DRAFT SCHEDULE FOR REVIEW AND REFINEMENT FOR GSP DEVELOPMENT IN THE COLUSA SUBBASIN

Aiming for Plan adoption by December 15, 2021

PHASE 1 BASIN SETTING AND MANAGEMENT AREAS (8/1/18-4/30/20)

Project Management/Administration..... 8/1/18-4/30/20

Execute Contract with DE 8/1/18

Basin Setting

- HCM 1/1/19-9/30/19
- Water Budget..... 5/1/19-3/31/20
- IHM 8/1/18-12/31/19

Management Areas..... 4/1/19-3/31/20 (possibly move this up a couple months)

PHASE 2 GSP PREPARATION

CATEGORY a: PROJECT MANAGEMENT AND ADMINISTRATION (9/1/2018 – 4/30/2022)

(Plan adoption target is December 15, 2021, Grant project completion will go through Jan. 31, 2022, final grant reporting is 90 days after grant project completion)

Execute Prop 1 Grant Agreement 9/1/2018

Grant reporting and Invoicing..... quarterly

Final Report..... (90 days after project completion) April 30, 2022

RFP Process (or sole source) ..... 2 months if RFP

Award Contract ..... 1 month

Administration 9/1/2018-4/30/2022

CATEGORY b: OUTREACH AND COORDINATION 9/1/2018-12/15/2021

Facilitation Support..... ? – 12/15/2022

Interbasin/Intrabasin Coordination 9/1/2018-12/15/2021

Develop Cooperative Agreements..... 9 months

Meetings

- Board Meetings CGA..... Bi-Monthly
- Board Meetings GGA ..... Bi-Monthly
- Joint Board Meetings..... every 6 months
- Subcommittee meetings..... Monthly
- Public Outreach Meetings ..... every 6 months

Intrabasin Coordination mtgs ..... quarterly

CATEGORY C: GSP PREPARATION

*from DE Grant Proposal timeline

Data Collection and Analysis ..... Through March 2021 (* 39 months)

Monitoring Protocols ..... *3 months

Data and Reporting Standards ..... *27 months

Data Management System ..... *15 months (can likely be condensed, part of Stressed basins grant)

GSP Administrative info 9/1/2018-12/15/2021

Sustainable Management Criteria ..... *39 months

Monitoring Networks ..... *33 months (can likely be condensed, part of Stressed basins grant)

Projects and Management Actions ..... *15 Months

PHASE 3: GSP Document Prep and Adoption by December 15, 2021

Document Prep 6/1/2021-12/1/2021

Public Notice 9/15/2021-12/15/2021

Adoption 12/15/2021

References:

- D.E. Colusa Subbasin Basin Setting Scope Timeline
- D.E. Timeline from Prop. 1 GSP Grant Proposal
- Exhibit A: Grant Agreement Work Plan, Prop 1GSP Grant

EXHIBIT A
WORK PLAN

PROJECT TITLE: Colusa Subbasin Groundwater Sustainability Plan Development
PROJECT DESCRIPTION: Prepare a Groundwater Sustainability Plan for the Colusa Subbasin

COMPONENT 1: GSP preparation

CATEGORY a: PROJECT MANAGEMENT AND ADMINISTRATION

Task 1: Administration

Activities under Category a, Task 1 include management of grant Agreement execution and Amendment(s) if necessary, communication with DWR on a timely basis, and maintenance of project files related to implementation of the grant agreement. This task also includes day to day management of the project, as well as general coordination with DWR, consulting teams, and other agencies as necessary.

- Deliverables
  - Executed Grant Agreement.
  - Grant Agreement Amendment(s) if necessary

Task 2: Invoicing

Activities under Category a, Task 2 include preparation and submittal of invoices to DWR, tracking task progress and schedule, and managing contracts and budgets associated with the Grant Agreement. The Grantee, or its designee, will administer and track contracts with consultants or other agencies that are necessary to complete tasks in the Work Plan, and compile the required invoice back-up information.

- Deliverables
  - Invoices and associated backup documentation

Task 3: Reporting

Activities under Category a, Task 3 include preparation and submittal of quarterly progress reports, at a minimum, and Final Grant Completion Report. Quarterly reports will meet generally acceptable professional standards for technical reporting and the requirements outlined in Exhibit F of this Agreement. Upon completion of this Work Plan, a final Grant Completion Report will be prepared and submitted to DWR.

- Deliverables
  - Progress reports
  - Draft and Final Grant Completion Report

CATEGORY b: OUTREACH AND COORDINATION

Task 1: Facilitation Support

Activities under Category b, Task 1 include:

1. Identification and engagement of interested parties
2. Meeting facilitation (public, intra-basin, inter-basin)
3. Interest-based negotiation/consensus building
4. Public outreach facilitation and education

Facilitation support activities will build upon Phase 1 and Phase 2 Facilitation Support Services activities that were provided by DWR for the Colusa Subbasin prior to GSP development. Activities under this task include updating the Colusa Subbasin Public Outreach Plan as needed, identifying additional stakeholders and determining how they will be engaged, and coordination within the subbasin and neighboring subbasins, and implementing facilitation support throughout GSP development and adoption.

- Deliverables
  - Updates to Public Outreach Plan
  - Meeting announcements, agendas, and minutes or meeting summaries when applicable

Task 2: Coordination within Colusa Subbasin and with Neighboring Basins/Subbasins

Activities under Category b, Task 2 include:

1. Regular communication between Colusa Groundwater Authority (CGA), Glenn Groundwater Authority (GGA), any other GSAs within the subbasin, and with representatives of neighboring basins
2. Periodic meetings and workshops to facilitate coordination regarding technical efforts and policy considerations, including evaluation of groundwater conditions and flows, definition of sustainable management criteria, and other relevant topics
3. Assessment of opportunities to partner on regional studies, share data, and cooperate within and across basins on programs and projects

It is likely that many of the discussions or workshops will be led by a professional facilitator as described in and reported under Category b, Task 1. Coordination will likely occur through a variety of venues such as GSAs, County Board of Supervisors, the Northern Sacramento Valley Integrated Regional Water Management Plan (NSV IRWMP) Board of Directors and Technical Advisory Committee (TAC), other standing and ad hoc groups, and other informal means.

