

Prospectus

Investigating Surface and Groundwater Resources in the Southern Sierra to Support Water Management and Water Management Planning

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This study prospectus outlines basic water information and research needs for the southern Sierra Region between the San Joaquin River and Kern Rivers, the Sierra crest in the east and approximately the 600-foot elevation in the west.

Background

The Southern Sierra Regional Water Management Group (SSRWMG) completed an Integrated Regional Water Management Plan (IRWMP) in 2012-13 describing the Region, water management-related objectives, resource management strategies, climate adaptation strategies, projects, and data needs among other items. The SSIRWMP describes several critical data needs the RWMG identified in the southern Sierra through public regional water management group meetings, interviews with decision-makers, stakeholder group board meeting, briefings with stakeholders, and a public survey. The SSRWMG is in the process of updating the plan during the 2013-2014 timeframe and would like to leverage the work of the RWMG members and stakeholders, the consultants Provost and Pritchard Consulting Group and Kamansky's Ecological Consulting by partnering with the California Department of Water Resources (DWR) to gain access to data DWR has and to the extent possible, make the data accessible for use in the plan, project development and stakeholder participation in water-related issue analysis and identification.

The SSIRWM Region encompasses the upper watersheds of the San Joaquin, Kings, Kaweah, Tule and Kern rivers, as well as Poso Creek, Deer Creek, and White River. Approximately 34,000 residents live in this region and rely primarily on limited and variable supplies of groundwater pumped from fractured rock aquifers. There are at least two districts (one in Springville and one in Three Rivers) utilizing surface water for drinking.

Within the SSIRWM Region are the Sequoia, Sierra and Inyo National Forests and Sequoia and Kings Canyon National Parks. These public lands draw over 1.6 million visitors per year and rely on the Region's water supply. Visitors are a great economic resource to the Region, but add significant seasonal demands to the local fractured bedrock groundwater supply that must also support the Region's permanent residents.

Very little groundwater information is available and accessible for resource planning in the Region where fractured bedrock aquifers serve remote, disadvantaged communities through individual wells and septic tanks. There are no incorporated cities, only small water treatment plants and the majority of the region utilizes wells and septic tanks.

County general plans call for development in the foothill and mountain communities in the Region, yet sustainable use rates have yet to be established for existing communities who rely almost exclusively on fractured-rock aquifers. The Region is supported by a small number of public districts, including Three Rivers Community Services District, Springville Public Utilities District, several small water associations, many private ditch companies,

two resource conservation districts and two resource conservation and development councils.

Towns such as Three Rivers (County of Tulare, approximately 1,700 full time residents and also supporting over 500,000 seasonal tourists) exemplify the need for more information regarding both groundwater and surface water resources. The town relies on individual wells and surface water supplies from the Kaweah River watershed. Surface water supplies originate from Sequoia and Kings Canyon National Parks and Sequoia National Forest and fluctuate seasonally with snowmelt and precipitation. Groundwater supplies also fluctuate seasonally, but amounts and extents are unknown. The area's water quality also fluctuates seasonally, but locally, drinking water must be boiled to be drinkable. Because they, like most other communities in the SSIRWM region, rely on fractured-rock groundwater, it is critical to conduct this study in order to plan for and sustainably manage their groundwater supplies. Water quality in Three Rivers has been historically good, but some water sources in the area are under a water boiling order. This problem is exacerbated by nutrient plumes from septic tanks and low water quantities late in the summer in drought cycles.

As noted above, the SSRWGM will complete an update to its current IRWMP but lacks funds to conduct fractured-rock groundwater studies in key areas to better understand and thereby manage this resource. Only the northern portion of the Isabella Groundwater Basin has been mapped and identified in the Region with the likely other unofficial basins yet to be identified. It is unknown if developing a regional groundwater management plan is appropriate for this Region, but additional information and support for the IRWMP will advance groundwater management efforts. SSRWGM recognizes that, at this time, it is not feasible to construct a full groundwater management plan for the entire Region. Thus, the focus of data gathering should be localized compared to the size of the Region because of potentially prohibitive costs and most of the Region does not have traditional groundwater management basins, increasing the cost of understanding fractured bedrock aquifers. Additional information and data would benefit not only Three Rivers or other suitable town and groundwater users, but will also serve as a starting point for other geographically similar watersheds and communities to begin to understand and manage the limited groundwater supplies.

Study Questions and Goals

With this prospectus, the Southern Sierra Regional Water Management Group seeks assistance with accomplishing the following goals:

1. Support and inform IRWMP development, especially the groundwater components in the southern Sierra;

2. Initiate a partnership with DWR staff to provide critical information on **groundwater wells, surface water hydrology, watershed geology, prior studies, water quality problem areas, water budget** and other information important for planning for water resources in the Region;
3. Initiate a partnership with DWR to initiate and complete a groundwater and watershed study in Three Rivers, California or other suitable area;
4. The Region needs **detailed maps of the locations of water systems in and around the small towns primarily in the foothills**. The mapped water systems and identifying the source of water supply, surface or groundwater, and locations of private wells in and around the towns in the Region;
5. The Region needs **detailed geology maps of the areas around towns**. This information is useful in extrapolating information from wells or alternatively learning that extrapolation is not feasible because of complex geology;
6. Synthesize, analyze and integrate data into the IRWMP for the upper watersheds working with US Forest Service researchers, hydrologists and National Park Service natural resource professionals.

Research Questions

There are several questions that can help guide the goals listed above:

1. Are there distinct geological differences among the watersheds in the Region that would preclude extrapolating data gathered in and around the towns? Is the information gathered from well data broadly applicable?
2. Are there past studies that can be used to understand ground and surface water resources?
3. Are there locations that may be suitable for groundwater recharge?
4. Is it possible to map landslide risk and flood prone areas?
5. Where is surface water quality and quantity sampled in the Region? Where is groundwater quality monitoring and what are the results of the sampling?
6. Are there discrepancies in the surface water quantities based on where they are sampled? If there are discrepancies, to what do they owe?
7. What increases in water demand occur as a result of the seasonal influx of visitors? How does this correspond with water availability and quality?
8. What are the water budgets (supply versus use) for surface and groundwater resources?
9. What are the sources of the most common water quality problems? Are there methods to managing pollutants to avoid contamination or are there natural contaminants that may require treatment?