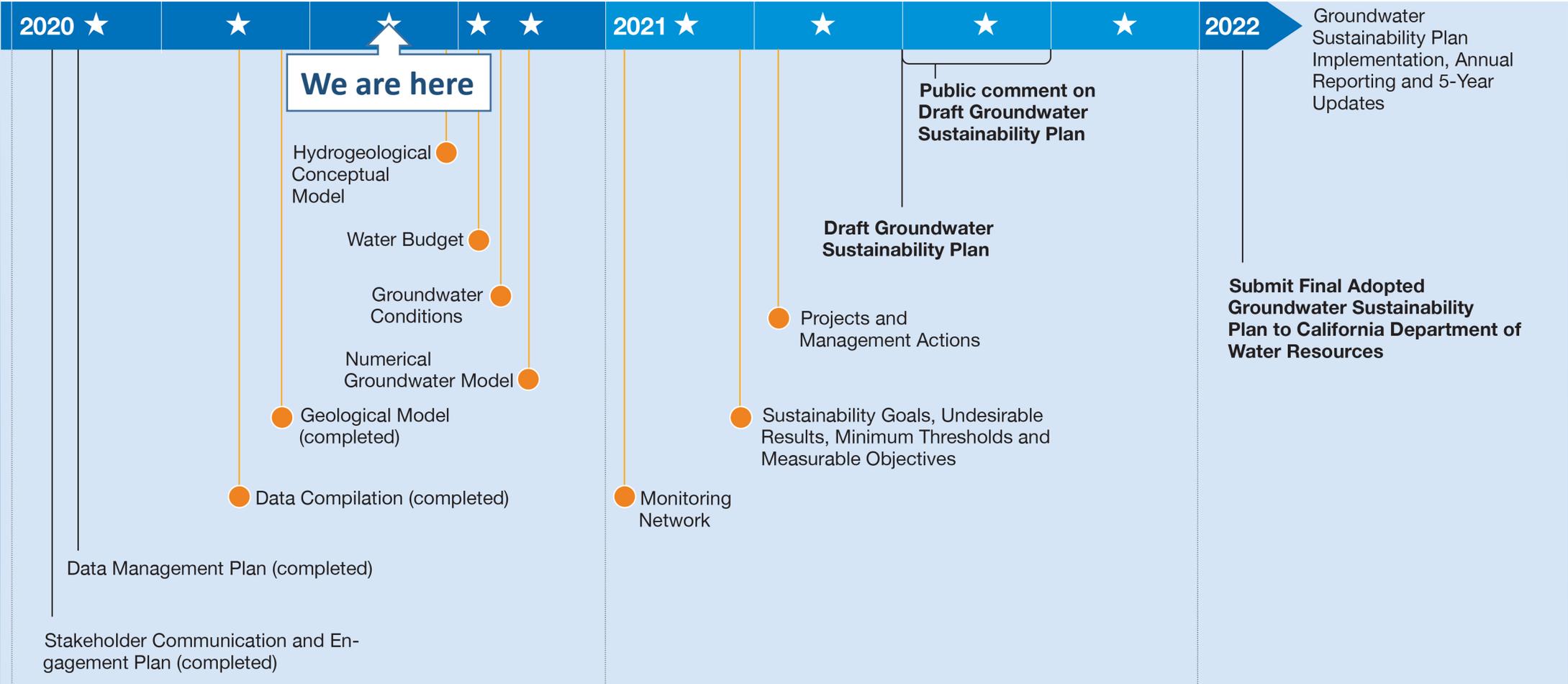


Updated Aug. 2020, includes WMA/CMA/EMA boundary updates.

# Timeline and Milestones

## Groundwater Sustainability Plan Development Milestones

★ Groundwater Sustainability Agency Committee Public Meeting ● Technical Memorandum



# Consultant Team Progress

**Geosyntec**  
consultants

153 Avenida Playa, Suite 4A  
San Rafael, CA 94901  
Tel: 415.457.0700 Fax: 415.457.0701  
www.geosyntec.com

TO: Stetson Engineers  
SUBJECT: **DRAFT** Technical Memorandum  
Regional Geology and 3D Geologic Model for the  
Santa Ynez River Valley Groundwater Basin  
PREPARED BY: Ryan Torres, Senior Professional  
Morgan Chase, Senior Geologist  
Mark Grivett, Senior Principal Hydrogeologist  
DATE: May 12, 2020

### 1. INTRODUCTION

This technical memorandum is prepared as part of the hydrologic conceptual model (HCM) for the Western and Central Management Areas (WMA and CMA, respectively) Groundwater Sustainability Agency (GSA) within the larger Santa Ynez River Valley Groundwater Basin (SYRVGB). This technical memorandum focuses on the geologic units within the SYRVGB, and the subsurface geologic model built to visualize these units. The geologic characteristics of these units are then considered in a separate study which correlates principal aquifers within the basin. This technical memo identifies the modeled geologic units and existing literature that identifies the water-bearing tendency of each unit but does not include an in-depth principal aquifer analysis or discussion.

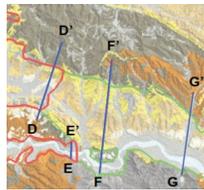
The HCM is the conceptual understanding of the physical characteristics related to the regional hydrology, land use, geologic units and structures, groundwater quality, principal groundwater aquifer, and principal aquifers of the WMA and CMA portions of the SYRVGB (basin). Understanding the regional geologic setting and structural configuration is integral to conducting subsequent technical analysis of the basin, including presence, absence and correlation of principal aquifers, identification of an appropriate monitoring network, numerical groundwater modeling, and identification of projects and management actions in accordance with the Sustainable Groundwater Management Act (SGMA).

A detailed subsurface three-dimensional model of the geologic units and structures (model) that comprise the basin was developed from publicly available published reports and data sources from the WMA and CMA GSAs. The model is intended for use as a visualization tool to communicate the regional geologic setting to the WMA and CMA GSAs, as well as the public, in accordance with SGMA. Additionally, the model will be used in concert with the Water Budget and the Data Management System to identify potential data gaps within the basin where additional data

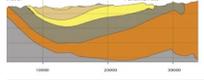
<sup>1</sup> This technical memorandum does not include the Eastern Management Area (EMA) within the SYRVGB. The EMA GSA is supported by a different consulting team.

regions | services | careers

## Section Locations



- Older Alluvium
- Orcutt
- River Channel
- Sisquoc
- Tertiary - Older than Monterey
- Paso Robles



### Sustainable Groundwater Management Quarterly Newsletter No. 1 June 2020

#### Santa Ynez River Valley Groundwater Basin (SYRVGB)

The Sustainable Groundwater Management Act (SGMA), signed into law in 2014, created a new framework for groundwater management in California. SGMA established a new structure for local groundwater management through Groundwater Sustainability Agencies (GSAs). The SYRVGB has three management areas each with their own GSA Committee comprised of local participating Agencies:

- Western Management Area (WMA) GSA Committee**
  - Santa Ynez River Water Conservation District + City of Lompoc
  - Mission Hills CSD + Vandenberg Village CSD
  - Santa Barbara County Water Agency
- Central Management Area (CMA) GSA Committee**
  - Santa Ynez River Water Conservation District + City of Buellton
  - Santa Barbara County Water Agency
- Eastern Management Area (EMA) GSA Committee**
  - Santa Ynez River Water Conservation District + City of Solvang
  - Santa Barbara County Water Agency + Santa Ynez River Water Conservation District, Improvement District No. 1

Each GSA Committee is preparing its own Groundwater Sustainability Plan (GSP) that will describe the path to groundwater sustainability. The GSPs will determine how much groundwater can be used in the future and could include restrictions on pumping.

