

# Sean Culkin

PG, CHG

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## SUMMARY

Mr. Culkin is a consulting professional with more than 15 years of experience serving a diverse range of projects. He is a California registered professional geologist and certified hydrogeologist who leverages his skills in analytical and quantitative hydrogeology to support private industry, public sector, and legal clients. His experience includes site characterization, water resources management, project management, conceptual site model development, soil and groundwater remediation, remedy optimization, property development, and regulatory compliance. He has developed a solid track record of successful project execution and has provided technical guidance and oversight for numerous projects throughout the United States. Mr. Culkin has extensive experience with industry-standard groundwater modeling software applications and has used site-specific numerical and analytical groundwater models to support remediation system design, litigation efforts, dewatering operations, and basin-wide resource management planning for groundwater and surface water supplies.

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## EXPERIENCE

### UPLAND HYDROGEOLOGY CONSULTING

President and Lead Hydrogeologist  
Mar 2024 – Present

### INTEGRAL CONSULTING, INC.

Consultant, Hydrology & Geosciences  
Aug 2017 – Mar 2024

### HYDROMETRICS WRI (NOW MONTGOMERY & ASSOCIATES)

Senior Hydrogeologist  
Mar 2015 – Aug 2017

### AMEC EARTH & ENVIRONMENTAL (NOW WSP)

Hydrogeologist  
Dec 2007 – Feb 2015



## CONTACT

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## PROFESSIONAL REGISTRATIONS

Geologist: CA, DE, NC, NY  
Hydrogeologist: CA

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## EDUCATION

The Pennsylvania State University, 2007  
MS, Geosciences

Johns Hopkins University, 2005  
BA, Earth and Planetary Sciences

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## PROFESSIONAL AFFILIATIONS

Groundwater Resources Association of California  
National Groundwater Association  
Association of California Water Agencies  
Association of Environmental and Engineering Geologists



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## PROJECT EXAMPLES

### WATER MANAGEMENT

#### **Groundwater Study for a Power Generation Facility, California**

Lead hydrogeologist for an assessment of available groundwater resources for this power station. Worked with geotechnical engineering teaming partners to characterize the local geology and groundwater flow system to make updates to the existing site conceptual model. Developed potential water supply alternatives and provided recommendations to the utility client.

#### **Water Resources Management, Olympic Valley, California**

Project manager and lead groundwater modeler supporting the local public utility client and associated private property developers, including developments undergoing environmental impact studies. Represented the client at public-facing meetings. Performed groundwater model calibration and utilized the updated model for long-term planning operations for the client. Successfully developed criteria for estimating long-term maximum groundwater supply within the valley that refined and improved on previous investigations. Provided review and evaluation of local hydrogeology to assist developers with construction dewatering and excavation for a large resort hotel.

#### **Groundwater Resources Management, Santa Cruz County, California**

Project management and technical oversight for a group of public clients utilizing a shared groundwater resource within Santa Cruz County. Coordinated with environmental impact report team of consultants and agencies for a planned groundwater replenishment project within the basin. Authored documents pursuant to the California Sustainable Groundwater Management Act (SGMA) that resulted in acceptance of basin boundary modifications by the California Department of Water Resources and promoted sustainable groundwater management through basin consolidation. Led construction of groundwater-surface water models in conjunction with the U.S. Geological Survey and made presentations to the basin Technical Advisory Committee. Developed and ran site-specific flow and transport models to evaluate impact of seawater intrusion, resulting in updated SGMA management objectives for the basin that improved on previous methods.

#### **Groundwater-Surface Water Study, Santa Cruz County, California**

Led groundwater pumping well, stream/aquifer interaction, and sampling investigations in response to state and coastal commission inquiries in Santa Cruz County, resulting in successful resolution with the state for the agricultural landowner.

### LITIGATION SUPPORT

#### **Expert Services for Settlement and Tilting of a High-Rise Development, San Francisco, California**

Lead expert hydrogeologist on a team of geotechnical and structural engineers supporting litigation related to a high-profile residential development in downtown San Francisco. Constructed site-specific 3-dimensional geologic models as well as groundwater models for analysis of local hydrogeology and the impact of construction dewatering on the building. Gave formal presentations of technical findings to mediation groups. Quickly developed a detailed conceptual site model of the downtown San Francisco groundwater basin. Worked with geotechnical engineer partners to develop a detailed time history of subsurface material property



changes in the vicinity of the building. These efforts contributed to a favorable settlement for the property developer.

#### **Natural Resources Damages Assessment (NRDA), Hanford Site, Washington State**

Provided expert opinions in support of the Department of Justice (DOJ) for the Hanford NRDA case. Assessed the extent of damages incurred by Trustees as a result of groundwater contamination stemming from historical activities at this former nuclear production complex, particularly as they pertain to use of the site for managed aquifer recharge. Authored expert analysis and documentation in response to Trustee damage assessments, and worked with the Department of Energy to develop detailed analyses of potential fate and transport pathways in the Hanford Aquifer. Case ongoing.