- Deliverables
  - Meeting materials, including agendas, minutes, presentations, etc. when applicable
  - Voluntary and formal coordination agreements, as applicable

CATEGORY c: GSP PREPARATION

Task 1: Data Collection and Analysis to Support GSP Development

Activities under Category c, Task 1 include:

1. Identification of data collection and analysis needs
2. Planning and implementation of data collection activities
3. Data analysis and documentation of methodologies and results

This task includes developing data and information to inform refinement of the hydrogeologic conceptual model (HCM), understanding of groundwater conditions, numerical modeling and calibration, and development of measurable objectives and sustainability thresholds. This task will build upon collection of existing data and analysis of data gaps conducted as part of the Glenn County and Colusa County Prop 1 Stressed Basin grants. This may include a variety of different efforts, including but not limited to verification of monitoring well locations and conditions, construction of additional stream gages or monitoring wells to provide critical data for better numerical model calibration, and monitoring of groundwater conditions, land subsidence and stream- groundwater interaction within the subbasin.

Deliverables

- Datasets developed
- Documentation of data collection, analysis, and results

Task 2: Integrated Hydrologic Modeling

Activities under Category c, Task 2 include:

1. Evaluation of model codes and existing applications
2. Compilation, evaluation, and comparison of simulated and local information
3. Selection and refinement of integrated hydrologic model for water budget development and other GSP model scenario analysis
4. Development of model scenarios, completion of model runs, and evaluation of model results,
5. Development of model scenarios to support evaluation of potential projects and management actions or other analysis

This task will build upon existing information, reports, and studies, the results and recommendations of which will be used to guide selection of an integrated hydrologic model code and application. It is anticipated that the selected model will be refined based on local water budget information, including the preliminary water budget being developed as part of the Glenn County Prop 1 Stressed Basin grant and the Interbasin Flow Study conducted by the Butte County Department of Water and Resource Conservation through the NSV IRWM group and funded by the California Water Foundation, and other sources of local data.

- Deliverables
  - Model evaluation and selection documentation

- Technical documentation of comparisons of selected model to local information
- Technical documentation of refinements to selected model
- Technical documentation of model scenarios and results
- Electronic model files for refined model and scenarios developed

Task 3: Monitoring Protocols

Activities under Category c, Task 3 include

1. Identify and compile existing monitoring protocols currently in use in the subbasin
2. Review and update monitoring protocols as needed for consistency with best management practices (BMPs) and GSP regulations

The task will build upon existing protocols developed during prior groundwater management efforts in Glenn and Colusa Counties. Existing protocols will be evaluated relative to the SGMA BMP for Monitoring Protocols, Standards, and Sites and GSP Regulations when relevant and updated as needed to ensure compliance with SGMA.

- Deliverables
  - Documented monitoring protocols for inclusion in the GSP.

Task 4: Data and Reporting Standards

Activities under Category c, Task 4 include:

1. Prepare a summary and discussion of Data and Reporting Standards for inclusion in the GSP
2. Verify and document in the GSP that the monitoring protocols and reporting plans and schedules are complaint with the Data and Reporting Standards
3. Review compiled existing data to be used in the GSP preparation and stored in the GSP data management system (DMS) for compliance with the Data and Reporting Standards and correct, reformat and qualify, as necessary, to document data quality and uncertainty
4. Assess gaps in existing data resulting from noncompliance or partial compliance with Data and Reporting Standards and developing data gap action plan
5. Fill high priority data gaps to support GSP development

This task will focus on existing, publicly available data and will build on work conducted to compile, manage, and assess existing data conducted as part of the Glenn County and Colusa County Proposition 1 Stressed Basins grants. Much of the effort required to satisfy this task was completed under the prior grants, and this effort will focus on implementation of the data gap action plans developed previously. Other work will include incorporating additional, high priority data gaps as new, relevant information becomes available from DWR and others. Priority will be placed on data required for the development of the hydrogeologic conceptual model (HCM), assessment of groundwater conditions, the water budget, and the monitoring network. Data gaps will be further evaluated under Category c, Task 10, Monitoring Networks.

- Deliverables
  - Summary and discussion of Data and Reporting Standards for inclusion in the GSP
  - Inventory of compiled data and organized, formatted datasets qualified to document the degree of compliance with the Data and Reporting Standards
  - Data gap action plan
  - Documentation of actions to fill high priority data gaps

Task 5: Data Management System

Activities under Category c, Task 5 include:

1. Final Data Management System
   a. Evaluate range of DMS options for long-term implementation, including proprietary, open source, and custom applications
   b. Select and implement DMS

Preliminary DMS development was completed as part of the Proposition 1 Stressed Basin grants awarded to Colusa and Glenn counties in 2016. Final DMS development will be completed during GSP preparation and will be informed by DWR reporting requirements, once established, as well as guidance that DWR may provide in the form of a BMP or other documents/materials that may be available. Final evaluation of DMS options will build upon an initial evaluation of DMS software completed under the Stressed Basins grant and will consider a range of available options, including proprietary systems, open-source systems developed by DWR or others, and custom applications.

- Deliverables
  - Final DMS evaluation and selection technical memorandum
  - DMS user guide

Task 6: GSP Document Preparation and Adoption

Activities under Category c, Task 6 include:

1. Assemble draft GSP
2. Distribute GSP for public review, gather, consider, document, and when appropriate incorporate public comments, and facilitate GSP adoption by GSAs

The draft PSP will be assembled for public review by compiling various sections of the GSP developed under Category c, Tasks 7 through 11, including review of each section to ensure that all GSP content required by the GSP Regulations is included. Copies of the GSP will be reproduced as needed to facilitate public review by stakeholders within each GSA. The availability of the GSP for review and comment will be advertised within the subbasin, comments will be gathered and considered, and responses will be developed and when appropriate incorporated into the GSP. Additionally, this task will include facilitation of adoption of the GSP at one or more public hearings.

Deliverables

- Draft GSP

- Final GSP

Task 7: GSP Administrative Information

Activities under Category c, Task 7 include:

General Information:

1. Prepare executive summary
2. Compile and prepare list of references and technical studies relied upon

Agency Information:

1. Prepare summary of Agency information
2. Prepare estimate of implementation costs

Description of Plan Area

1. Prepare map(s) of plan area, including GSAs; adjacent basins; adjudicated and alternative GSP areas; other jurisdictional boundaries; land uses, water use sectors, and water source types; well densities for ag, industrial, and domestic wells
2. Prepare written description of plan area, including summary of map(s)
3. Describe existing water resource monitoring and management programs, including integration into monitoring network
4. Describe how existing programs may limit operational flexibility
5. Describe conjunctive use programs
6. Describe land use elements including summary of general plans and specified considerations related to GSP development and implementation
7. Describe additional GSP elements determined to be appropriate

Notice and Communication

1. Describe beneficial uses and users
2. Develop database of stakeholders for purposes of outreach and notification
3. Compile list of public meetings related to GSP development
4. Compile public comments received and responses by GSAs
5. Prepare communication section describing GSA decision-making process, public engagement process, encouragement of active involvement, notification method(s) and process
6. Conduct outreach activities, including regular stakeholder meetings

Facilitation support will be utilized during this process however these services will be completed and reported under Category b, Task 1. Additionally, coordination with neighboring basins may also be a component of this task; however, that coordination will be completed and reported under Category b, Task 2. Documentation of comments and responses will apply to comments prior to the formal GSP adoption process, which will be documented under Category c, Task 6.

