



Serving Stewards of Western Water since 1993

JEFFREY C. DAVIDS, P.E., M.S.

Water Resources Engineer

Education

B.S., General Engineering, California Polytechnic State University, San Luis Obispo, CA

M.S., Geosciences – Option in Hydrology/Hydrogeology, Graduation with Distinction, California State University, Chico, CA

Professional Registrations

California Professional Civil Engineer Certificate (No. 75656)

Summary

Mr. Davids has provided flow measurement and environmental data acquisition services to water management and governmental entities in California since graduating from California Polytechnic State University. Mr. Davids has utilized various technologies to accurately quantify flows in a variety of settings including natural streams and rivers, open-channel agricultural conveyance systems and pipelines over a broad range of materials and sizes. Mr. Davids has experience performing hydrologic and hydrogeologic field measurements used to characterize groundwater and its interaction with adjacent surface water bodies. Mr. Davids has managed the design, installation, calibration and maintenance of several large flow measurement and data acquisition networks. Mr. Davids obtained a Master's Degree in Hydrogeology with an emphasis on characterization of groundwater-surface water interactions. Mr. Davids thesis concentrated on the nexus between stream restoration and aquifer recovery, with a specific focus on stream-aquifer interactions within the Shasta Valley, California.

Selected Experience

Flow Measurement Plan Development and Implementation, South San Joaquin Irrigation District, San Joaquin County, CA

Mr. Davids supported the development and implementation of a Flow Measurement Plan (Plan) for the South San Joaquin Irrigation District (SSJID). The goals of the Plan are (1) to provide cost-effective service to customers; (2) generate improved operational records for planning and analysis, and; (3) comply with recently passed California legislation (SBx7-7). As part of this effort, Jeff has designed a range of flow measurement methodologies and site improvements for SSJID involving standard critical depth structures (e.g. flumes and weirs) and acoustic Doppler flow measurement devices. Mr. Davids also participated in the field testing of acoustic Doppler devices.

Flow Measurement Pilot Project, Reclamation District No. 108, Colusa County, CA

Reclamation District No. 108 retained Mr. Davids to pilot test alternative measurement methods that are potentially capable of achieving heightening regulatory standards, including: existing orifice gates, weirs set in precast boxes, and a recently introduced portable acoustic Doppler flow measurement

device. The pilot program includes (1) customization of the portable measurement device for District needs, (2) selection and inventory of a test reach, (3) calibration of upstream and downstream measurement devices, (4) development of an automated data transfer process and (5) development of a Water Information System for billing and accounting.

Field Turnout Measurement Accuracy Studies, Richvale Irrigation District (RID) and Biggs-West Gridley Water District (BWGWD), Butte County, CA

According to California Water Code Section 597 (CWC §597), agricultural water providers over 25,000 acres are required to measure the volume of water delivered to customers with sufficient accuracy to: (1) report aggregated farm-gate delivery data to the state and (2) adopt a pricing structure based at least in part on the volume of water delivered to each field. Mr. Davids designed, implemented and documented an investigation with the purpose of assessing the flow measurement accuracy of RID's and BWGWD's existing orifice gates and weir boxes relative to the accuracy standards set forth in CWC §597.

Shasta Valley Groundwater Study Workplan, AquaTerra Consulting, Siskiyou County, CA

Mr. Davids prepared a groundwater study workplan to advance understanding of the Shasta Valley groundwater system with the overarching goal being to better characterize stream-aquifer interactions. Understanding these interactions is foundational to understanding and ultimately managing flows in the Shasta River and its tributaries. Jeff developed the theoretical background and conceptual framework for nine analytical methods used to understand stream-aquifer interactions including: groundwater level monitoring, aquifer performance testing, stream flow monitoring, land and water use survey, water balance/budget analysis, infiltration testing, tracer analysis, geochemical investigation and numerical groundwater modeling.