All three GSPs will be completed in early 2022. Progress updates will be given in each quarterly GSA Committee meeting and draft documents will be available for public review and comment on the website ([www.SantaYnezWater.org](http://www.SantaYnezWater.org)). Participation by members of the community in developing the GSPs is important and each of the GSA Committees has adopted an outreach and engagement plan to guide the public participation process.

#### Management Areas and Participating Local Agencies in the SYRVGB

For more information, please visit  
[www.SantaYnezWater.org](http://www.SantaYnezWater.org)  
or call (805) 693-1156 ext. 403

## Geological Model Tech Memo

## Outreach Newsletter

## DMS Tech Memo & Data Collection

**DRAFT TECHNICAL MEMORANDUM**  
2711 E. Francisco Blvd., Suite 4 - San Rafael, California 94901  
TEL: (415) 457-0700 FAX: (415) 457-0638 e-mail: [info@geosyntec.com](mailto:info@geosyntec.com)

TO: CMA GSA DATE: August 15, 2020  
FROM: Stetson Engineers/Geosyntec/Dusk JOB NO: 2711-03  
RE: Hydrologic Conceptual Model (HCM)

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Hydrologic Conceptual Model Page 1

## DRAFT HCM Tech Memo

**DRAFT TECHNICAL MEMORANDUM**  
2711 E. Francisco Blvd., Suite 4 - San Rafael, California 94901  
TEL: (415) 457-0700 FAX: (415) 457-0638 e-mail: [info@geosyntec.com](mailto:info@geosyntec.com)

TO: GSA Agency Staff DATE: August 2020  
FROM: Stetson Engineers JOB NO: 2711-04  
RE: **DRAFT** Central Management Area Water Budget for the Santa Ynez River Valley Groundwater Basin Groundwater Sustainability Plan

This DRAFT Water Budget Technical Memorandum is written for inclusion in a chapter in the Santa Ynez River Valley Groundwater Basin Groundwater Sustainability Plan ("GSP") in accordance with the Sustainable Groundwater Management Act ("SGMA"). The GSP is an interagency collaboration of eight public agencies involved in water resources in Santa Ynez River Valley Groundwater Basin ("SYRVGB"). The SYRVGB is divided into three management areas: Western Management Area ("WMA"), Central Management Area ("CMA"), and Eastern Management Area ("EMA"). This WMA Water Budget Technical Memorandum is prepared by Stetson Engineers Project Team (Stetson, Geosyntec, and Dusk) for the WMA Groundwater Sustainability Agency ("GSA") in cooperation with CMA and EMA GSAs. Other chapters of the GSP will describe the hydrologic conceptual model, management coordination, past and present management plans, and groundwater conditions in the SYRVGB.

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WATER IMPORTS  
PELINE AND SAN ANTONIO WELLS  
IN CENTRAL AND EASTERN MANAGEMENT AREAS

## DRAFT Water Budget

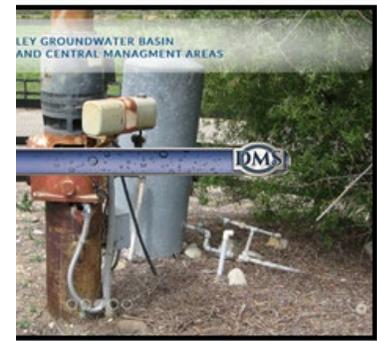
**DRAFT TECHNICAL MEMORANDUM**  
2711 E. Francisco Blvd., Suite 4 - San Rafael, California 94901  
TEL: (415) 457-0700 FAX: (415) 457-0638 e-mail: [info@geosyntec.com](mailto:info@geosyntec.com)

TO: GSA Agency Staff DATE: May 5, 2020  
FROM: Stetson Engineers JOB NO: 271011 - Santa Ynez SGMA  
RE: **DRAFT** Phase I Data Collection for the Santa Ynez River Groundwater Basin Data Management System (DMS) (WMA and CMA)

### INTRODUCTION

This memorandum describes the first phase of data compilation collected and entered into the data management system (DMS) developed for the Santa Ynez River Valley Groundwater Basin (SYRVGB) Western Management Area (WMA) and Central Management Area (CMA). This is a first step in developing and implementing a Sustainable Groundwater Management Act (SGMA) plan for these portions of the SYRVGB. It is anticipated that there will be additional phases of data that will be entered into the DMS. After each phase of data entry, this memorandum will be updated.

A description of the DMS was provided in the Data Management Plan (DMP), which included overall goals of the DMS, a description of the DMS platform, and how this addresses the needs of SGMA. This memorandum provides a snapshot view of data collected and entered into the DMS as of March 2020.



**Progress Report**  
2711 E. Francisco Blvd., Suite 4 - San Rafael, California 94901  
Phone: (415) 457-0700 FAX: (415) 457-0638 Web site: [www.geosyntec.com](http://www.geosyntec.com)

JN 2710 Lompoc Model Progress Report

The conceptualization and physical extents of the FEMFLOW3D groundwater flow model is being converted to the finite difference MODFLOW-LSG model code (LDMPOC-LSG). The modeling work completed through this billing period are summarized in the following bullet points. The attached table presents the LDMPOC-LSG model packages and model conversion progress.

- GIS was used to map the FEMFLOW3D model structure into polygons for the LSG model - developing six layers and 29,055 active cells. Cell discretization provided the horizontal extent and vertical elevation for each model cell. The grid system represents the geologic structure of the aquifers in the Lompoc Area.
- All model layers are coarsely specified which allow the model layer types to convert between confined and unconfined depending on the water level conditions.
- Model simulation period was extended from 357 monthly stress periods (January 1983 through September 2012) to 456 monthly stress periods (October 1982 and September 2020).
- FEMFLOW3D hydraulic properties (Kxy, Sz) and specified fluxhead (subflow beneath river, lagoons) were transferred into MODFLOW-LSG.
- Using USGS hydrologic survey, the Santa Ynez River and 12 tributaries were mapped onto layer 1 model cells to develop the Streamflow Routing package for the model.
- Modeling conference calls were had to streamline model conversion from FEMFLOW3D into MODFLOW-LSG.
- Digital land use maps were compiled for 17 years (every two years from 1984 to 2016). Seven categories were delineated by model cell for assigning recharge and evapotranspiration. (Appendix 1).
- Pumping distribution was developed for 187 alluvial irrigation wells, 7 upland irrigation wells, and 4 residential wells. Assigned pumping by well was transferred for Lompoc, Mission Hills, and Vandenberg Village wells. (Figure 11)

