Sierra Resource Conservation District

Improving Groundwater Management in the Southern Sierra Fractured Bedrock Aquifer

Schedule - Assuming Grant Award by January, 2013

		Year 1				Year 2				Year 3	
Task	**Description**	**Quarter 1**	**Quarter 2**	**Quarter 3**	**Quarter 4**	**Quarter 1**	**Quarter 2**	**Quarter 3**	**Quarter 4**	**Quarter 1**	**Quarter 2**
1	**Assemble and supplement geologic data**										
1.a	Project manager will work with DWR and assemble maps and data, previous studies and identify data gaps;										
1.b	The hydrogeologist will obtain aerial photos and review to map major lineaments to fill in the gaps in specific areas;										
1.c	The hydrogeologist will determine fracture trends and plotted on maps to fill in gaps;										
1.d	The United States Forest Service hydrologists and the National Park Service resource professionals will provide an inventory and synthesis of the upper watersheds' data, and to the extent possible, integrate it with downstream information.										
2	**Well yields and pumpage**										
2.a	The hydrogeologist will use completion reports for individual wells to prepare graphs showing well depths and air - test yields in the study are aand summarize water system wells, construction data, annual pumpage, and sustainable well yields and estimated total well pumpage for the study area.										
3	**Water level measurements**										
3.a	The hydrogeologist will measure water levels in as many wells as feasible (approximately 15 wells will be measured) during at least two periods. One would be during the spring and the other during the fall. Wells would be selected for which driller's reports are available, and to provide geographic coverage. Electric sounders will be used for measuring the water levels. A GPS unit would be used to precisely locate the wells and determine the elevation of the measuring point;										
3.b	The hydrogeologist will determine and plot water level elevations. Water-level elevation contours and direction of groundwater flow maps will then be prepared for the summer and fall. In specific developed areas, where both shallow and deep wells are present, separate maps may be prepared for the shallow and deep groundwater. In addition to these measurements, routine water-level measurements will be made in an estimated 15 wells to determine seasonal water level changes. For these sites, both shallow and deep wells (if available) will be selected for monthly water-level measurements where access is available. These will continue over a period of up to two years;										
3.c	The hydrogeologist will prepare water-level hydrographs for these wells. This will provide some of the best information on the extent and timing of recharge to the shallow and deep groundwater.										
4	**Watershed delineation and watershed budget**										
4.a	Project manager will work in partnership with DWR staff to assemble information in determining evapotranspiration rate and amounts for the various delineated watersheds based on already developed values for various types of vegetation. These are available primarily from studies of the U.S. Forest Service and the University of California;										
4.b	Project manager will work with DWR staff to evaluate streamflow records to compare precipitation, evapotranspiration, and runoff in the area. In general, groundwater pumpage in the fractured bedrock aquifer is based on pumping water that would have otherwise been used by plants, lost to evaporation, or run off as streamflow. This information will enable development of reasonable values of potential groundwater recharge various watersheds;										
4.c	Project manager will work with DWR and hydrogeologist to dertermine potential groundwater recharge in developed watersheds, and this would be compared to the existing pumpage from the hydrogeologist. The potential recharge estimates will be extremely useful in evaluating the carrying capacity of specific parts of the study area.										
5	**Develop understanding of hydraulic connection between streamflow and groundwater**										
5.a	Hydrogeologist will use water-level elevation maps to evaluate the direction of groundwater flow relative to the primary streams;										
5.b	Hydrogeologist will also compare stream channel elevations to groundwater level elevations to evaluate the relationtionship between streamflow and groundwater. Locations of groundwater recharge from streamflow and groundwater discharge to streams would be determined.										
6	**Delineation of water quality problem areas**										
6.a	First, project manager will summarize and plot available data for water systems and private wells and in partnership with Tulare County Department of Public Health, local districts and DWR;										
6.b	Second, hydrogeologist will develop and carry out a water sampling program for analyses of key constituents to fill in data gaps. Maps would then be prepared showing approximate problem areas for constituents of concern.										

7	**Meetings, project management and stakeholder coordination**										
7.a	Hydrogeologist will present at two regional water management group meetings, discussing study progress, findings, important data, and draft illustrations, as they become available and provide input to reports;										
7.b	Project Manager will coordinate with stakeholders coordinate stakeholder involvement and collaboration, presenting at two town hall or other public meetings;										
7.c	Project manager will coordinate study activities, consultants, reporting and timing.										
8	**Final Report**										
8.a	The hydrogeologist will prepare a draft technical report, presenting the basic data and interpretation, maps, illustrations, and appendices, as well as recommendations for future studies and monitoring programs. This report will be reviewed by interested parties, the comments addressed, and the final report prepared.										
9	**Project Office Operations and Administration (2.5%)**										
9.a	Quarterly reporting – quarterly reports will be submitted to DWR in a timely fashion;										
9.b	Financial administering – time tracking, invoicing and consultant invoice receipt.										
	Travel, Materials and Supplies										
	Office Supplies / Printing										
	Travel - Mileage										