

Fox Canyon Groundwater Management Agency

DBS&A Scope/Budget for Update and Finalization of Groundwater Budgets for Four Basins

Water Budget Component	GSI Approach (based on preliminary review)	DBS&A Proposal	Budget (Four Basins)
Groundwater Inflows			
Stream Leakage	Visual evaluation (Google-Earth); UWCD coordination	Review gage data where available; use CA-DWR IDC <u>or</u> DPWM model results for ungauged ephemeral washes	Soil-moisture balance modeling: \$45K Review gage data: \$16K
Artificial Recharge	Agency records	Review/Edit/Update GSI (following QA review) work	\$5K
Subsurface inflow (including seawater intrusion)	Hydrogeologic evaluation, Darcy's law	Review/Edit/Update GSI (following QA review) work; coordination with Dudek	\$10K
Deep percolation of irrigation	16% of applied water for ag, 5% for urban	Apply CA-DWR IDC Model or DPWM	Soil-moisture balance modeling included above
Deep percolation of precipitation	Turner empirical equations	Apply CA-DWR IDC Model or DPWM	Soil-moisture balance modeling included above
Leakage from septic systems	65-percent of total water usage	Review/Edit/Update GSI (following QA review) work	\$5K
Leakage from distribution systems	5-percent of deliveries	Review/Edit/Update GSI (following QA review) work	\$5K
Groundwater Outflows			
Discharge to tile drains	90% of irrigation deep percolation; UWCD coordination	Coordinate with UWCD; evaluate areas where tile drains intercept shallow groundwater	\$10K
Subsurface outflow	Hydrogeologic evaluation, Darcy's law	Review/Edit/Update GSI (following QA review) work; coordination with Dudek	\$10K
Discharge to streams (baseflow)	Visual evaluation (Google-Earth)	Review gage data; apply digital filtering methods for baseflow (e.g., Lim et al., 2005)	Analyze gage data: \$16K
Riparian evapotranspiration	USGS (Hanson, 2003) modeling estimates	Update with US Fish and Wildlife Service GIS mapping of riparian vegetation; Arundo donax occurrence mapping where available	Riparian mapping and ET estimates: \$16K
Extraction	Agency records	Review/Edit/Update GSI (following QA review) work	\$5K
Change-in-storage			
Change in storage	Difference between inflows and outflows	Update based on statistical analysis of available groundwater level data	\$37K
TOTAL:			\$180,000

Budget Explanation/Limitations:

- Upon budget authorization, DBS&A will prepare a detailed approach for water budget finalization for each basin, in the form of a power-point presentation or technical memorandum. The detailed approach will include a list of limitations that will be associated with the final water balance. DBS&A will proceed with water-budget finalization for each Basin once the detailed approach has been approved by Dudek/FCGMA.
- Budget includes DBS&A attendance at monthly TAG meetings (4 total) and ad-hoc water budget committee meetings (up to 3 total).
- DBS&A will apply either the CA-DWR IWFMD-Demand Calculator (IDC) or the Distributed Parameter Watershed Model (DPWM) to estimate recharge from deep percolation of precipitation and irrigation. These two models are generally similar in their capabilities, mathematical approach, and data requirements. There are advantages and disadvantages to each model, and DBS&A will determine which model to use in consultation with Dudek and FCGMA.
- Statistical analysis of available groundwater level data will rely on readily available groundwater data, wherein well location and screened interval are specified. Statistical analyses include Mann-Kendall analysis for the presence of trend, and linear regression analysis for slope (feet of change per year) for those wells that exhibit a statistically significant trend. A range of aquifer storativity will be determined based on available data and literature sources.
- DBS&A will review, edit, and update to the extent necessary existing water-budget component data from GSI (as listed in the table above).
- Budget does not include creating original geologic cross-sections to support Basin inflow and outflow calculations, or revising existing geologic cross-sections.
- Proposed budget is for submittal of updated water budget calculations and report text consistent with the table above and the approved detailed approach, and in coordination with Dudek. Subsequent edits in response to FCGMA, TAG, State, or stakeholder comments, if necessary, may require additional budget authorization.