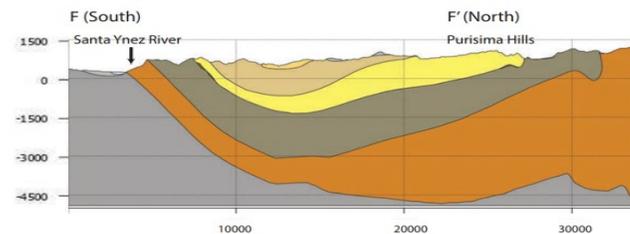
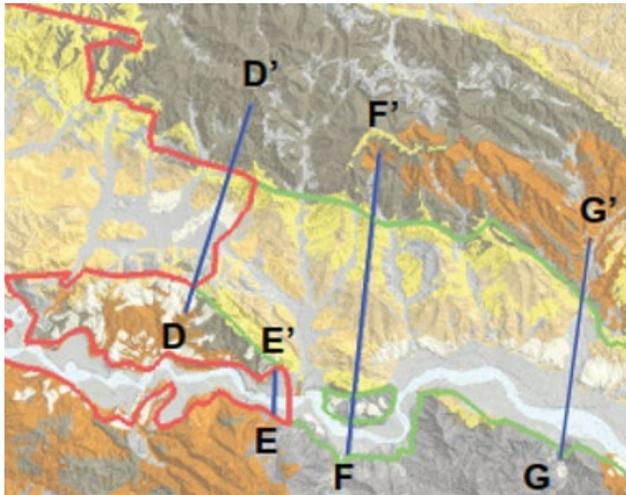
Stetson Engineers Inc. 8/3/2020 Lompoc Model Status Page 1

## Groundwater Modeling

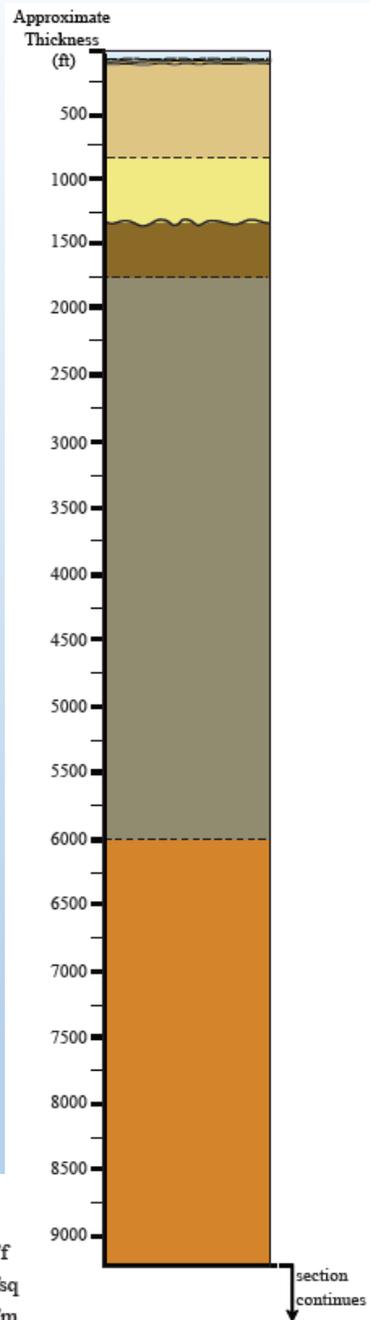
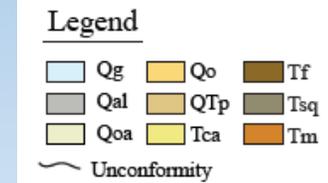
# Geologic Model

## Technical Memorandum

### Section Locations



- Released for CAG and public review
- Comments considered and incorporated
- DRAFT Final submitted to the GSA committee
- SkyTEM data may be used later to refine the model



# Outreach & Engagement

## Sustainable Groundwater Management Quarterly Newsletter No. 1 June 2020

### Santa Ynez River Valley Groundwater Basin (SYRVGB)

The Sustainable Groundwater Management Act (SGMA), signed into law in 2014, created a new framework for groundwater management in California. SGMA established a new structure for local groundwater management through Groundwater Sustainability Agencies (GSAs). The SYRVGB has three management areas each with their own GSA Committee comprised of local participating Agencies:

#### Western Management Area (WMA) GSA Committee

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- Mission Hills CSD • Vandenberg Village CSD
- Santa Barbara County Water Agency

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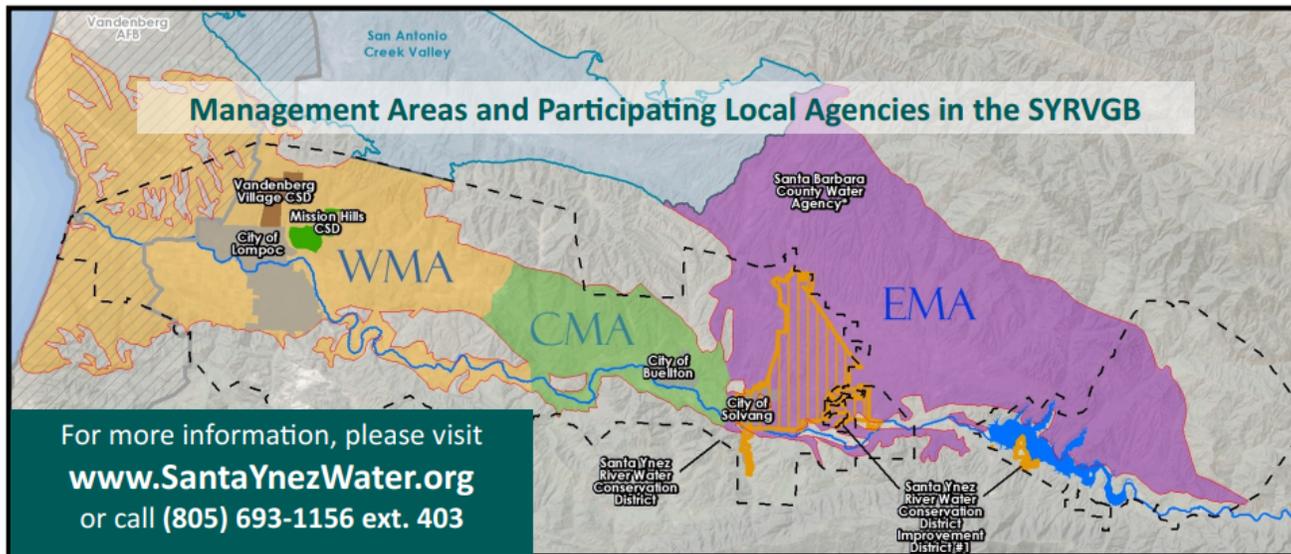
- Santa Ynez River Water Conservation District • City of Buellton
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- Santa Ynez River Water Conservation District • City of Solvang
- Santa Barbara County Water Agency • Santa Ynez River Water Conservation District, Improvement District No. 1

Each GSA Committee is preparing its own Groundwater Sustainability Plan (GSP) that will describe the path to groundwater sustainability. **The GSPs will determine how much groundwater can be used in the future and could include restrictions on pumping.**

All three GSPs will be completed in early 2022. Progress updates will be given in each quarterly GSA Committee meeting and draft documents will be available for public review and comment on the website ([www.SantaYnezWater.org](http://www.SantaYnezWater.org)). **Participation by members of the community in developing the GSPs is important and each of the GSA Committees has adopted an outreach and engagement plan to guide the public participation process.**



## First Newsletter Created

- English and Spanish versions
- CAG feedback
- Distributed in Water Bills
- Available online at: [SantaYnezWater.org](http://SantaYnezWater.org) and GSA member agency websites

FAQs also developed and available on [SantaYnezWater.org](http://SantaYnezWater.org)

# DMS Tech Memo and Data Update



DMS Tech Memo released for CAG and public review. Comments considered and DRAFT Final submitted to GSA.

