

## Yuba County Water Agency Groundwater Model Phase Two

### YCWA-01

#### I. Project Sponsor Contact Information

Lead Agency/Organization	Yuba County Water Agency
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Project Partners/Collaborators	YCWA member units

#### II. General Project Information

Project Title	Yuba County Water Agency Groundwater Model Project Phase Two
Project Total Budget	\$750,000
Project Funding Match	25% match proportionally contributed by member units
Project Funding Request	\$562,500
Can a detailed cost estimate be provided upon request?	Yes
Project Location:	Regional (see description below)
Latitude	N/A
Longitude	N/A
Could you provide a map of the project location including boundaries upon request?	Yes
Project Location Description:	The study area for this Project will include, at a minimum, the groundwater subbasins beneath Yuba County, consisting of the portion of the North Yuba Groundwater Subbasin (California Department of Water Resources [DWR] Basin 5-21.60) within Yuba County and the entire South Yuba Groundwater Subbasin (DWR Basin 5-21.61). Both subbasins are part of the larger Sacramento River Groundwater Basin (DWR Basin 5-21). Adjacent groundwater subbasins will be included in the model as necessary to develop a technically sound groundwater model.
Project Type	Planning Study/Assessment Monitoring Best Management Practices

#### III. Project Description

This project seeks funding for the second and final phase to develop a groundwater model for Yuba County.

The first phase of the project has been funded through the DWR Local Groundwater Assistance Grant Program and will accomplish the following outcomes:

- review and summarize existing groundwater modeling codes and studies,
- based on the review, select a modeling code that is well suited to meet the goal of the Project,
- update the existing hydrogeologic conceptual model for the groundwater basins in Yuba County,
- develop input datasets for the selected model,
- run and calibrate the groundwater model, and
- document the model development process, all input data sets, adequacy of model calibration, and limitations and suggestions for future use.

The second and final phase of the groundwater model will address data gaps that were identified in phase one and would utilize historical data and apply the model to future scenarios that have significant implications for managing the region's groundwater resources.

Additionally, in order to further inform effective decision-making, phase two would find linkages between the Yuba County Groundwater Model and the WEAP modeling effort being conducted in conjunction with the Yuba County IRWMP Update.

YCWA takes an active role in managing the groundwater resources of Yuba County. As part of the management program, YCWA conducts extensive monitoring of the groundwater system. Monitoring data is collected, stored in a data management system, and used on a continual basis to guide management of the resource. YCWA publishes an annual monitoring report, and meets routinely with member units to plan for groundwater substitution transfers. The existing methods and tools for analysis (i.e., individual well hydrographs, groundwater elevation maps, and the groundwater adaptive management tool (GWMT) have been adequate for planning purposes to date, but do not fully leverage existing data. An adequately designed and calibrated groundwater model provides an additional, and defensible "line of evidence" to ensure continued success of the groundwater management program.

#### **IV. Project Rationale/Issues Statement**

A groundwater model would be an important addition to YCWA's "tool box" for analyzing groundwater conditions in Yuba County. Development of a groundwater model was identified as a direct management action in the GWMP under the component category associated with groundwater sustainability. The GWMP states that increased understanding of how groundwater responds to various stressors (e.g., pumping, changes in aquifer recharge, and changes in climate) is critical to ensuring the long-term sustainability of the resource. One area where additional, robust analytical tools will be crucial is planning for future groundwater substitution transfers. Requirements for groundwater

substitution transfer planning under the Yuba Accord, as stated in the Water Purchase Agreement (WPA), require YCWA to determine “the amount of water that can be pumped within the safe yield of the basin without contributing to long-term overdraft and without resulting in significant unmitigated impacts to other groundwater users in the basin.” The WPA specifies that such determination will be made in the spring of the year during which groundwater substitution transfers are planned.

In an attempt to meet the above requirements, YCWA developed the Groundwater Adaptive Management Tool (GAMT) in 2008. The GAMT includes a set of response and recovery functions for each analysis unit (e.g., each member unit or hydrologic unit) that were developed as statistical relationships between historical pumping, precipitation, and water levels in dedicated monitoring wells distributed throughout the basin. The response and recovery functions are used to predict water-level response (i.e., drawdown and recovery) to pumping volumes in the analysis unit.

While the GAMT has been successfully applied for groundwater management planning, it has several limitations. First, the GAMT generates a predicted response for the entire analysis unit. For example, the response and recovery functions may predict a drawdown of 15 feet in response to a given member unit’s planned pumping. However, the prediction does not account for spatial variations in drawdown within a member unit. Second, each response and recovery function does not explicitly consider the effects of pumping or other stressors outside of the analysis unit. In other words, the predicted drawdown in response to pumping does not consider pumping from adjacent, and often hydraulically connected, analysis units. A three-dimensional groundwater model is well suited to the purpose of supporting groundwater management analysis, and would represent a significant improvement on the existing GAMT.