#### **Comingled Groundwater Plume, Confidential Location, Delaware**

Provided expert opinion for allocation of damages from a large, comingled groundwater plume where the municipal water supply had been impacted by metals. Developed a detailed time-history of plume migration from multiple source areas using empirical and groundwater model data sources. Made recommendations to counsel for refined allocation metrics and authored associated technical documentation.

#### **Microplastics Fate and Transport Evaluation, Confidential Location, Northern California**

Provided opinions on the fate and transport of microplastics from telecommunications infrastructure based on research and site investigation. This expert work resulted in a favorable outcome for the telecom client to continue project planning and construction.

#### **Portland Harbor Superfund Site, Portland, Oregon**

Produced expert reports for the allocation process at this large multi-parcel Superfund site. Worked with counsel to refine a complex fate and transport conceptual site model of interconnected surface water and groundwater pathways. Developed a detailed analytical model for estimating mass loading of key contaminants from surface water runoff to the harbor.

#### **PFAS Litigation Support, Various Confidential Locations, United States**

Provided technical analysis of PFAS fate and transport in the vicinity of various industrial facilities and large municipal water suppliers. Reviewed hydrologic data and developed analytical models to calculate riverine contaminant flux time histories.

#### **Property Development Litigation, Seattle, Washington**

Analyzed the impact of numerous construction dewatering projects on groundwater flow and contaminant transport from multiple sites in the vicinity of an urban redevelopment project. Performed groundwater drawdown and capture analysis. The revised hydrogeologic conceptual model supported expert testimony on site contamination transport history.

## **REMEDIATION**

#### **U.S. Army Corps of Engineers Site Remediation, California and Nevada**

Developed a portfolio of work at current and former military facilities through a longstanding partnership with 8(a) contractors and the U.S. Army Corps of Engineers, including Fort Ord, Sharpe Army Depot, Riverbank Army Ammunition Plant, and Hawthorne Army Depot. Provided modeling and overall technical hydrogeologic support for current and planned remediation efforts, as well as coordination with regulatory agencies on behalf of the client. This work has included construction of calibrated flow and transport models within several regional



aquifer systems, and the use of models for optimization of extraction/injection well networks for chlorinated solvents and metals. These efforts successfully informed efficient rehabilitation and redesign.

#### **Former Wood Treating Facilities, Various Locations, United States**

Lead hydrogeologist for characterization of former wood treating sites in a variety of geologic settings, including riparian, coastal, and shallow karst environments. Developed site characterization work plans for feasibility studies and data gaps analyses. Prepared technical documentation on the fate and transport of dense nonaqueous-phase liquid and remediation feasibility. Developed site-specific groundwater models to assess fate and transport of PAHs and support remedy alternative design. Provide strategic and technical support of existing consultant teaming partners.

#### **RCRA Corrective Action, Confidential Client, Brunswick, Georgia**

Used density-dependent groundwater transport modeling to assist project team's reinterpretation of the conceptual site model for offsite migration of VOCs for a revised corrective action. Updated previous consultant's model to more accurately simulate coastal aquifer dynamics. Used particle tracking and transport/attenuation models to support offsite plume characterization and impacts to local water supply.

#### **Agricultural Well Profiling, Chico State University Farm, California**

Performed ambient and dynamic down-hole flow logging at wells on an organic farm that had been impacted with chlorinated solvents. Calculated groundwater and contaminant mass flux within the well boreholes. Characterized well construction and hydrostratigraphy through a video logging. Oversaw pump reinstallation and well maintenance. The resulting analysis provided the basis for successful ongoing well operations to maintain groundwater availability at the farm.

#### **Perchlorate Plume Remediation, San Francisco Bay Area, California**

Provided technical oversight for the characterization and remediation of a sedimentary basin contaminated with perchlorate that included impacts to private and municipal water users. Characterized basin hydrostratigraphy and contributed to conceptual model development via sonic core logging, aquifer pumping and injection tests, monitoring of a basin-wide transducer network, pneumatic slug testing, and lateral/vertical plume delineation from a network of nested monitoring wells and domestic pumping wells. Characterized basin groundwater flow, as well as groundwater-surface water interactions, via chemical and isotope analysis. Developed the conceptual design and performance estimates for an innovative remediation well network via analytical solutions, flow and transport modeling, and model optimization techniques. These efforts significantly reduced client implementation costs. Led the team that designed and implemented an efficient groundwater monitoring network to meet stringent regulatory requirements. Developed a regional groundwater flow model to support treatment system design and remedial optimization. Performed statistical analysis for evaluating an approved natural attenuation remedy for a portion of the basin. These efforts contributed to substantial reduction of monitoring time and expenditure by the client and successful remediation of private water supply wells.