## DMS Update:

- Collected field data incorporated
- Groundwater levels for USBR wells updated through June 2020
- Review data provided by the SYRWCD (Parent District)

\*Buellton Uplands well pictured

 **DRAFT TECHNICAL MEMORANDUM**  
2175 E. Francisco Blvd., Suite K • San Rafael, California • 94901  
TEL: (415) 457-0700 FAX: (415) 457-0100 e-mail: info@stetson.com

TO: GSA Agency Staff  
WMA Committee  
CMA Committee

DATE: May 5, 2020

FROM: Stetson Engineers

JOB NO: 2710/11 - Santa Ynez  
SGMA

RE: **DRAFT** Phase I Data Compilation for the Santa Ynez River Groundwater Basin  
Data Management System (WMA and CMA)

### INTRODUCTION

This memorandum describes the first phase of data compilation collected and entered into the data management system (DMS) developed for the Santa Ynez River Valley Groundwater Basin (SYRVGB) Western Management Area (WMA) and Central Management Area (CMA). This is a first step in developing and implementing a Sustainable Groundwater Management Act (SGMA) plan for these portions of the SYRVGB. It is anticipated that there will be additional phases of data that will be entered into the DMS. After each phase of data entry, this memorandum will be updated.

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# Hydrogeologic Conceptual Model (HCM)

*Describes the conceptual understanding of the general physical characteristics of the groundwater basin.*

The Hydrogeological Conceptual Model consists of:

- Written narrative description
- Graphics that clearly portray the geographic and climatic setting, regional geology and structures, groundwater basin geometry, general groundwater water quality, and consumptive water uses in the basin.

# Hydrogeologic Conceptual Model (HCM)



## DRAFT TECHNICAL MEMORANDUM

2171 E. Francisco Blvd., Suite K • San Rafael, California • 94901  
TEL: (415) 457-0701 FAX: (415) 457-1638 e-mail: sr@stetsonengineers.com

TO: CMA GSA DATE: August 15, 2020  
FROM: Stetson Engineers/ Geosyntec/ Dudek JOB NO: 2711-03  
RE: Hydrogeologic Conceptual Model (HCM)

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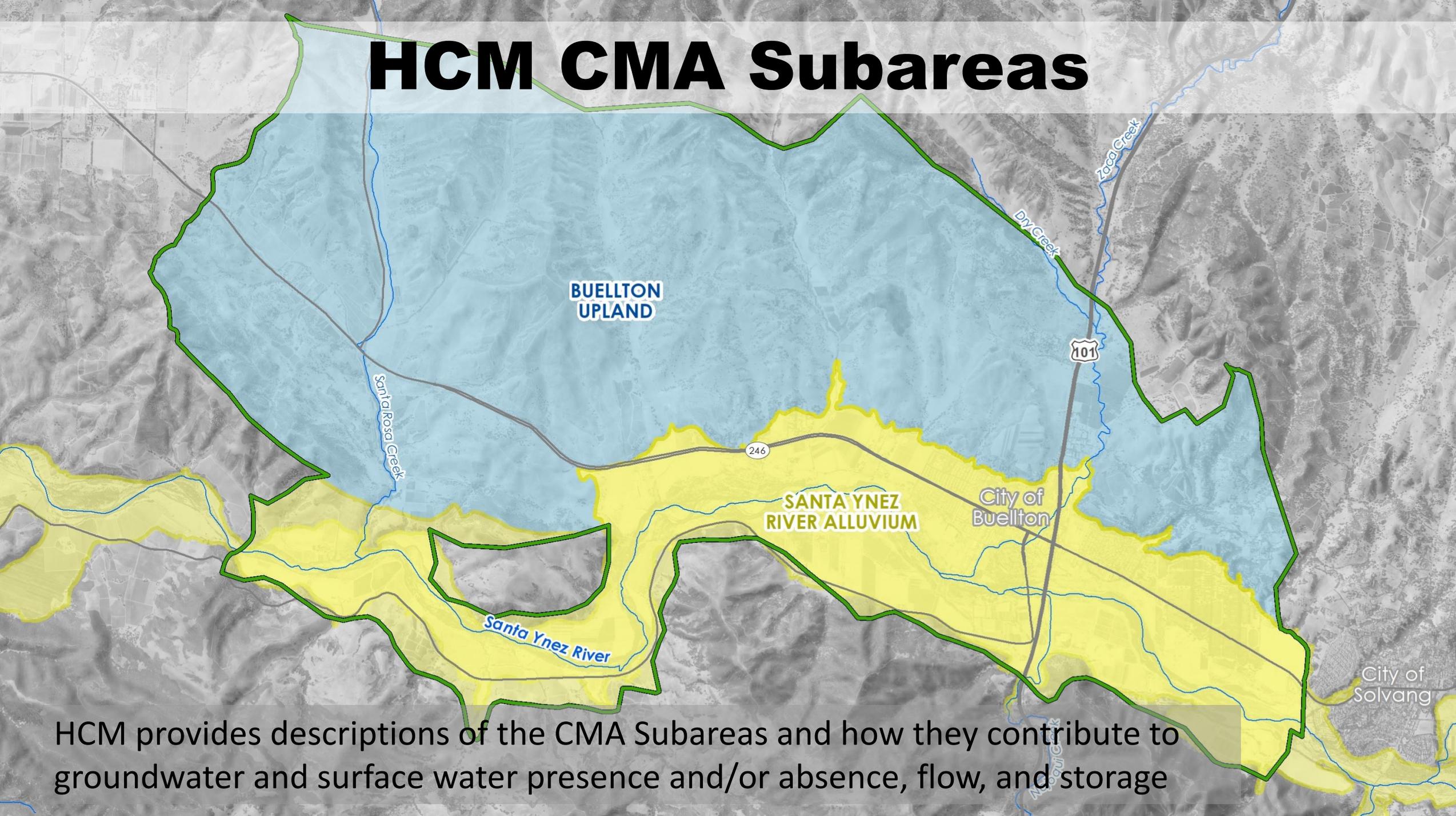
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DRAFT HCM released to Staff

## HCM Sections:

- CMA Extents and Subareas
- Topography and Surface Water Bodies
- Surface Water and Groundwater Interactions
- Regional Geology
- Principal Aquifers & Aquitards

