



DRAFT TECHNICAL MEMORANDUM

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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.

DATA COLLECTION GOALS

Different types of geologic and hydrogeologic data are required to prepare a Groundwater Sustainability Plan (GSP) that is compliant with the Sustainable Groundwater Management Act (SGMA) of 2014. Data from Federal, State and Local agencies as well as private well owners were collected with the goal to prepare parts of the GSP including:

1. Description of the basin, and basin characterization;
2. Development of the preliminary water budget for the basin
3. Preparation of the hydrogeological conceptual model.
 - a. Development of three-dimensional (3-D) geological visualization tool.”
4. Development of a groundwater flow model.
 - a. Calibration of the groundwater model, to historical groundwater levels.
5. Evaluation of additional data needs or data gaps;
6. Data monitoring and recording relative to SGMA evaluation criteria and project and management goals.
 - a. Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon.
 - b. Significant and unreasonable reduction of groundwater storage.
 - c. Significant and unreasonable seawater intrusion.
 - d. Significant and unreasonable degradation of water quality.
 - e. Significant and unreasonable land subsidence.
 - f. Depletion of interconnected surface water and groundwater that has significant and unreasonable adverse impacts on beneficial uses of the surface water.

DMS UPDATES

The DMP was made Draft Final on February 18, 2020. There have been several updates and improvements to the DMS since the last revision of the DMP. These include the following added features:

- Direct connection to the map server for GIS desktop programs including ArcGIS and QGIS for authorized users was added to the DMS. Previously users were required to use a web browser to access data hosted through the map server.

- A new “entity at a glance” feature was added which summarizes information from a single agency or other entity associated with the GSAs.
- Modifications to email system for user notifications to improve email deliverability. This included additional DNS and other configurations to meet requirements of “anti-spam” filters and unique requirements such as the plain-text requirement for .mil email addresses.
- New feature that allows users to see how they’ve used the site, listing how many times they have logged over the last month, last six months, and all time.

SUMMARY OF DATA ON DMS

The focus of Phase I of data collection was geologic and hydrogeologic data which include direct measurements from agencies that monitor their respective groundwater systems. This data includes well locations, static groundwater level data, and groundwater pumping or production data. The following tables list data sets that were uploaded to the DMS.

GROUNDWATER LEVEL DATA

Type	Summary	Range	Sites	Records	Description
Monthly	City of Buellton	January 2003- March 2019	4	290	Static water level reads from the City of Buellton.
Monthly	City of Lompoc	March 1964- June 2008	10	3,504	Static water level reads from the City of Lompoc provided as part of the HCI model.
Monthly	USBR	October 1972- December 2019	58	38,556	Groundwater elevation data reported in the USBR Cachuma project monthly reports. Data was converted from NGVD29 to NAVD88, and includes source NGVD29 data.
Monthly	Vandenberg Village CSD	July 1959- October 2019	9	2,194	Static water level reads from Vandenberg Village CSD.
Semiannual	USGS NWIS	January 1940 - June 2019	2,150	76,712	Groundwater data available from the USGS NWIS (entire Santa Ynez Valley).
Semiannual	County of Santa Barbara Water Agency	March 2019 – October 2019	113	150	Groundwater elevation data provided by the County of Santa Barbara Water Agency. CASGEM data is a subset of this.

GROUNDWATER PRODUCTION DATA

Type	Summary	Range	Sites	Records	Description
Daily	City of Buellton	August 2007-December 2017	4	12,300	Pumping records from the City of Buellton.
Monthly	City of Lompoc	March 2003-December 2013	11	4,456	Pumping records from the City of Lompoc provided as part of the HCI model and updates.
Daily	Vandenberg Village CSD	July 2005-June 2019	3	10,027	Daily pumping from Vandenberg Village CSD.
Monthly	DWR - Public Water System Statistics	January 1994-December 2018	9	1,368	Production records by public water system reported to DWR Water Use and Efficiency Branch.

Daily groundwater production data is generally provided through the DMS interface as monthly totals.

GROUNDWATER QUALITY DATA

Type	Summary	Range	Records	Description
Various	Waterboard GAMA	April 1911-October 2019	22,312	Selected water quality (TDS, Chloride, Sodium) from GeoTracker GAMA compilation. Includes areas in the EMA.

The above water quality data are in the database but are not available through the interface at this time.