**V. Goals/Objectives/Performance Metrics**

Goals Addressed by the Project	<p><b>Goal 1:</b> Ensure adequate and reliable water supply that meets the diverse needs of the region</p> <p><b>Goal 2:</b> Protect, restore and enhance water quality for water users and in support of healthy watersheds</p> <p><b>Goal 5:</b> Protect public safety through emergency and drought preparedness and integrated flood management</p> <p><b>Goal 6:</b> Address climate vulnerabilities and reduce greenhouse gas emissions</p>
Objectives Addressed by Project	<p>1.1 Improve water supply system capacity, flexibility and efficiency, including, but not limited to, optimizing existing water storage; upgrading and retrofitting aging infrastructure; and, developing new infrastructure, where necessary;</p> <p>1.2 Promote water conservation and water use efficiency by instituting various techniques including, but not limited to, groundwater recharge, conjunctive management, irrigation efficiencies,</p>

	<p>municipal water conservation, water recycling and reuse;</p> <p>1.3 Protect and restore water supplies that support watershed health;</p> <p>1.4 Promote disaster preparedness and conservation planning efforts;</p> <p>1.6 Preserve water supplies that support recreational opportunities and agricultural uses;</p> <p>1.7 Support regulatory compliance with current and future state and federal water supply standards;</p> <p>1.8 Promote regional education and outreach regarding water supply issues and needs;</p> <p>2.5 Maintain and improve water quality required to restore and protect freshwater ecosystems, fisheries and groundwater-dependent habitat;</p> <p>2.6 Support regulatory compliance with current and future state and federal water quality standards;</p> <p>5.2 Support regional and inter-regional collaboration to improve drought and emergency preparedness;</p> <p>6.2 Improve data, modeling and technical analyses to better understand the impacts of climate change on regional and inter-regional water supply and watershed health;</p> <p>6.6 Promote regional and inter-regional collaboration to implement climate change adaptive management strategies.</p>
<p>What performance metrics will be used to demonstrate that objectives are being met? Wherever possible, provide a quantitative measurement reflecting successful project outcomes.</p>	TBD

## VI. Resource Management Strategies

<b>Increase Water Supply</b>	
Conjunctive Management and Groundwater	A groundwater model will support the continued, successful implementation of the Lower Yuba River Accord and groundwater substitution transfers.
<b>Improve Water Quality</b>	
Pollution Prevention	One criterion that will be evaluated during model application is the prevention of upwelling of poor quality water into the fresh water aquifer (i.e., from below the base of fresh groundwater).
<b>Practice Natural Resources Stewardship</b>	
Land Use Planning and Management	Better understand how changing land use (e.g., agriculture to residential) in Yuba County could impact groundwater resources.
Recharge Areas Protection	During development and application of the groundwater model, information will be compiled and

	calculated that will result in quantification of groundwater recharge from such sources as infiltration of precipitation, infiltration of applied water, and recharge from surface water bodies.
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**VII. Statewide Priorities**

**Drought Preparedness**

- Promote water conservation, conjunctive use, reuse and recycling
- Efficient groundwater basin management

**Climate Change Response Actions**

- Adaptation to Climate Change: Advance and expand conjunctive management of multiple water supply sources

**Protect Surface and Groundwater Quality**

- Protecting and restoring surface water and groundwater quality to safeguard public and environmental health and secure water supplies for beneficial uses

**Climate Change Adaptation**

The development of a groundwater model as previously described would provide the region with a more flexible tool in making well informed water planning and management decisions, particularly in the face of a changing, variable climate. Groundwater overdraft is considered a significant vulnerability in the Yuba County region. Particularly in light of the many uncertainties presented by climate change, a groundwater model would be an invaluable tool for the region to safeguard continued effective and sustainable conjunctive management and in meeting the requirements of the Water Purchase Agreement under the Lower Yuba River Accord.

**GHG Emissions Reduction**

Since this project does not entail construction activities, GHG considerations are not particularly relevant to the project design.

**VIII. Project Status and Schedule**

<b>Project Stage</b>	<b>Description of Activities in Each Project Stage</b>	<b>Planned/Actual Start Date</b>	<b>Planned/Actual Completion Date</b>
Planning	Phase 1- funded through LGA Grant Program		2015
Design	Phase 1- funded through LGA Grant Program		2015
Environmental Documentation	N/A		

(CEQA/NEPA)			
Permitting	N/A		
Tribal Consultation (if not applicable, indicate by N/A)	N/A		
Construction/ Implementation	N/A		

**IX. Project Technical Feasibility**

a. List the water planning documents that specifically identify this project.	YCWA Groundwater Management Plan
b. List the adopted planning documents the proposed project is consistent with (e.g., General Plans, UWMPs, GWMPs, Water Master Plans, Habitat Conservation Plans, etc.)	YCWA Groundwater Management Plan Lower Yuba River Accord YCWA Agricultural Water Management Plan
c. List technical reports and studies supporting the feasibility of this project.	
<b>If you are an Urban Water Supplier:</b>	
1. Have you completed an Urban Water Management Plan and submitted to DWR?	Yuba County Water Agency (YCWA) does not supply water for direct urban use and is not subject to the Urban Water Management Plan Act (UWMPA).
2. Are you in compliance with AB1420?	See above.
3. Do you comply with the water meter requirements (CWC Section 525)?	See above.
<b>If you are an Agricultural Water Supplier:</b>	
1. Have you completed and submitted an AWMP?	Yes
<b>If the project is related to groundwater:</b>	
1. Has GWMP been completed and submitted for the subject basin?	Yes