Montague Weir Flow Measurement and Fish Passage Alternatives Analysis, AquaTerra Consulting, Siskiyou County, CA

Montague Weir is a flow measurement station on the Shasta River operated and maintained by the United States Geological Survey (USGS), but also relied upon by the California Department of Water Resources (DWR) for water mastering services. While adequate for flow measurement, the structure is generally regarded as having features that pose challenges for fish passage. As part of efforts to improve conditions in the Shasta River for anadromous fish, Mr. Davids evaluated alternatives for modifying the Montague Weir to satisfy the co-equal goals of improving fish passage conditions while retaining or improving flow measurement accuracy and reliability. The project included (1) an assessment of the existing weir structure from fish passage and measurement perspectives and (2) development of alternatives for modification of the weir to satisfy the identified co-equal goals.

San Pasqual Groundwater Basin Surface Water Monitoring Program Development, City of San Diego, San Diego County, CA

Within the San Pasqual Groundwater Management Plan, data gaps were identified to improve management of the Basin. One of these data gaps is surface water flow data into and out of the basin. Mr. Davids aided in the development of the methodology to characterize surface inflows and outflows to improve estimates of groundwater recharge occurring from the creeks.

Regulating Reservoir and Canal Improvement Design, Plan Preparation and Construction Management, Orland Unit Water Users' Association, Glenn County, CA

Mr. Davids assisted with the design, plan preparation and construction management for a 35 acre-foot regulating reservoir for the Orland Unit Water Users' Association. Mr. Davids compared historical rating

curves for a Parshall flume and sharp crested weir with spot flow measurements to validate accuracy of historical flow records used in designing the reservoir. Mr. Davids performed numerous structure and canal cross section and profile surveys used to design long crested weir and overshot flume gate upgrades to existing check structures. Mr. Davids created 3-D digital terrain models of both the existing and proposed ground surfaces to quantify grading quantities and prepare project cost estimates.

Little Shasta River Water Efficiency Study & Shasta Springs Ranches Water Management Plans, Siskiyou County, CA

Mr. Davids has served as the field work project manager, lead flow measurement specialist and groundwater hydrologist for a series of studies in the Shasta Valley. The Shasta River is located in Siskiyou County and is a tributary to the Klamath River. Concerns over anadromous fish populations in the Klamath have increased interest in water management within the Shasta River watershed. Consequently, the California Department of Fish and Game, the Pacific States Marine Fisheries Commission and a group of Shasta Valley farms and ranches have commissioned two studies concerning irrigation practices in the Shasta River Watershed. The goal for each of the projects is to delineate and quantify water use efficiency measures that would (1) increase flows in the Shasta River thus preserving the habitat of anadromous species and (2) maintain or improve agricultural productivity. The project requires various assessments of the hydrologic complexity of the Little Shasta and Shasta River watersheds: groundwater monitoring, flow measurements within respective distribution systems, seepage ponding tests and irrigation evaluations on select fields. Mr. Davids also compiled hydrogeologic assessments of each of the study areas that included descriptions and analysis of regional geology, groundwater contours, recharge and discharge, aquifer testing, water quality and stream-aquifer interactions.

Near-Term and Long-Term Water Conservation Plans, Deer Creek Irrigation District, Tehama County, CA

Deer Creek has long been recognized as an important watershed for anadromous fish recovery. In cooperation with Deer Creek Irrigation District, as part of a larger study for DWR Northern District, Mr. Davids aided in the development of a conceptual District water balance structure and designed/installed broad and sharp crested weirs at strategic locations. Mr. Davids performed bi-weekly discharge measurement and developed stage-discharge curves for the each site. These data sets were used in the preparation of a District water balance used to delineate and quantify water conservation opportunities.