# HCM CMA Subareas



**BUELLTON  
UPLAND**

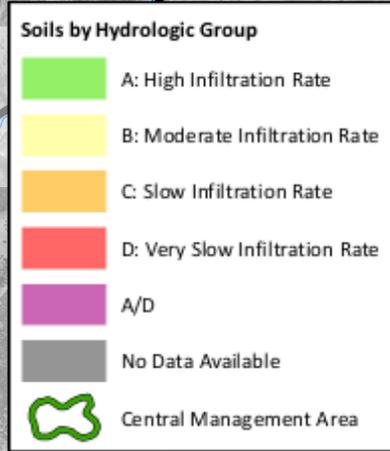
**SANTA YNEZ  
RIVER ALLUVIUM**

City of  
Buellton

City of  
Solvang

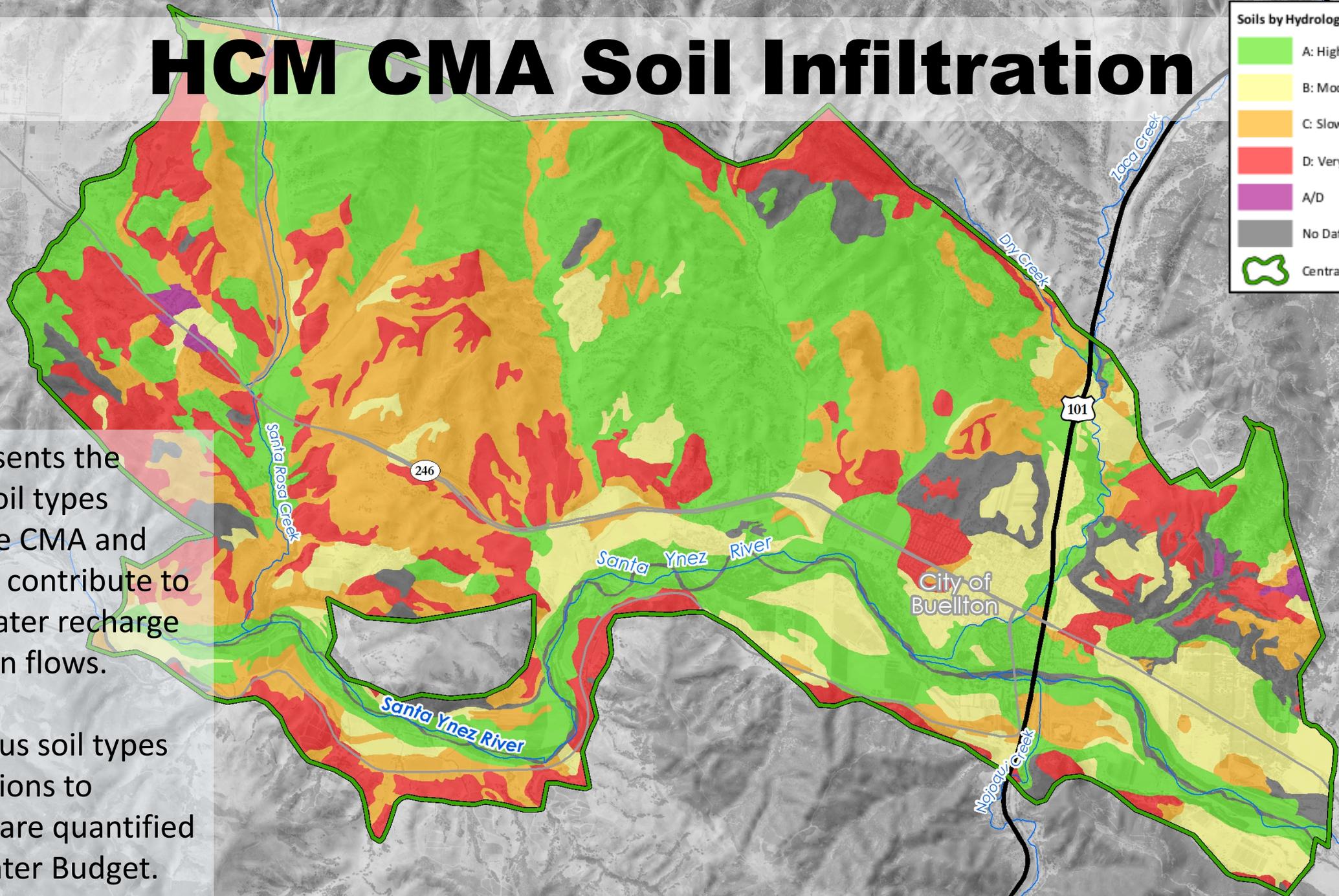
HCM provides descriptions of the CMA Subareas and how they contribute to groundwater and surface water presence and/or absence, flow, and storage

# HCM CMA Soil Infiltration



HCM presents the various soil types within the CMA and how they contribute to groundwater recharge and return flows.

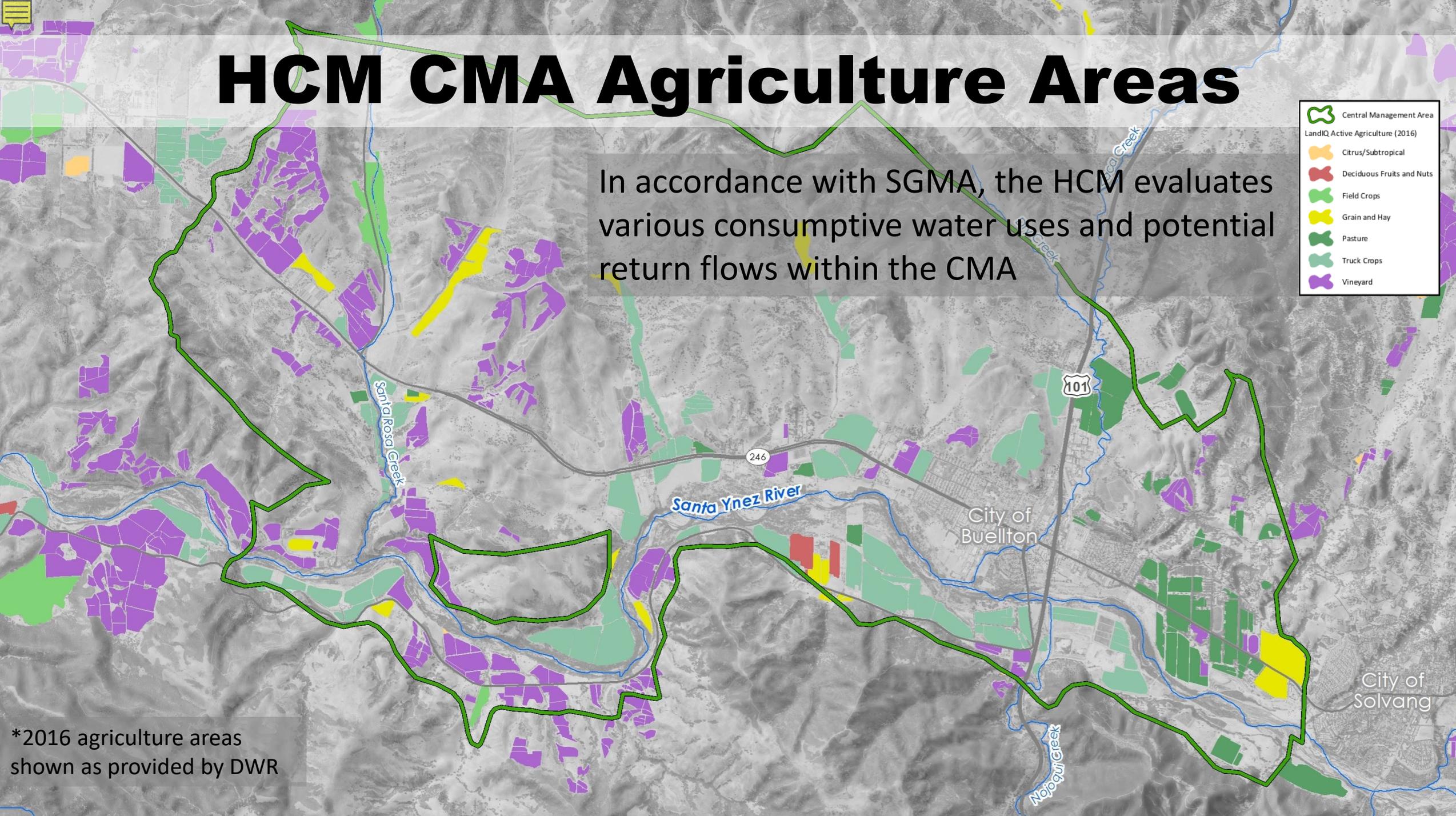
The various soil types contributions to recharge are quantified in the Water Budget.