GEOSPATIAL DATA

Type	Summary	Presented	Description
Management Area	Project Extents	GeoJSON	Extents as posted to California Department of Water Resources. Based on Buellton 118 Update 2018 basin boundaries.
SYRWCD Annual Report	Groundwater Divisions	GeoJSON	Extents of key groundwater basins as reported in the 41 st Santa Ynez Annual Report.
SYRWCD Annual Report	Wells	GeoJSON	Locations of wells as reported in the 41 st Santa Ynez Annual Report.
Committee	SYRWCD	GeoJSON	Extents of SYRWCD developed from the county surveyor in 2012.
Committee	Lompoc	GeoJSON	Extents of City of Lompoc.
Committee	Vandenberg Village CSD	GeoJSON	Extents of Vandenberg Village CSD.
Committee	Mission Hills CSD	GeoJSON	Extents of Mission Hills CSD.
Committee	Buellton	GeoJSON	Extents of City of Buellton.
Committee	Solvang	GeoJSON	Extents of City of Solvang.
Committee	ID#1	GeoJSON	Extents of Improvement District No. 1.

Type	Summary	Presented	Description
General Location	Streets	Map Server (vector)	Roads for the County of Santa Barbara. Data was included with the County of Santa Barbara Parcel Data received in June 2019.
General Location	Railroads	Map Server (vector)	Railroad lines of the US sourced from the 2018 TIGER/Line, a product of the US Census Bureau.
Topography	Topographic Contours (USGS)	Map Server (vector)	USGS 1:24,000 scale contours for 1 Degree Quadrangles of Santa Maria West, and Santa Maria East. Sourced from the USGS from 7.5-minute contour maps.
Topography	Digital Elevation Model	Map Server (raster, rendered as hillshade)	Combined from three sources: 1) 1m sourced from NED, covering the entire CMA, and the WMA (except portions of Burton Mesa). Survey from 2018-2019. 2) 5m sourced from NOAA, covering the entire CMA and WMA. Source date in 2002. 3) 10m Digital Elevation Model (DEM) at 1/3 Arc-Second Resolution, downloaded from USGS National Map. Regional coverage of the 1 Degree Quadrangles of Santa Maria West, and Santa Maria East. Source date in 2008.
Surface Water	Watersheds / Hydrologic Units	GeoJSON	The Watershed Boundary Dataset (WBD) is a seamless, national hydrologic unit (HU) dataset developed by the USGS. Longer hydrologic unit codes (HUC) indicated a smaller watershed area. These are the HUC8 “Subbasin,” HUC10 “Watershed,” and HUC12 “Subwatershed.” Sourced from the USGS.
Surface Water	Hydrography	Map Server (vector)	The National Hydrography Dataset (NHD) represents the water drainage network of the United States with features such as rivers, streams, canals, lakes, ponds, coastline, dams, and streamgages. Sourced from the USGS.
Survey Information	Estimated Township/Ranges, Sections	Map Server (vector)	California Department of Water Resources Section fill. Township / Range dissolve. Sourced from Well Completion Report Map Application, downloaded in 2019. Note, “official” BLM Cadastral Survey Program does not include Mexican Land Grants, which are majority of the WMA and CMA.
Survey Information	Mexican Land Grants	GeoJSON	Territory granted as part the Mexican Rancho system.
Survey Information	County of Santa Barbara	Map Server (vector)	Parcels extents as provided by the County of Santa Barbara as of June 2019.
Reference	Vandenberg AFB	GeoJSON	Extents of Vandenberg AFB developed from the County of Santa Barbara parcel data, as received in June 2019.

In addition, to the above listed geospatial datasets, the DMS database includes specific site location information in the well table, surface water table, and USGS location table which are used to index the data tables such as water levels, water production, and water quality.

GEOLOGIC MODEL GEOSPATIAL DATA

Development of the hydrogeologic conceptual model included the review and compilation of production and monitoring well logs, and lithological logs from a variety of sources including

Department of Water Resources (DWR) and the County of Santa Barbara Department of Environmental Health Services (EHS). The locations of available wells and boreholes were uploaded to the DMS. Wells and well logs were selected to be uploaded based on a twofold approach to evaluate the usefulness of each log as follows:

1. Identify and download available well logs for the basin from DWR. DWR organizes well logs by sections. Locations of deeper wells were identified, based upon information from the logs, and the lithology was determined. There are 497 “deeper” wells identified in the basin. The data from these wells are stored in a specific GIS layer specific to the deeper DWR wells.

2. Identify and download available well logs for the basin from the Santa Barbara County Environmental Health Services (EHS). EHS organizes well logs by parcel number. Wells for the CMA and WMA parcels were selected from the EHS files for the entire County. To limit the potential for duplicates, only parcels without a DWR well log were reviewed. There are 334 wells stored in a specific GIS layer specific to the EHS wells

LINKED GEOSPATIAL DATA

In addition to the geospatial data that are hosted on the DMS server, the DMS links to external geospatial data hosted by third parties. Third-party data by nature are not controlled or managed by the DMS, so availability may be subject to change. Data may be temporarily cached on the SYWATER server.