- Deliverables
  - General information section of GSP document, including executive summary and list of references and technical studies
  - Summary of Agency information and GSP implementation costs for inclusion in the GSP

- Maps and narrative description of the plan area for inclusion in the GSP
- Notice and communication section of GSP

Task 8: Basin Setting

Activities under Category c, Task 8 include:

Hydrogeologic Conceptual Model

1. Prepare written description of the basin
2. Prepare graphical depiction of the HCM illustrating major features of the hydrologic system relevant to the water budget and flow
3. Compile and/or prepare at least two scaled cross-sections depicting major stratigraphic and structural features in the subbasin
4. Prepare map(s)

Current and Historical Groundwater Conditions

1. Develop groundwater elevation maps and hydrographs demonstrating flow directions, lateral and vertical gradients, and regional pumping patterns, and changes in groundwater elevations over time for the principal aquifers in the subbasin
2. Develop graphs estimating annual and cumulative change in groundwater storage, including annual use and water year type
3. Describe and map groundwater quality issues, including known contamination sites and plumes
4. Describe and map land subsidence
5. Identify interconnected surface water and estimate quantity and timing of depletions
6. Identify groundwater dependent ecosystems (GDEs)

Water Budget Information

1. Quantify historical and current water budget components
2. Evaluate historical water budget
3. Develop projected water budgets

Management Areas

1. Consider and define management areas as necessary.
2. Describe the following for each management area:
    a. Reason for creation.
    b. Minimum Thresholds (MTs) and Measurable Objectives (MOs) based on undesirable results defined with basin-wide consistency, as developed under Task 9,
    c. Level of appropriate monitoring and analysis.
    d. Explanation of operations without undesirable results in adjacent areas.
3. Prepare maps and descriptions to describe conditions in each management area.

Tasks include preparation of the *Hydrogeologic Conceptual Model* section of the GSP, which will

include refinement of the preliminary hydrogeologic conceptual model (HCM) developed for the Colusa Subbasin as part of the Glenn County Prop 1 Stressed Basin grant and the hydrogeologic characterization developed as part of monitoring network evaluation conducted as part of the Colusa County Prop 1 Stressed Basin grant. Additionally, it is anticipated that the HCM and associated documentation developed for SVSim will be reviewed and utilized as appropriate to refine the preliminary HCM previously developed. Refinements may include expansion and refinement of existing geologic cross-sections or development of new cross-sections to adequately describe major stratigraphic and structural features. It is anticipated that this work will include consultation with DWR modeling and regional office technical staff as well.

Preparation of the *Current and Historical Groundwater Conditions* section of the GSP will build on work conducted under the Glenn County and Colusa County Prop 1 Stressed Basin grants to evaluate historical groundwater conditions (Glenn County) and assess existing monitoring well networks (Colusa County). For initial GSP development, existing, available information will be relied upon primarily, with additional data collected as needed and identified under (Category c, Task 10) described below. Examples of existing information that will be considered are the DWR Water Data Library, monitoring results reported under the CASGEM and local monitoring programs, USGS data, available DWR models and tools, existing groundwater quality monitoring and management programs (GAMA, ILRP, etc.), existing subsidence monitoring (DWR, NASA), and the GDE identification framework and potential GDE dataset from The Nature Conservancy.

Development of the *Water Budget Information* section of the GSP will consist primarily of organizing, summarizing, and reporting water budget information developed using the integrated hydrologic model under (Category c, Task 2), described previously and will build on the preliminary water budget being developed as part of the Glenn County Prop 1 Stressed Basin Grant and the water budget analysis for the Colusa Subbasin in Colusa County completed as part of local cost share for the Colusa County Prop 1 Stressed Basin grant. Primary analysis conducted as part of this subtask will include the evaluation of sustainable yield, as informed by sustainable management criteria developed under (Category c, Task 9), as well as evaluation of the availability and reliability of surface water supplies, suitability of the historical water budget to project future water budget information, and impacts of historical conditions on the ability to operate sustainably.

The primary focus of work to develop the *Management Areas* section of the GSP will be to consider, evaluate, and define management areas as necessary, which will be driven by a combination of technical analysis and discussions with stakeholders within the subbasin. Facilitation support, as described in Task Category b, will be a critical component to the stakeholder discussions. Facilitation support will be reported under Category b, Task 2. Definition of management areas will consider groundwater conditions, geology and aquifer characteristics, land use, water sources, water uses, jurisdictional boundaries, existing subbasin boundaries, etc. through a collaborative, public process.

- Deliverables
  - Written description of the Subbasin, graphical depiction of the HCM, geologic map and cross sections, and other maps as required by the GSP Regulations for inclusion in the GSP
  - Maps, hydrographs, and other data required by the Regulations for inclusion in the GSP
  - Water budget section including required content for inclusion in the GSP
  - Descriptions and maps of management areas as required by the GSP Regulations for inclusion in the GSP

Task 9: Sustainable Management Criteria

Activities under Category c, Task 9 include:

Sustainability Goal

1. Prepare general description of sustainability goal
2. Describe information from basin setting to establish goal
3. Describe measures to ensure operation within sustainable yield
4. Describe how sustainability goal is likely to be achieved within 20-year planning horizon

Undesirable Results (URs)

1. Describe processes and criteria to define URs
2. Describe existing or potential URs

Minimum Thresholds (MTs)

1. Establish MTs at representative monitoring sites
2. Describe MTs

Measureable Objectives (MOs)

1. Establish MOs and 5-year Interim Milestones (IMs) for each sustainability indicator
2. Describe establishment of reasonable margin of operational flexibility
3. Describe reasonable path to sustainability for 20-year planning horizon

Development of the *Sustainability Goal* section of the GSP will include preparing the general description of the sustainability goal. Development of the sustainability goal will consider the basin setting developed under Category c, Task 8; evaluation of sustainability indicators, significant and unreasonable conditions, minimum thresholds, undesirable results, interim milestones, and measurable objectives under this task; and development of projects and management actions to maintain or achieve sustainability under Category c, Task 11.

Development of the *Undesirable Results* section of the GSP includes qualitative descriptions of significant and unreasonable conditions which will be developed through a collaborative, public process informed by technical data and analysis based on the basin setting, monitoring network, and other information. This task will build upon preliminary SGMA Risk Assessments completed by both Colusa and Glenn counties previously to provide a preliminary evaluation of groundwater conditions and

potential undesirable results in the Colusa Subbasin. Facilitation support, as described in Category b, Task 1, will be a critical component to the stakeholder discussions. Facilitation support will be reported under Category b, Task 1.