# HCM CMA Agriculture Areas

In accordance with SGMA, the HCM evaluates various consumptive water uses and potential return flows within the CMA

- Central Management Area
- LandIQ Active Agriculture (2016)
  - Citrus/Subtropical
  - Deciduous Fruits and Nuts
  - Field Crops
  - Grain and Hay
  - Pasture
  - Truck Crops
  - Vineyard



\*2016 agriculture areas shown as provided by DWR



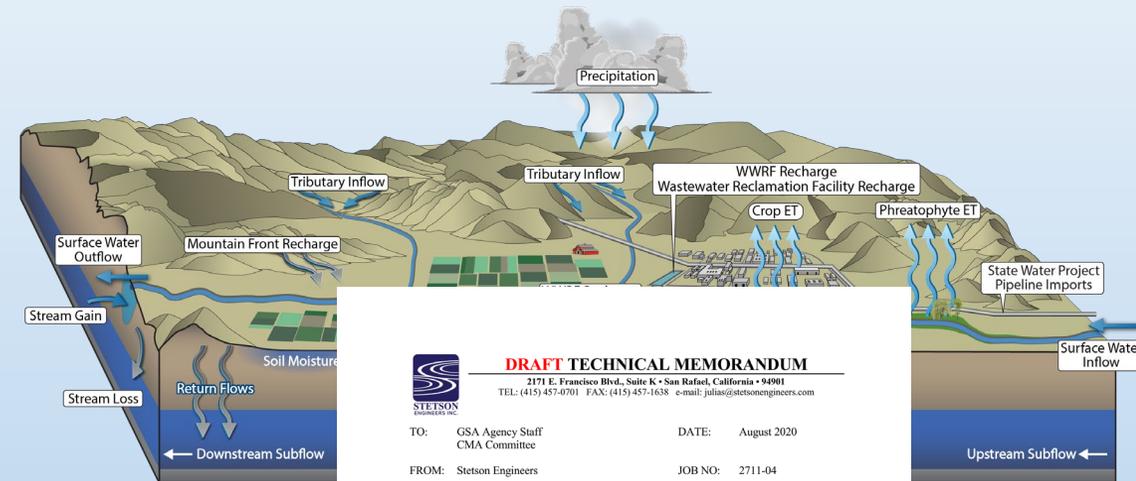
# Water Budget Technical Memo (TM)

*The accounting and characterization of spatial and temporal distribution of inflows and outflows to a watershed, groundwater basin, or management area.*

## Key Water Budget components:

- Total surface water entering and leaving the basin
- Inflows and outflows to the groundwater system
- The annual change in groundwater storage volume

CENTRAL MANAGEMENT AREA OF THE  
SANTA YNEZ RIVER VALLEY GROUNDWATER BASIN



### DRAFT TECHNICAL MEMORANDUM

2171 E. Francisco Blvd., Suite K • San Rafael, California • 94901  
TEL: (415) 457-0701 FAX: (415) 457-1638 e-mail: julian@stetsonengineers.com

TO: GSA Agency Staff  
CMA Committee

DATE: August 2020

FROM: Stetson Engineers

JOB NO: 2711-04

RE: **DRAFT** Central Management Area Water Budget for the Santa Ynez River Valley  
Groundwater Basin Groundwater Sustainability Plan

