



Proposal for
**Downtown San Pablo Creek
Restoration Project**

Friends of Orinda Creeks



1624 Franklin Street Suite 901
Oakland, California
510.454.9378
flowwest.com





Cover Letter

Cinda MacKinnon
Friends of Orinda Creeks

Dear Cinda,

I am pleased to present this proposal for the Downtown San Pablo Creek Restoration Project. FlowWest has extensive experience developing innovative and creative solutions to urban stream restoration projects in Northern California. Our design process starts with historical analysis and geomorphic assessment of the watershed and the project reach followed by hydraulic modeling of the existing and proposed conditions. Our approach to all urban stream restoration projects uses data-driven decision making to assess alternatives and select the best design for the unique site conditions.

FlowWest has experience working in the Bay Area, including recent projects for Alameda County Zone 7 Water Agency, Santa Clara Valley Water District, and East Bay Regional Park District. In addition to our project work, we are committed advocates of Bay Area watersheds. I am a member of the Wildcat-San Pablo Creeks Watershed Council, and I currently serve as the chair of the financial subcommittee where I identify restoration funding opportunities and match them with restoration projects in the watersheds. Another FlowWest founding partner, Paul Frank, is a board member on the Friends of Sausal Creek. We are excited to offer this local watershed advocacy passion and experience in addition to our technical expertise to benefit Friends of Orinda Creeks. FlowWest is located in Oakland, and we understand streams in the urbanized Bay Area. FlowWest's staff for this project includes civil engineers, environmental planners, and geomorphologists with extensive local experience. We integrate geomorphology and historical ecology into our stream restoration designs and our hydraulic modelers also understand the importance of integrating geomorphic analysis into our design. We also integrate environmental planning into our design process to ensure that our designs can be permitted and implemented. Lastly, our team has extensive experience developing alternatives, facilitating data-driven design charrettes to identify a preferred alternative, and delivering environmental compliance and design documents.

Please contact me to discuss the details of the proposal. While I have attempted to develop an approach for this effort that is comprehensive and responsive to all of the requirements in the Request for Proposals, I recognize that the available budget may not support the level of effort in this proposal. If needed, I would certainly be willing to revise the scope of work and budget in collaboration with Friends of Orinda Creeks to tailor our work to fit within funding constraints. Thank you for this opportunity, and I look forward to talking with you soon.

Sincerely,



Anthony Falzone, MLA, CFM
Senior Geomorphologist/Founding Partner
FlowWest
1624 Franklin Street, Suite 901
Oakland, CA 94612
510-454-9378, 106 office
415-713-5855 mobile
afalzone@flowwest.com

Summary & Overview

FlowWest is ideally suited to develop conceptual designs for the Downtown San Pablo Creek Restoration Project based on our previous experience with urban stream restoration and flood control projects in the Bay Area. The FlowWest principals have decades of experience working together on similar projects on Bay Area streams, including Ardenwood Creek, Arroyo Mocho, and Lower Silver Creek. FlowWest's design process is based on geomorphic and historical analysis combined with our state of the art hydraulic modeling capabilities, which gives FlowWest a real advantage in urban stream restoration and flood control design and implementation.

Understanding of Friends of Orinda Creeks' Objectives and Purpose of the Project

Anthony Falzone, FlowWest Principal and Project Manager for this project, is a member of the Wildcat-San Pablo Creeks Watershed Council. As the lead the Financial Subcommittee, Anthony understands our local watersheds and available restoration funding opportunities. FlowWest Principal, Paul Frank, is a board member of Friends of Sausal Creek and understands the unique challenges facing our watershed groups. We also understand the importance of developing solid conceptual designs and guiding projects through California Environmental Quality Act (CEQA) compliance in order to increase the eligibility of the project for implementation funding. FlowWest integrates expertise from the fields of geomorphology, hydraulic modeling, civil engineering, and environmental compliance to ensure that our designs are self-maintaining, adaptable to changing watershed conditions, and implementable. We conduct analyses to make data-driven decisions to facilitate the best possible design for a site's unique opportunities and constraints.

We see Friends of Orinda Creeks' (FOC) objectives for this project as follows:

- 1) Increase channel width, sinuosity and reduce velocity to improve public safety and increase aquatic habitat and floodplain; provide bank stabilization as needed, especially along the Camino Pablo slope to protect existing infrastructure
- 2) Provide public access and connection opportunities for all members of the community including school children and seniors
- 3) Improve water quality of San Pablo Creek
- 4) Revitalize the downtown area aesthetics, foot traffic, commercial appeal, and property values
- 5) Provide educational opportunities for schools and community groups

FlowWest will work with FOC to develop conceptual designs and select a preferred alternative that is appropriate for the watershed, and can be permitted and constructed under existing environmental regulations.

Our Approach

FlowWest has extensive experience developing innovative and creative solutions to multi-objective urban stream restoration and flood control projects. The figure below illustrates our approach to this project that integrates our multidisciplinary approach. FlowWest leverages our expertise in ecosystem-based design, hydraulic modeling and civil engineering, and grant support and environmental planning to take projects through their entire life cycle from planning to design, environmental compliance, construction, and monitoring. We will approach this project using the same framework that has proven to be effective and efficient in design of urban stream restoration and flood control projects throughout California and nationwide.