Minimum Thresholds (MTs) will be established through a collaborative, public process informed by technical data and analysis based on the basin setting, monitoring results, and other information as applicable. It is anticipated that for most management areas, the goal of this process will be to establish MTs for groundwater levels as the representative measurement for multiple sustainability indicators and, where possible, to demonstrate that undesirable results for some sustainability indicators are not present, are not likely to occur, and that MTs are not required; however, this assumption will be assessed during site and area specific evaluations. Facilitation support, as described in Category b, Task 1, will be a critical component to the stakeholder discussions. Facilitation support will be reported under Category b, Task 1.

Measureable Objectives (MOs) and Interim Milestones (IMs) will be established through a collaborative, public process informed by technical data and analysis based on the basin setting, monitoring results, and other information.

- Deliverables
  - Description of sustainability goal and supporting information required by the GSP Regulations for inclusion in the GSP
  - Description of Undesirable Results as required by the GSP Regulations for inclusion in the GSP
  - Description of Minimum Thresholds as required by the GSP Regulations for inclusion in the GSP
  - Description of Measurable Objectives and Interim Milestones as required by the GSP Regulations for inclusion in the GSP

Task 10: Monitoring Networks

Activities under Category c, Task 10 include:

Monitoring Network

1. Develop monitoring network capable of collecting sufficient data to demonstrate short-term, seasonal, and long-term trends in groundwater and related surface conditions, and yield representative information about groundwater conditions as necessary to evaluate GSP implementation
2. Describe monitoring network objective, including how network will be developed and implemented
3. Describe adequacy of monitoring network to evaluate sustainability indicators, including site density and monitoring frequency
4. Describe the following:
   a. Scientific rationale for site selection

   b. Consistency with data and reporting standards
   c. MTs, MOs, and IMs corresponding to each site and sustainability indicator
5. Prepare map(s) and table(s) describing the location, type, monitoring frequency, and purpose of each site

Representative Monitoring

1. Designate representative monitoring sites
2. Evaluate adequacy of groundwater levels as proxy for other sustainability indicators
3. Describe adequacy of sites to represent general conditions in area

Assessment and Improvement of Monitoring Network

1. Update initial data gap action plan
2. Evaluate uncertainties and potential effect on GSP success
3. Modify frequency and density of monitoring sites, as needed

Reporting Monitoring Data to the Department

1. Review DWR forms for reporting of monitoring data
2. Format monitoring data and/or develop reports aligned with DWR requirements

Preparation of the *Monitoring Network* section of the GSP will build on work conducted under the Glenn County and Colusa County Prop 1 Stressed Basin grants to evaluate historical groundwater conditions (Glenn County) and assess existing monitoring well networks (Colusa County). The prior grant efforts concentrated on evaluation of existing monitoring networks, with a focus on identifying additional monitoring sites needed to fill high priority data gaps. The monitoring networks evaluated in these prior efforts will be revised and refined based on the Counties' collaborative processes to define management areas, MTs, MOs, and IMs under Category c, Tasks 8 and 9, and additional technical data collected (Category c, Tasks 1 and 4). It is anticipated that these efforts may lead to the identification of additional monitoring needed to support evaluation of undesirable results during GSP implementation.

Preparation of the *Representative Monitoring* section of the GSP will build on work conducted under the Glenn County and Colusa County Prop 1 Stressed Basin grants to evaluate historical groundwater conditions (Glenn County) and assess existing monitoring well networks (Colusa County). The monitoring sites assessed in these prior efforts and new monitoring sites identified as part of this proposed effort will be considered for classification as representative monitoring sites using the GSAs' collaborative processes to define management areas, MTs, MOs, and IMs under Category c, Tasks 8 and 9 , and additional technical data collected as part of the proposal (Category c, Tasks 1 and 4). Representative monitoring sites will be selected from the monitoring network defined under Category c, Task 10 .

Preparation of the *Assessment and Improvement of Monitoring Network* section of the GSP will build on work conducted under the Glenn County and Colusa County Prop 1 Stressed Basin grants to evaluate historical groundwater conditions (Glenn County) and assess existing monitoring well networks (Colusa County). In conjunction with the work conducted under Category c, Task 4, this task will provide an

evaluation of the data gaps in the proposed monitoring network and the uncertainty in the network. The assessment will address the number and locations of monitoring sites, monitoring frequencies and the quality of the data collected. Recommendations will be made to fill the data gaps. A description of the process to be used for five-year review of the monitoring network will be developed.

- Deliverables
  - Description of the monitoring network capable of yielding representative information about groundwater and related surface conditions in the subbasin, including monitoring objectives, rationale for the selection of monitoring locations, parameters and frequencies for each sustainability indicator
  - Maps and tabular summary of the existing and proposed monitoring network
  - Implementation plan for proposed monitoring network
  - Description of the Representative Monitoring sites, including supporting information justifying why each site reflects general conditions in the area, as required by the GSP Regulations for inclusion in the GSP
  - Assessment of the number and locations of monitoring sites, monitoring frequencies and the quality of the data collected, as required by the GSP Regulations for inclusion in the GSP
  - Recommendations for improvements to the monitoring network
  - Description of the process for evaluating the monitoring network during five-year reviews
  - DMS updates to produce monitoring data to be included in Annual Reports and electronic submittals on DWR forms
  - Description of the DMS functionality for Annual reporting for inclusion in the GSP

Task 11: Projects and Management Actions

Activities under Category c, Task 11 include:

1. Develop projects and management actions (PMAs) to achieve sustainability goal as needed.
2. Describe PMAs, including:
   a. List of PMAs and associated MOs, including circumstances for implementation/termination and processes for determining associated conditions that have occurred and for notifying the public and other agencies
   b. Quantification of demand reduction or other methods to reduce overdraft
   c. Required permitting and regulatory processes
   d. Status of each PMA, including timeline for implementation and accrual of benefits
   e. Explanation of PMA benefits and process for evaluation
   f. Explanation of how PMA will be accomplished, including source and reliability of additional supplies
   g. Description of required legal authority
   h. Description of estimated cost and financing
   i. Description of management of extractions and recharge to ensure lowering

of groundwater levels during drought is offset by increases during other periods

Facilitation support, as described in Category (b) Task 1, will be a critical component to the stakeholder discussions under this task. Facilitation support will be reported under Category (b) Task 1. Identification and discussion of PMAs in potential areas of concern will be initiated early in GSP development through a collaborative, public process. Based on this process and initial screening, selected PMAs will be further defined and evaluated. Selected PMAs will be evaluated using the Integrated Hydrologic Model under Category c, Task 2 to evaluate project impacts on groundwater conditions and related sustainability indicators to support quantification of project benefits.