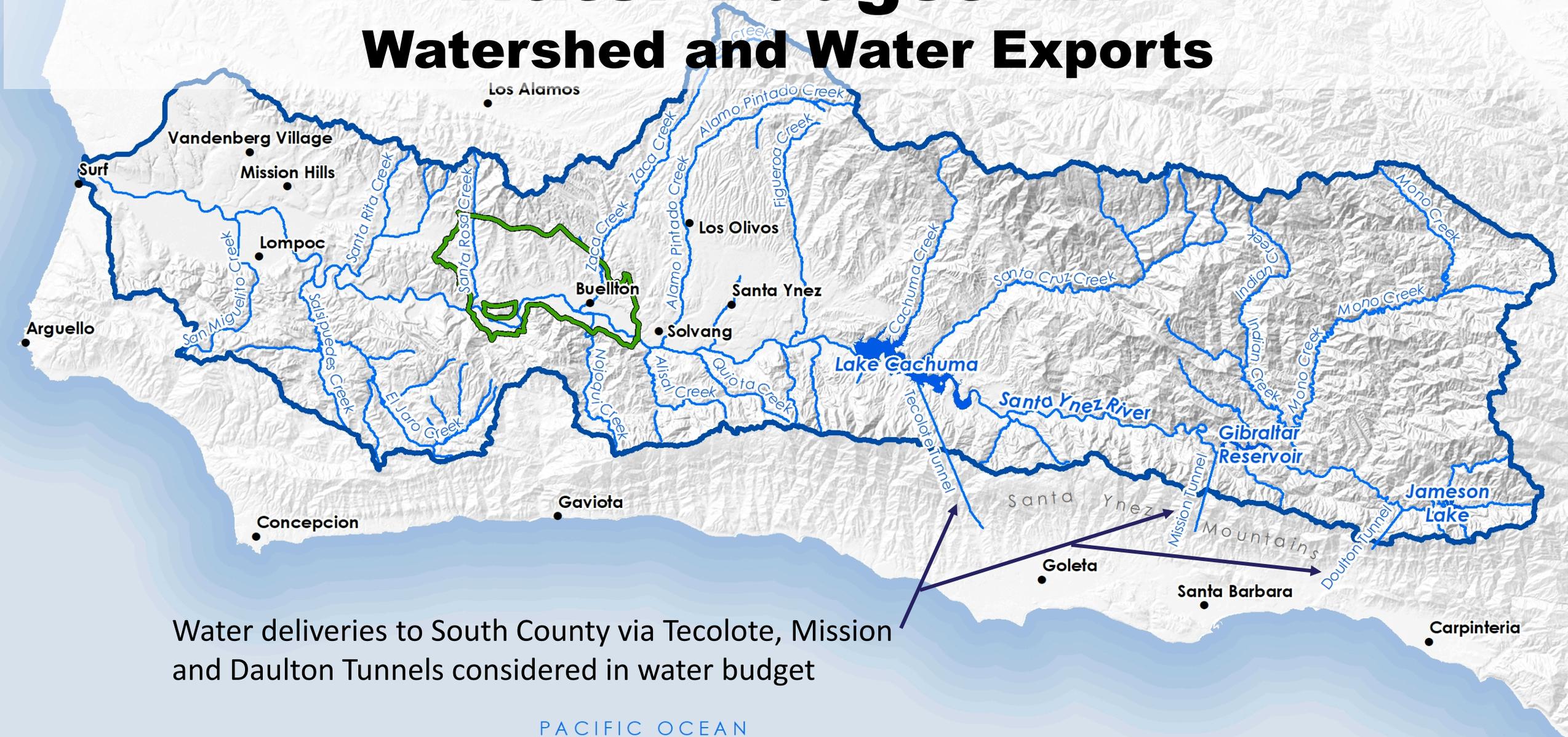
This DRAFT Water Budget Technical Memorandum is written for inclusion as a chapter in the Santa Ynez River Valley Groundwater Basin Groundwater Sustainability Plan ("GSP") in accordance with the Sustainable Groundwater Management Act ("SGMA"). The GSP is an interagency collaboration of eight public agencies involved in water resources in Santa Ynez River Valley Groundwater Basin ("SYRVGB"). The SYRVGB is divided into three management areas: Western Management Area ("WMA"), Central Management Area ("CMA"), and Eastern Management Area ("EMA"). This WMA Water Budget Technical Memorandum is prepared by Stetson Engineers Project Team (Stetson, Geosyntec, and Dudek) for the WMA Groundwater Sustainability Agency ("GSA") in cooperation with CMA and EMA GSAs. Other chapters of the GSP will describe the hydrogeologic conceptual model, management coordination, past and previous management plans, and groundwater conditions in the SYRVGB.

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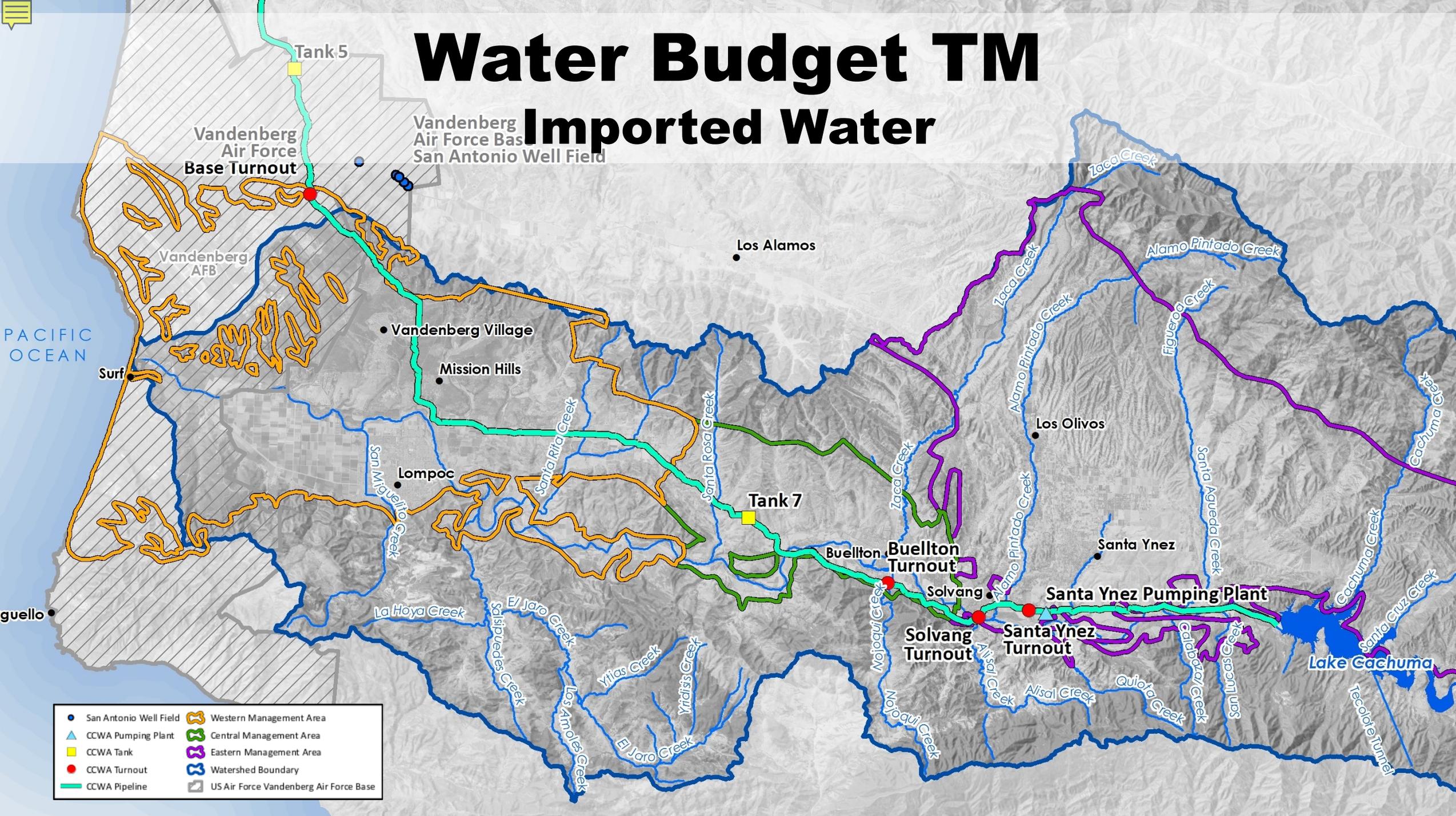
# Water Budget TM

## Watershed and Water Exports



# Water Budget TM

## Imported Water



- |  |  |
|--|--|
| <span style="color: blue;">●</span> San Antonio Well Field | Western Management Area                |
| <span style="color: blue;">▲</span> CCWA Pumping Plant     | Central Management Area                |
| <span style="color: yellow;">■</span> CCWA Tank            | Eastern Management Area                |
| <span style="color: red;">●</span> CCWA Turnout            | Watershed Boundary                     |
| CCWA Pipeline  | US Air Force Vandenberg Air Force Base |