Type	Summary	Presented	Description
Geologic Map	Geologic map mosaic.	Cache	Mosaic of geological maps provided by the USGS National Geological Map Database (NGMDB).
Crop Map	Crop Classification.	Cache	DWR provided crop classification and land use for the 2016 main season agricultural season.
Hillshade	USGS Hillshade	Link	Supplied by the USGS “The National Map.” Hill shade features only.
Hillshade	Color Hillshade	Link	Supplied by Stamen Design. Hill shading using quasi-natural vegetation colors.

Type	Summary	Presented	Description
Orthoimagery	NAIP 2012	Cache	NAIP ¹ images from 2012 sourced from California Department of Fish and Wildlife images. Most recent complete imagery for the basin: More recent NAIP from 2014, 2016, and 2018 do not include portions of the WMA related to Vandenberg AFB.
Orthoimagery	NAIP 2018	Cache	Natural color imagery sourced from California Department of Fish and Wildlife images from 2018. Does not include portions of the WMA related to Vandenberg AFB.
Orthoimagery Color Infrared	NAIP 2018 CIR	Cache	Color infrared sourced from California Department of Fish and Wildlife images from 2018. Color infrared is used to identify vegetation. Does not include portions of the WMA related to Vandenberg AFB.
Orthoimagery	NAIP 2010	Link	Sourced from California Department of Fish and Wildlife images from 2010.
Orthoimagery	NAIP 2009	Link	Sourced from California Department of Fish and Wildlife images from 2009.
Orthoimagery	NAIP 2005	Link	Sourced from California Department of Fish and Wildlife images from 2005.
Topography Map	USGS Topography	Link	Supplied by the USGS “The National Map.” Combined map showing roads, topographic contours, hill shade, and other map features.
Road Map	Open Street Map	Link	Supplied by Open Street Map. Community based mapping project.

LIBRARY OF REPORTS

The consultant team reviewed available documents from a variety of sources including local agencies, state, federal and local entities. As of January 23, 2020 there are 184 report entries related to the Santa Ynez groundwater basin. Documents were sourced from the following list of report repositories.

- Stetson Engineers physical and electronic libraries.
 - Including all Santa Ynez River Water Conservation District Annual Engineering and Survey Reports
- Santa Ynez River Water Conservation District physical and electronic libraries.
- Other documents as provided by the GSA Committee Agencies.

¹ National Agriculture Imagery Program (NAIP) are captured by the US Department of Agriculture (USDA). It consists of periodically acquired imagery at one-meter resolution, with an accuracy of six meters of ground control points. In most cases only natural color imagery is used and provided.

Natural color imagery means the color as presented matches the electromagnetic spectrum that was recorded, so the result image approximates what would be observed by a human observer. This is opposite of pseudo-color such as color infrared where the recorded data for some range of electromagnetic spectrum is mapped to each of the red, green, and blue color channels

- Reference documents gathered by Tim Durbin in development of historical City of Lompoc groundwater model and model update.
- USGS online publications warehouse, and map locations.
- DWR libraries
 - Urban Water Management Plans
 - DWR Bulletins
- General Plans
- County of Santa Barbara Reports (Groundwater Reports)

FUTURE DATA PHASES

It is anticipated that there will be the additional future updates as additional data is provided and processed.

ADDITIONAL AGENCY DATA

GSA member agencies may provide additional data including pumping and water levels. The Santa Ynez River Water Conservation District is digitizing historical groundwater pumping data from its paper archive files once compiled, this data will be uploaded to the DMS.

GSA member agencies may provide additional water quality data. The current water quality data from the Waterboard GeoTracker GAMA is a compilation of water quality from Federal and state of California sources, which includes data that all public water agencies submit to the State. Once compiled the additional water-quality data will be uploaded to the DMS.

Data used to develop the water budget (not including groundwater data) will be uploaded to the DMS. This includes USGS gaged surface flows, Santa Barbara County precipitation data, and a summary of imported water by the Central Coast Water Authority.

COMPLETED GROUNDWATER MODEL AND WATER BUDGET

Developing the groundwater model and water budget may result in the identification of additional data sources which could be used in other components of the GSP. These additional data will be reviewed for potential inclusion in the DMS.

In addition some components of the model or model outputs as may also be uploaded to the DMS. Examples could include the 3D visualization model and numeric groundwater model output, which may include modeled water levels for selected time periods.

ONGOING FIELD WORK AND DATA COLLECTION

Data collected from field efforts will be reviewed and incorporated into the DMS as appropriate. Anticipated field work includes a surveying effort to verify measuring point elevation and special location accuracy. These survey data are required to meet SGMA standards and will be used for tracking land subsidence, water quality sampling, and future monitoring well installation projects. There will also be an Aerial Electro-Magnetic (AEM) survey of the CMA and WMA, which will inform and update the Hydrogeologic Model of those areas. Data from the AEM survey will be uploaded to the DMS.