- Deliverables
  - Description of Projects and Management Actions as required by the GSP Regulations for inclusion in the GSP

Attachment 6. Schedule

for

Colusa Subbasin Groundwater Sustainability Plan Development

Project Schedule

The work plan for the Colusa Subbasin Groundwater Sustainability Plan Development Project includes a total of 14 tasks culminating in the submittal of a GSP to DWR by the due date of January 31, 2022 for non-critically overdrafted subbasins. The schedule for completing the work plan tasks towards submitting a final GSP is presented in Figure 1. As noted in the work plan, the GSP development tasks will build upon work completed for the Colusa County and Glenn County Prop 1 Stressed Basin grants as described in Attachment 4. The schedule presented in Figure 1 is based on estimates of timing and sequence of individual tasks and subtasks necessary to complete the GSP as outlined in the work plan and in accordance with schedule requirements identified in SGMA or in the GSP regulations. The schedule illustrates the timing of all tasks and subtasks and some of the dependencies that exist between tasks. Many of the GSP development tasks will occur concurrently. The completion of each of the tasks shown on the schedule represent milestones in the project.

According to the Grant Agreement Template[1] provided for Proposition 1 Sustainable Groundwater Planning Grant program, only work performed on the project between July 1, 2017 and January 31, 2022 (for non-critically overdrafted subbasins) is eligible for reimbursement on this grant. Therefore, the GSP development schedule presented in Figure 1 indicates January 31, 2022 as the completion date for all tasks associated with the GSP development project. Direct project administration under Task 1 will be conducted in accordance with the Grant Agreement.

[1] http://www.water.ca.gov/irwm/grants/sgwp/sgwp_docs/GrantAgreementTemplate_Prop1-SGWP_DRAFT.pdf

Name	Start	Finish
Task 1. Project Management and Administration.	1/1/18	1/31/22
Project management.	1/1/18	1/31/22
Preparation of quarterly and final reports.	1/1/18	1/31/22
Quarterly Reports	4/1/18	1/1/22
Final Report	10/1/21	1/31/22
Task 2. Facilitation Support	1/1/18	1/31/22
Task 3. Coordination within Colusa Subbasin and with Neighboring Basins	1/1/18	1/31/22
Task 4. Integrated Hydrologic Modeling	4/1/18	6/30/20
Task 5. Data Collection and Analysis to Support GSP Development	1/1/18	3/31/21
Task 6. Monitoring Protocols (§352.2)	4/1/18	6/30/18
Task 7. Data and Reporting Standards (§352.4)	4/1/18	6/30/20
Task 8. Data Management System (§352.6)	1/1/20	3/31/21
Task 9. GSP Document Preparation and Adoption	7/1/21	1/31/22
Task 10. GSP Administrative Information	1/1/18	1/31/22
Subtask 1. General Information (§354.4)	1/1/18	6/30/21
Subtask 2. Agency Information (§354.6)	1/1/18	6/30/21
Subtask 3. Description of Plan Area (§354.8)	7/1/18	6/30/21
Subtask 4. Notice and Communication (§354.10)	1/1/18	1/31/22
Task 11. Basin Setting	4/1/18	3/31/20
Subtask 1. Hydrogeologic Conceptual Model (§354.14)	4/1/18	12/31/18
Subtask 2. Current and Historical Groundwater Conditions (§354.16)	7/1/18	3/31/19
Subtask 3. Water Budget Information (§354.18)	4/1/18	9/30/19
Subtask 4. Management Areas (§354.20)	4/1/19	3/31/20
Task 12. Sustainable Management Criteria	1/1/18	3/31/21
Subtask 1. Sustainability Goal (§354.24)	1/1/18	3/31/21
Subtask 2. Undesirable Results (§354.26)	4/1/20	3/31/21
Subtask 3. Minimum Thresholds (§354.28)	4/1/20	3/31/21
Subtask 4. Measurable Objectives (§354.30)	4/1/20	3/31/21
Task 13. Monitoring Networks	7/1/18	3/31/21
Subtask 1. Monitoring Network (§354.34)	7/1/18	3/31/21
Subtask 2. Representative Monitoring (§354.36)	6/1/20	3/31/21
Subtask 3. Assessment and Improvement of Monitoring Network (§354.38	6/1/20	3/31/21
Subtask 4. Reporting Monitoring Data to the Department (§354.40)	1/1/20	3/31/21
Task 14. Projects and Management Actions (§354.44)	1/1/20	3/31/21

Figure 1. Colusa Subbasin Groundwater Sustainability Plan Development Project Schedule.