Our approach to all stream restoration projects follows a framework of historical analysis and ecological design. We plan to follow the work plan from the Request for Proposals (RFP), and we have included two additional optional tasks (CEQA compliance and grant support) that we feel are critical to securing funding for implementation of the project. The components of the project are organized into the following tasks and described in more detail in the Approach section:

Summary & Overview

- 1) Data review and topographic survey
- 2) Development of concept level design alternatives
- 3) Preparation of 30% preliminary design for proposed alternative
- 4) Project management and final report
- 5) Environmental compliance & CEQA (Optional)
- 6) Grant support (Optional)

Project Management

We approach all of our projects in collaboration with our clients and take the project management component of a project seriously. As a small business, each project gets engagement from our principals and we understand the importance of transparent project management and clear communication. We anticipate conducting monthly progress checks with the FOC project manager for this project. We envision that most of these meetings will be conducted in person to review interim work products. We will ensure that the project objectives are always translated into the project deliverables. We are responsive to our clients and believe in building strong, long-term relationships that provide value to a project along each step of the way from conceptual design through implementation.

Ecosystem Based Design Process

Our approach to restoration and flood control seeks to understand the underlying geomorphic and hydraulic processes operating on the channel. Our integration of historical analysis and riparian ecology further strengthens our design process. FlowWest Project Manager, Anthony Falzone, completed a detailed sediment source analysis in the adjacent watershed on Wildcat Creek for the East Bay Regional Park District. FlowWest brings a better understanding of sediment dynamics in the East Bay Hills than any other consultant team. We will review background data and incorporate previous analysis and documents conducted on behalf of FOC into our design process to avoid duplicating analysis that has already been completed. As a local firm, we have implemented restoration and flood control projects in both urban and rural environments in the Bay Area.

FlowWest integrates expertise in geomorphology, hydraulic modeling, and environmental planning to guide development of design alternatives. FlowWest will draw upon each of these areas of expertise to select the best alternative for the Downtown San Pablo Creek Restoration Project. In addition, the basic geomorphic analysis conducted as part of this project will feed into the hydraulic modeling task. We have successfully used this approach to develop alternatives and identify a preferred alternative for other stream restoration projects in the Bay Area.

FlowWest will develop a conceptual design and summarize our analysis in a report for FOC. We envision that the conceptual design drawings and report will be used as the foundation for future phases of the project to complete permitting and final design, and implement the project. We believe that integrating environmental planning and geomorphology into the conceptual design process will streamline environmental compliance and implementation of the project.

Hydraulic Modeling and Civil Engineering

FlowWest is a state-wide recognized leader in hydrology and hydraulic modeling and we are particularly adept at communicating our analyses so that stakeholders can understand their significance. We work with HEC-RAS, with which we have built fully 2D models of more than 100 river miles along the Salinas Valley and the Stanislaus River. We have also built HEC-RAS models for local creeks including Ardenwood Creek, Arroyo Mocho, Arroyo De La Laguna, Yellowjacket Creek, and Rancheria Creek. We will conduct a hydrologic and hydraulic study to guide design of channel realignment, riparian restoration, and flood control enhancements for this project. We will also use the hydraulic model to evaluate our alternatives and quantify the flood reduction benefits of each. FlowWest will integrate the geomorphic analysis into our hydraulic modeling to improve our development of model inputs and improve our interpretations of the modeling results.