# Water Budget TM



## DRAFT TECHNICAL MEMORANDUM

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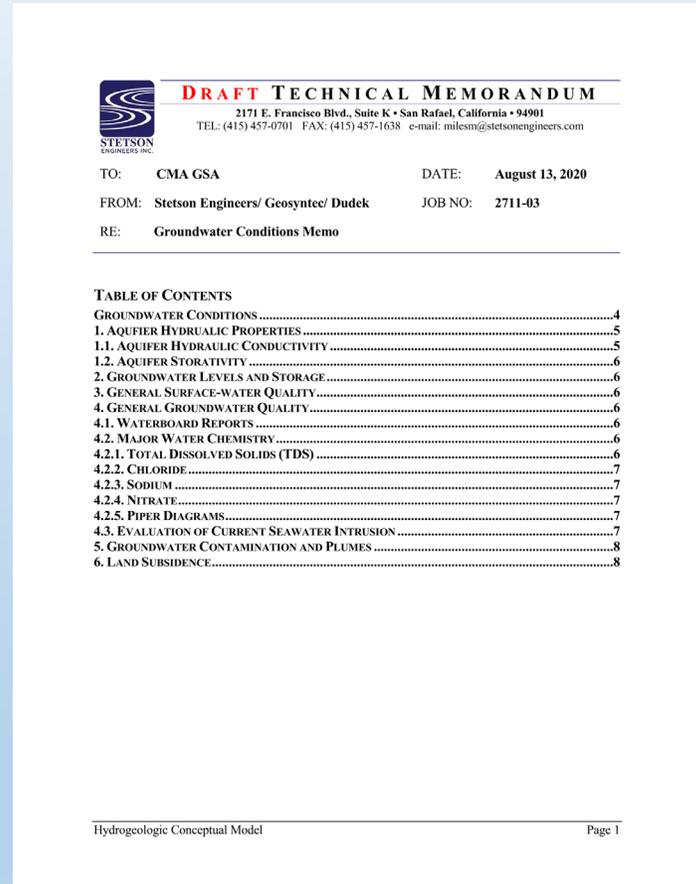
TO: WMA GSA DATE: August 13, 2020  
FROM: Stetson Engineers/ Geosyntec/ Dudek JOB NO: 2710-03  
RE: Hydrogeologic Conceptual Model (HCM)

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- Plan to release DRAFT Water Budget TM to Staff in Sep
- Plan to release to GSA committee at Oct meeting
- Plan to workshop the information for the GSA, public and CAG

# Groundwater Conditions TM



DRAFT document in progress, discusses:

- Principal aquifers and water levels
- Aquifer properties and storage
- Groundwater quality
- Surface water
- Seawater intrusion
- Land subsidence

**"description of current and historical groundwater conditions in the basin [...], based on the best available information"  
23 CCR § 354.14(a)**

# Groundwater Model

Conversion of FEMFLOW  
model into modern MODFLOW-  
USG of existing model:

- Node structure converted into MODFLOW-USGS
- Hydraulic properties converted over

# Next Steps



Special GSA Meeting / Workshop in October to review DRAFT documents:

- Hydrogeologic Conceptual Model Technical Memo
- Water Budget Technical Memo

Regularly scheduled GSA Meeting / Workshop in November to review:

- Groundwater Conditions Technical Memo
- Groundwater Modeling Technical Memo

Groundwater modeling construction, calibration and simulations

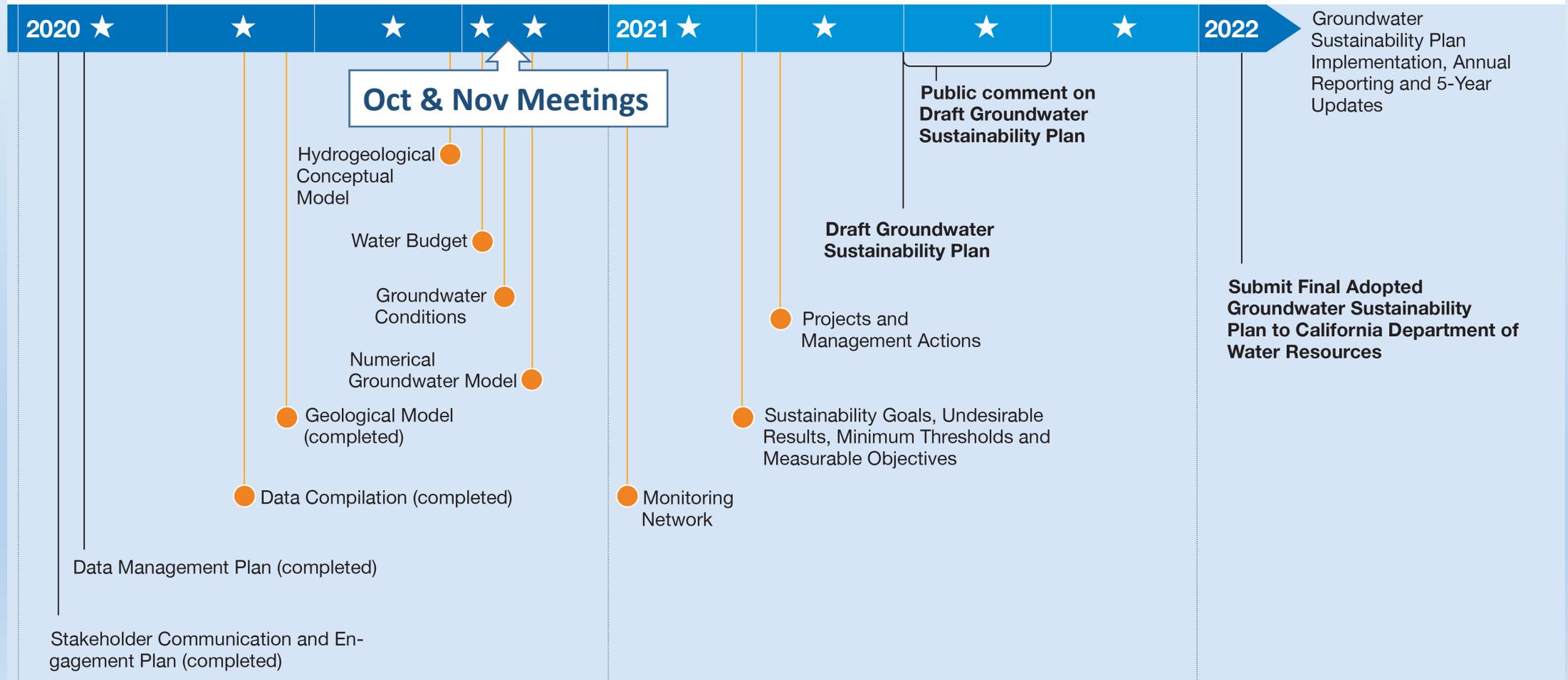


Stars denote items for public engagement and opportunities to review and provide comment

# The Way Ahead

## Groundwater Sustainability Plan Development Milestones

★ Groundwater Sustainability Agency Committee Public Meeting ● Technical Memorandum



**Questions?**