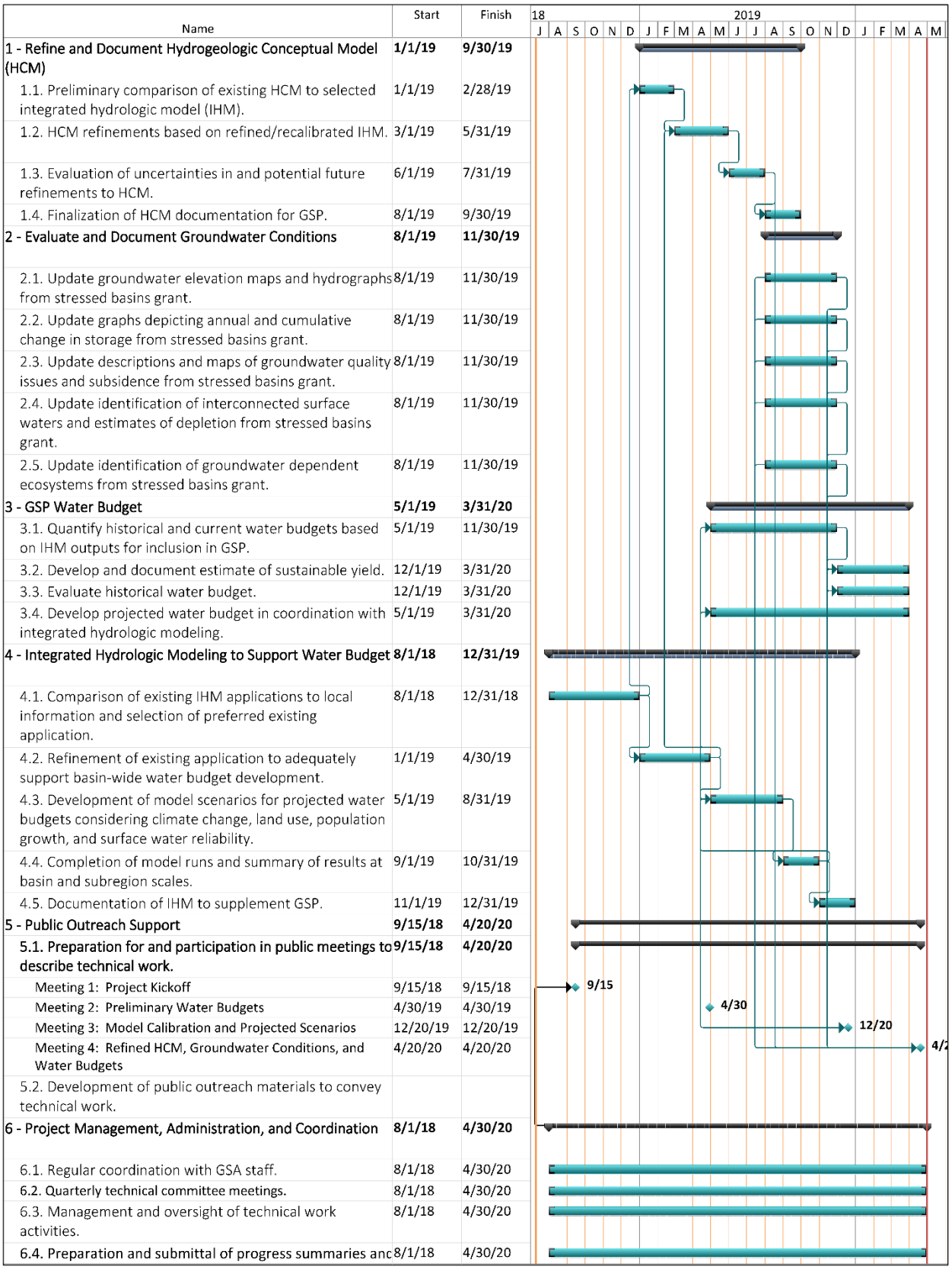
Proposal Schedule

The proposal schedule outlined in Table 1 below illustrates the overall proposal schedule, which is coincident with the Project Schedule presented previously in Figure 1 because only one project is included in the proposal. The project will be completed by January 31, 2022.

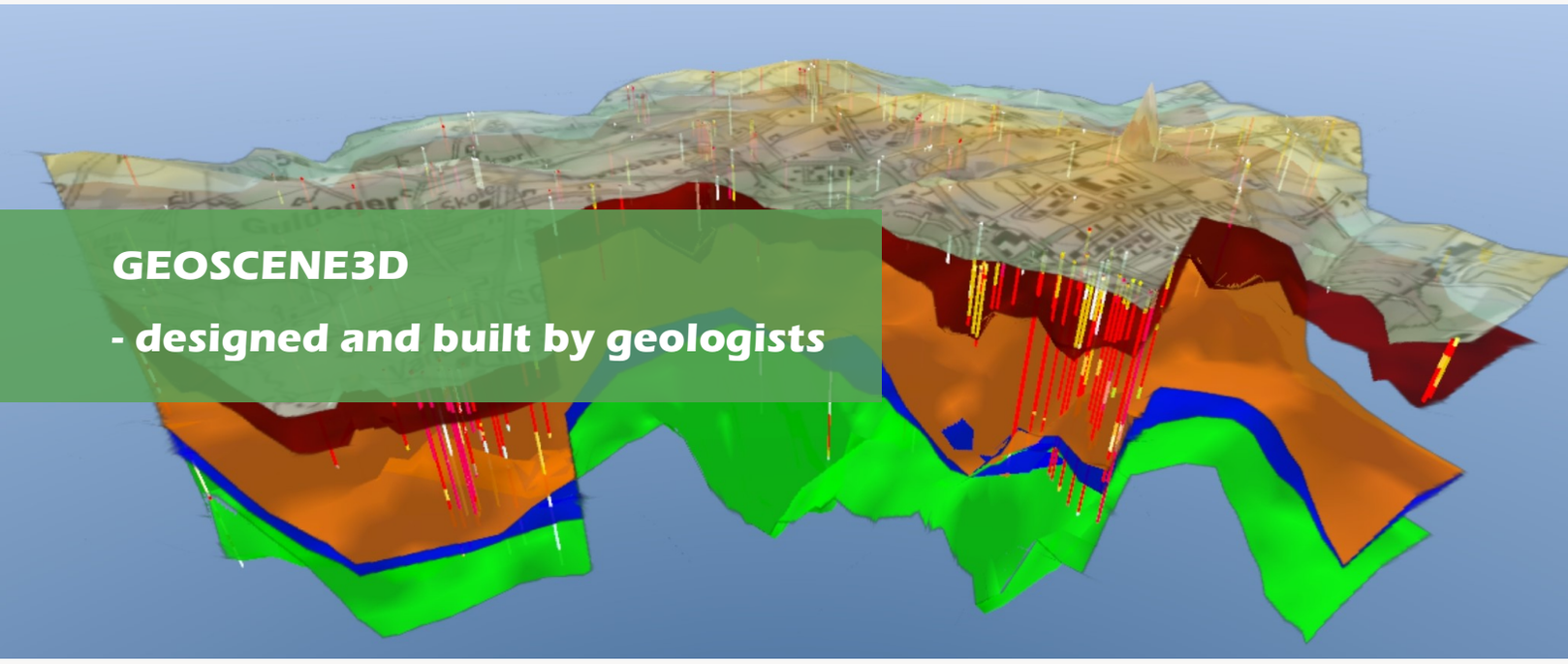
Table 1. Colusa Subbasin Groundwater Sustainability Plan Development Proposal Schedule.

Description	Start Date	End Date	2018				2019				2020				2021				2022
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Category 1 Project																			
(none)																			
Category 2 Project																			
Colusa Subbasin Groundwater Sustainability Plan Development	1/1/2018	1/31/2022																	
Complete Proposal	**1/1/2018**	**1/31/2022**																	