Orifice Gate Flow Measurement Analysis, Reclamation District No. 108, Colusa County, CA

Historically, district waterman used check structures with weir boards as a means of flow measurement. The installation of Long Crested Weirs has rendered this type of measurement unfeasible. Mr. Davids led the effort to develop a replacement method for District employees to measure flow through over 120 farm turnout gates within Reclamation District No. 108. Services included flow measurement, water head surveys and evaluation of turnout gate flow measurements throughout the district. Mr. Davids verified gate coefficients by performing discharge measurements using a SonTek FlowTracker ADV. Mr. Davids has also commissioned and calibrated several acoustic doppler discharge measurement devices (Mace and SonTek) located at strategic locations within RD108.

Improved Drain Flow Measurement, Glenn-Colusa Irrigation District, Glenn/Colusa Counties, CA

Mr. Davids has designed flow measurement methodology and improvement plans for 12 drain flow measurement sites around the low gradient borders of Glenn-Colusa Irrigation District. Much of his

time has been spent selecting appropriate measurement sites, developing specifications for measurement equipment and materials needed at the various measurement sites. Mr. Davids performed detailed hydraulic calculations necessary for the design of the various flow measurement structures.

Rice Water and Harvest Yield Monitoring, Western Canal Water District and the Joint Water Districts, California Department of Water Resources, Butte/Sutter Counties, CA

Pursuant to a settlement agreement reached in 2008, Rice Farmers receiving water from Lake Oroville will be compensated for the cold water impacts that the State Water Project has had on rice yields. Mr. Davids was retained as a member of the field team to help collect and quality control the necessary data to quantify the impacts of cold water on yields from individual rice fields. Mr. Davids installed, maintained and managed data from 125 continuous monitoring sites measuring both water and air temperature.

Water Balance and Conservation Analysis, The Nature Conservancy and Grenada Irrigation District, Siskiyou County, CA

Grenada Irrigation District is a water rights holder on the Shasta River in far North-Central California. Mr. Davids designed, installed and maintained three continuous flow monitoring sites in the District canal and drain system for two irrigation seasons (April – September). Mr. Davids aided in the development of a final District water balance technical report to guide the District's water conservation efforts. The water balance analysis uncovered significant potentials for water conservation and led to changes in District operations.

Nelson Ranch Irrigation Efficiency Study, The Nature Conservancy, Siskiyou County, CA

The Nature Conservancy recently purchased the Nelson Ranch, a 1,700-acre property that includes five miles of the Shasta River. As part of an irrigation efficiency study aimed at reducing Shasta River Diversions and tailwater return flows, Mr. Davids provided TNC several critical services. Mr. Davids provided support in identifying strategies to minimize irrigation return flows and assisted with various flow measurement tasks. Activities conducted during site visits included performing spot flow measurements in conveyance ditches, testing seepage rates in ditches, observing tailwater flows and drainage patterns and installing two (2) dedicated doppler ultrasonic transit-time flowmeters.

Joint Board Main Canal Measurement Upgrades, Joint Water District Board, Butte and Sutter Counties, CA

Mr. Davids has installed and velocity-index rated three (3) Acoustic Doppler Current Profilers (ADCP) for the Joint Water District Board. The ADCP's were installed on trapezoidal concrete lined portions of the Joint Board's Sutter, Richvale and Minderman canals. Typical flows vary from 100 to over 400 cubic feet per second during rice flood flows. Additional activities included performing detailed cross-sectional surveys of canals and installing site peripherals including a solar power supply, digital flow display and weatherproof enclosure.

Civil Design and Site Improvement Plan Preparation, Wilsey Ham, Butte County, CA

Wilsey Ham is a civil engineering firm offering land development, transportation, surveying and mapping services. As an employee of Wilsey Ham, Mr. Davids designed and prepared plans for various improvement projects using AutoCAD. Project elements included gravity pipeline design, retention pond design, grading and drainage and roadway design.

Professional Organizations

American Society of Civil Engineers

National Ground Water Association

Groundwater Resources Association of California

American Geophysical Union

Publications

Mr. Davids has authored several project reports and professional papers.