#### **Groundwater Remediation, North Hollywood Operable Unit, San Fernando Valley, California**

Contributed to ongoing updates to the basin conceptual site model via well log analysis/correlation and evaluation of depositional histories. Acted as team leader for extensive hydrogeological field investigation, including aquifer testing, slug testing, and down-hole electromagnetic flow logging. These analyses, along with review of available well logs, contributed to a successful update of the conceptual site model and remedial strategy. Delineated contaminant distribution of chlorinated solvents, metals, and 1,4-dioxane through geostatistical interpolation that filled significant data gaps and improved understanding of plume delineation.



**Former Chemical Production and Storage Facility, Newark, California**

Led groundwater monitoring program on dynamic, multi-consultant site with ongoing in situ remediation of chlorinated solvents. Responsible for RCRA regulatory compliance and was lead author on report deliverables. Oversaw aquifer testing and characterization, including short-term pumping tests and slug tests. These tests provided relatively low-cost, efficient characterization of aquifer properties of contaminated areas with minimal waste generation that contributed to in situ remediation design.

**Chemical Production Facility, El Segundo, California**

Led the monitoring/reporting program for remediation of a chlorinated solvent site, and directed subcontractors. Used geospatial analysis to implement sampling frequency reduction for the monitoring well network and reduce costs. Characterized local hydrostratigraphy via well logs and an in-well transducer network. Assessed injection well operations for the West Coast Basin Barrier Project to address concerns about potential interaction with contaminants in coastal aquifers.

**Industrial Facility, Torrance, California**

Employed analytical element modeling to assist groundwater remediation system design. These models provided an efficient platform for design of injection/extraction well configuration and operations. Acted as groundwater monitoring and reporting program leader and directed the industrial client's offsite data management contractors, which resulted in substantial cost savings for routine analysis and reporting.

**Brownfield Site Remediation, San Francisco, California**

Characterized site geology, hydrogeology, and extent of solvent and metals contamination via direct-push sampling and logging. Oversaw an in situ bioremediation pilot study for enhanced reductive dechlorination that led to successful full-scale injection operations and eventual site closure and redevelopment.

**GEOTECHNICAL****Construction Dewatering Projects, Various Locations, Los Angeles, California**

Oversaw all phases of planning, scoping, permitting (including NPDES), performance, and data collection associated with aquifer characterization to aid in dewatering design and subsurface construction plans. Analyzed pumping and slug test data to evaluate projected inflow during construction dewatering. Results of the investigations led to substantial improvements over the dewatering contractor recommendations and averted large future costs and engineering difficulties for the developer client. Utilized analytical element and traditional numerical flow models to evaluate the effects of dewatering systems on the local hydrogeology. Used models to perform forensic analysis to improve the clients' understanding of unsuccessful dewatering designs.

**Transit and Utility Alignments, Los Angeles, California**

Provided technical support for aquifer tests associated with dewatering activities for subsurface transit and utility alignments. These projects included the Westside Subway Extension, as well as water pipeline alignments.



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## SELECTED PUBLICATIONS AND PRESENTATIONS

- Culkin, S. 2023. Monitoring and Modeling of Subsidence and Settlement from Groundwater Pumping, Millennium Tower Property, Downtown San Francisco Groundwater Basin. GRA Western Water Conference, September.
- Culkin, S. 2019. Evaluating Saltwater-Freshwater Dynamics in Coastal Aquifer Conceptual Site Model Development and Groundwater Management. 29th Annual International Conference on Soil, Water, Energy, and Air, AEHS Foundation, San Diego, CA, March.
- Culkin, S., Tana, C., and Williams, D. 2017. Proxy Measurable Thresholds for Seawater Intrusion, GRA SGMA Conference – Tools for Developing a GSP, May.
- Culkin, S. 2016. Using Cross-Sectional Models to Develop Measurable Objectives for Saltwater Intrusion, California Water and Environmental Modeling Forum 2016 Annual Meeting, April.
- Culkin, S. 2013. Use of genetic algorithm optimization for operational management of extraction wells within a mature groundwater plume, Monterey Bay, California, MODFLOW and More 2013.
- Culkin, S. 2013. Hydrogeological characterization in the development of underground structures – Los Angeles Basin, California. 2013 Annual Meeting Program with Abstract, Association of Environmental & Engineering Geologists, Seattle, WA.
- Chamberlain, W.C., Culkin, S., and Xu, X. 2012. Hydrogeologic Characterization in the Development of Underground Structures - Los Angeles Basin, California, Environmental and Engineering Geoscience, Vol 18, no. 3, pp. 295-308.
- Culkin, S., Singha, K., and Day-Lewis, F.D. 2008. Implications of Rate-Limited Mass Transfer for Aquifer Storage and Recovery Efficiency, Ground Water Vol. 46, no. 4, pp. 591-605.
- Culkin, S. 2007. Understanding aquifer storage and recovery efficiency in a clastic-limestone aquifer, Charleston, South Carolina. Geological Society of America Abstracts with Programs, Vol. 39. No. 1.
- Culkin, S., and A.M. Franzese. 2004. Distinguishing between provenance changes and sorting effects on the Rb-Sr systematics in glacial and Holocene South Atlantic sediments. AGU Fall Meeting Abstracts.