BASIN SETTING SCHEDULE, DRAFT



Name	Start	Finish
1 - Refine and Document Hydrogeologic Conceptual Model (HCM)	**1/1/19**	**9/30/19**
1.1. Preliminary comparison of existing HCM to selected integrated hydrologic model (IHM).	1/1/19	2/28/19
1.2. HCM refinements based on refined/recalibrated IHM.	3/1/19	5/31/19
1.3. Evaluation of uncertainties in and potential future refinements to HCM.	6/1/19	7/31/19
1.4. Finalization of HCM documentation for GSP.	8/1/19	9/30/19
2 - Evaluate and Document Groundwater Conditions	**8/1/19**	**11/30/19**
2.1. Update groundwater elevation maps and hydrographs from stressed basins grant.	8/1/19	11/30/19
2.2. Update graphs depicting annual and cumulative change in storage from stressed basins grant.	8/1/19	11/30/19
2.3. Update descriptions and maps of groundwater quality issues and subsidence from stressed basins grant.	8/1/19	11/30/19
2.4. Update identification of interconnected surface waters and estimates of depletion from stressed basins grant.	8/1/19	11/30/19
2.5. Update identification of groundwater dependent ecosystems from stressed basins grant.	8/1/19	11/30/19
3 - GSP Water Budget	**5/1/19**	**3/31/20**
3.1. Quantify historical and current water budgets based on IHM outputs for inclusion in GSP.	5/1/19	11/30/19
3.2. Develop and document estimate of sustainable yield.	12/1/19	3/31/20
3.3. Evaluate historical water budget.	12/1/19	3/31/20
3.4. Develop projected water budget in coordination with integrated hydrologic modeling.	5/1/19	3/31/20
4 - Integrated Hydrologic Modeling to Support Water Budget	**8/1/18**	**12/31/19**
4.1. Comparison of existing IHM applications to local information and selection of preferred existing application.	8/1/18	12/31/18
4.2. Refinement of existing application to adequately support basin-wide water budget development.	1/1/19	4/30/19
4.3. Development of model scenarios for projected water budgets considering climate change, land use, population growth, and surface water reliability.	5/1/19	8/31/19
4.4. Completion of model runs and summary of results at basin and subregion scales.	9/1/19	10/31/19
4.5. Documentation of IHM to supplement GSP.	11/1/19	12/31/19
5 - Public Outreach Support	**9/15/18**	**4/20/20**
5.1. Preparation for and participation in public meetings to describe technical work.	**9/15/18**	**4/20/20**
Meeting 1: Project Kickoff	9/15/18	9/15/18
Meeting 2: Preliminary Water Budgets	4/30/19	4/30/19
Meeting 3: Model Calibration and Projected Scenarios	12/20/19	12/20/19
Meeting 4: Refined HCM, Groundwater Conditions, and Water Budgets	4/20/20	4/20/20
5.2. Development of public outreach materials to convey technical work.		
6 - Project Management, Administration, and Coordination	**8/1/18**	**4/30/20**
6.1. Regular coordination with GSA staff.	8/1/18	4/30/20
6.2. Quarterly technical committee meetings.	8/1/18	4/30/20
6.3. Management and oversight of technical work activities.	8/1/18	4/30/20
6.4. Preparation and submittal of progress summaries anc	8/1/18	4/30/20



GEOSCENE3D

- designed and built by geologists

About GeoScene3D

GeoScene3D is a 3D geological modelling package for visualizing geoscience data and building geological models for distribution to specialists and stakeholders.

The software is designed for geoscientists in both public and private organizations, working on engineering geology, groundwater, soil contamination or other tasks that involve compilation, interpretation or visualization of spatial data.

GeoScene3D simplifies integration of a wide range of geoscience data. Common applications often include water well descriptions, geophysical profile data, chemistry results, terrain surface models, imagery, and buried geological-surface grids. Tools are available for manual or semi-automated interpretation and correlation of point data, for the generation of geological-surface grids through advance interpolation techniques, and for export of surface grids for further processing in other software (e.g., FEFLOW, MODFLOW). GeoScene3D also allows geological models to be easily built using both community- and user-defined workflows.

GeoScene3D is the standard platform for geoscience data visualization and modeling in Denmark, and is being continuously developed in collaboration with the Geological Survey of Denmark (GEUS), the Danish Nature Agency, all major Danish geo-engineering companies and a number of international clients.

The versatile design and robust functionality of Geo-Scene3D has been guided by the range of problems our clients face and the commitment at I•GIS to provide tools for finding practical solutions.

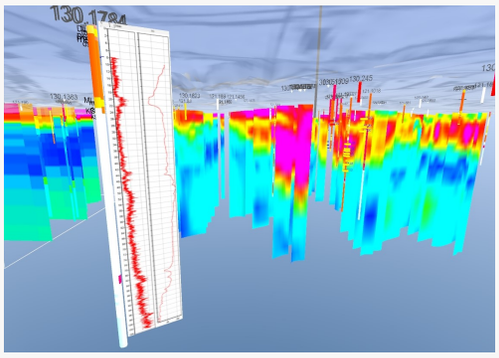
Data types and formats

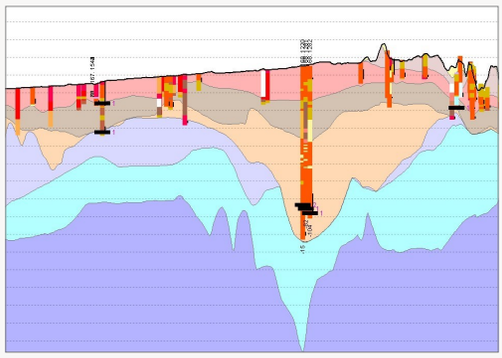
GeoScene3D support a variety of data types and provides sophisticated import wizards, making it easy to visualize your data.

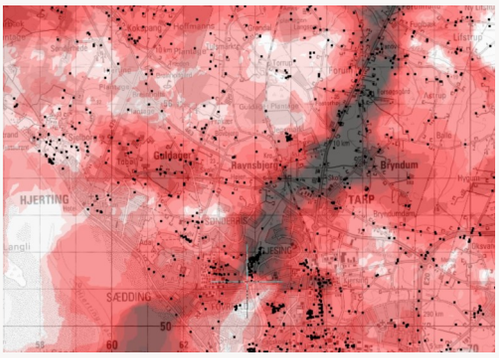
Common data types in GeoScene3D:

- Digital terrain models
- Imagery and raster layers (e.g. tiff, jpeg, grd)
- Vector map layers (e.g. shp)
- Driller's logs
- TEM, Airborne TEM
- DC, ERT
- Geophysical wireline logs
- MRS
- Seismic data, SEGY
- Tabular data (e.g. database, CSV ...)
- Chemical data

GEOScene3D







User interface and Modeling Tools

The GeoScene3D interface is based on 3 fundamental views of model and data, all integrated and interlinked:

- **Cross Sections**

Cross sections are defined in maps and 3D, and can be handled dynamically. User-defined buffer zones can be added to data in cross sections.

- **GIS Maps**

Any number of GIS maps can be added to a GeoScene3D project. GeoScene3D accepts standard GIS data formats (shape, TAB...), WFS and WMS services.

- **3D Scenes**

Any number of individual 3D camera views can be generated for any model.

- **Editing**

Tools are available for direct editing of surfaces, points, voxels, layer attributes, etc. in all views. Easy-to-use Wizards guide the user throughout the modelling process.

Export utilities are available for model elements and support several standard formats, including MODFLOW, FEFLOW, Surfer, CSV points, and more.

GeoScene3D Modules and Extensions

GeoScene3D is licensed as a series of modules and extensions. This enables the end user to tailor the software to their organizational requirements.

The various modules enable building of geologic models, while the extensions provide tools for specific application areas (e.g. tools for work with AEM data, or hydrogeologic calculations).

Description of modules and extensions

- **Basic Module**

  Create new projects, visualize data and work with cross sections, maps and 3D.

- **Layer Builder Module**

  Tools for constructing layer based models including interpolation tools.

- **Voxel Builder Module**

  Tools for constructing voxel models.

- **AEM Extension**

  Special tools for working with Airborne EM data, incl. GeoSoft XYZ support and Smart Interpretation, enabling fast model building from AEM data.

- **Hydro Extension**

  Tools for creating potentiometric maps (also aquifer specific), simple hydrological calculations as draw down based on Theis equation.

- **Simulation Extension**

  Tools for simulation of voxel properties, including Multiple Point Statistics (MPS), creation of hard and soft data and handling of simulations.

YouTube

WANT TO KNOW MORE?

We are here to help you! Find our useful online tutorials and information about GeoScene3D on our homepage or on YouTube channel: www.youtube.com/user/GeoScene3D

info@geoscene3d .com • (+45) 87 31 00 80 • www.geoscene3D.com

GEOSuite

California

SGMA-compliant DMS

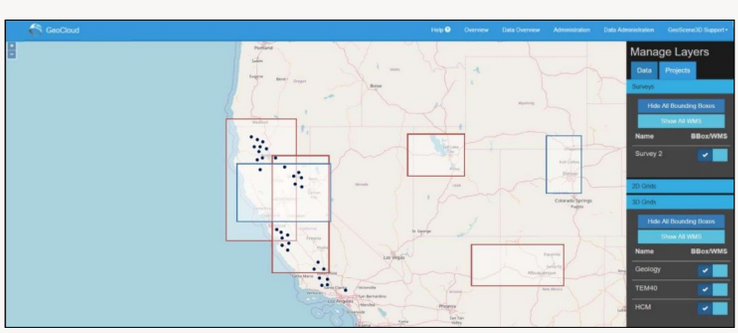
Your Groundwater Sustainability Plan (GSP) starts here!

GeoSuite: An all-you-need hydrogeological DMS suite

GeoSuite is a web based georeferenced relational data management system (DMS) developed especially for California, to facilitate hydrogeological conceptual modelling, GSP construction, and other DMS data serving needs. The DMS frames capabilities required by the SGMA. This includes the ability to create, host, share, interpret, report, and much more. The GeoSuite is carefully developed and designed to ensure a streamlined work process and to give the user a full specter of tools required for any GSP. GeoSuite is based on 20 years of sustainable groundwater management in Denmark and has been carefully re-designed according to requirements in the California SGMA, making it ready to implement by any GSA.

Online Data Management System (DMS)

Gather all your spatial data on one platform; boreholes, recharge and subsidence data, geophysics/AEM, point data, etc. You name it! GeoSuite contains an advanced georeferenced and easy to use DMS, which enable you to handle all your data consistently. With 2D and 3D support, GeoSuite becomes the center of your DMS workflow. An interactive map will give you a complete overview for any water management task. GeoSuite provides unlimited opportunities for large or small-scale mapping, for internal users or for serving data to external stakeholders. Upload, share and easy update.



Manage your water in 3D

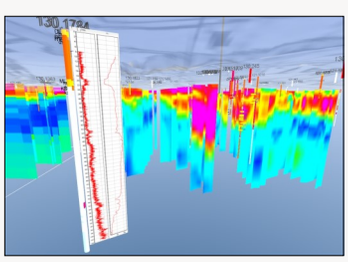
GeoSuite comes with 3D capabilities for an in-depth view of hydrogeological conceptual model (HCM) and geological model. Easy access and online serving of all your data makes GeoSuite an invaluable partner.

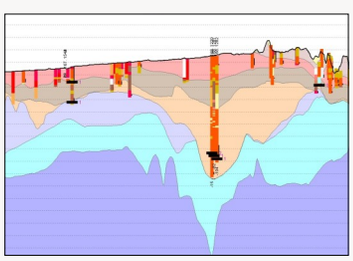
Well Database

A well database handles everything needed in relation to well- and aquifer management and can automatically monitor thresholds or print lithological logs. Gather, modify, monitor and report on well data. GeoSuite can import already existing well databases and makes management of wells easier. The GeoSuite contain the tools to be in compliance with the SGMA requirements and comes with a user friendly front-end for your mobile devices to take to the field. QA/QC has never been easier.

Stakeholder and Public Communication

Communicate your work to stakeholders and the public in real time. GeoSuite provides you with the capability to present your knowledge directly on your website. With an integrated web-based GIS viewer, it is simple, quick and easy to present your data with GeoSuite.





Customizable for your needs

GeoSuite is under active development, ensuring features and functionality that meet and anticipate customer needs. If your organization has special requirements or needs additional functionality, our team of GeoSuite consultants are ready to help you.

For further information about GeoSuite or the possibilities it provides for your organization, please contact our consultants at info@geoscene3d.com

GeoSuite is the only, SGMA-compliant, cloud based DMS package tailored specifically for the sustainable groundwater management in California.

Below is a list of what makes GeoSuite SGMA-compliant

We strive to be the best at:	GeoSuite
County-wide DMS intergration	✓
Customizeable for individual needs	✓
Data download/upload functions	✓
Data formatting in many standard options	✓
Data visualization, 2D and 3D	✓
Easy updating and sharing	✓
Evaporation/ precipitation monitoring	✓
Gauging station monitoring	✓
Georeferenced database	✓
Groundwater monitoring, level and quality	✓
Groundwater modelling results	✓
GSP development, reporting, and submittal	✓
Hydrograph/chart/table tools	✓
Identify data gaps with data analysis tools	✓
Integrate data from multiple sources and formats	✓
Interactive interface	✓
Interbasin/inter GSA coordination	✓
Interface with ArcGIS, MapInfo, and ModFlow	✓
Intergrate organizational QA/QC procedures	✓
Irrigation monitoring	✓
Land use/crop production data and maps	✓
Recharge estimation	✓
Relational database integrated with a Geographic Information System (GIS)	✓
Search and reporting function with control of individual and group user permissions	✓
Spatial data stored as shape files or other GIS formats	✓
Store, protect, and organize all your data	✓
Subsidence mapping	✓
Surface water diversion map	✓
Temporal data stored in cross-referenced tables	✓
Text search and spatial query capability	✓
Visualize hydrogeological data for GSP	✓
Water budget analysis and viewing tools	✓
Water quality monitoring	✓
Web-based GIS viewer	✓
Well construction data storing	✓
Well metering management	✓