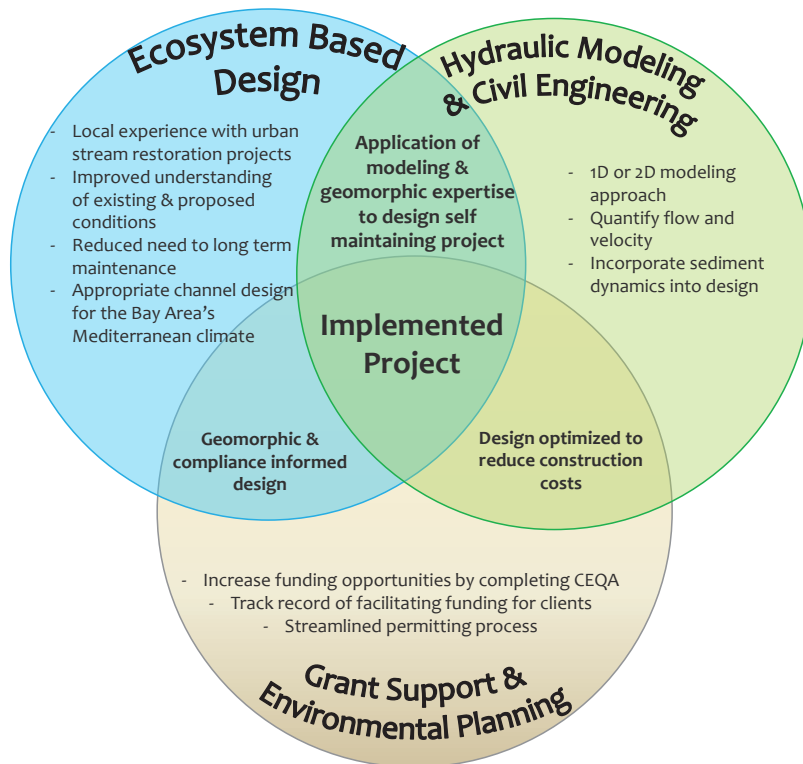
Summary & Overview

FlowWest’s engineering staff knows how to perform an efficient engineering design process for ecosystem enhancement and flood management projects honed through numerous projects involving increasing culvert and channel capacities, restoring floodplain connectivity, removing fish barriers, detaining and treating stormwater, and alleviating sedimentation and erosion concerns. We will develop design drawings in AutoCAD Civil 3D and develop a Basis of Design Report that documents important design decisions and modeling. As with all of our clients, we will work with FOC to make sure that the project meets your objectives.

Grant Support and Environmental Planning

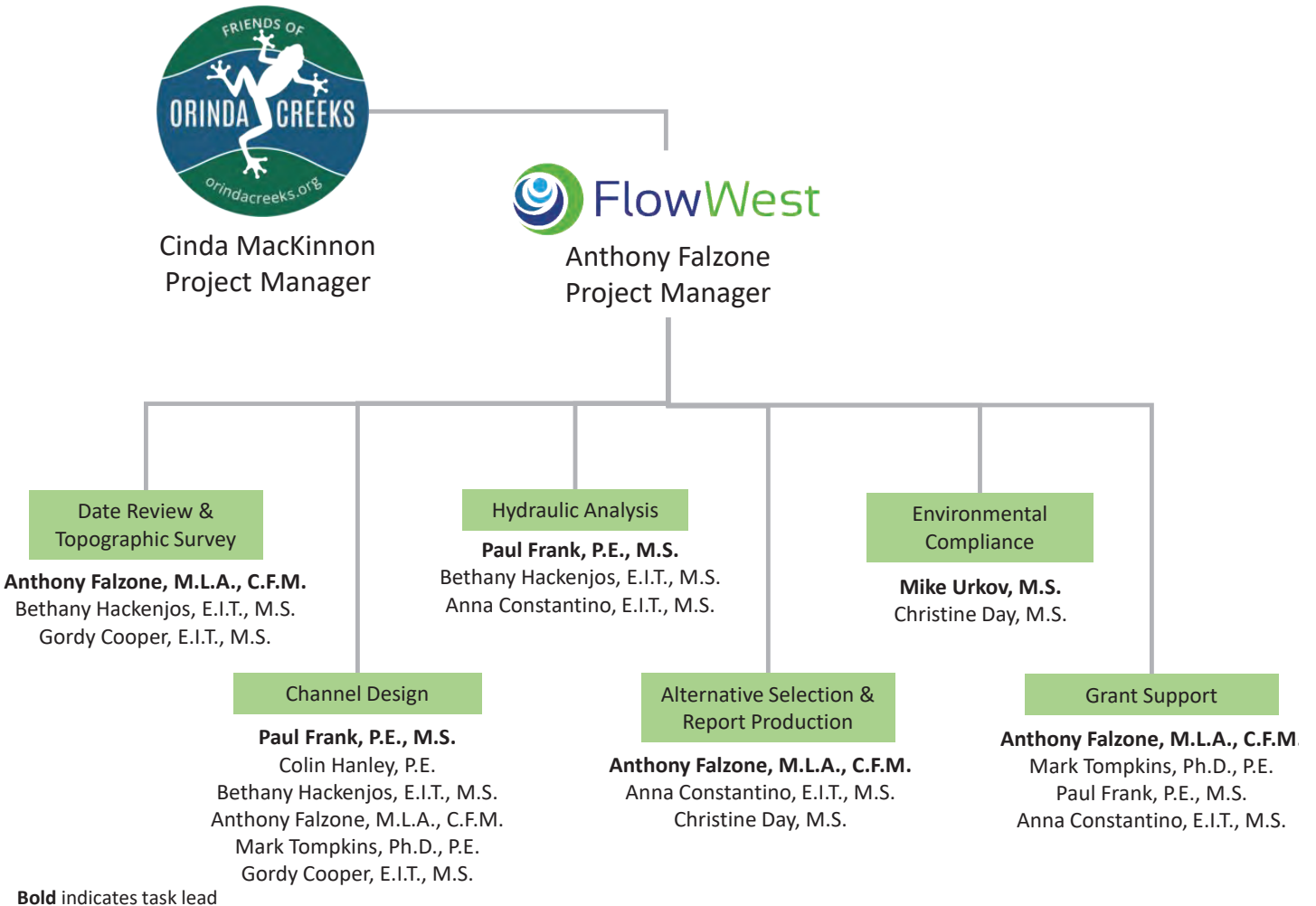
Although not included in the RFP, we feel that completing CEQA is critical to obtain implementation funding for the project. Mike Urkov is an environmental planner with decades of planning experience on complex projects across California, and will lead the CEQA compliance for the Project. We believe that all potential environmental impacts for this project can be mitigated to a less than significant level. Therefore, preparation of an Initial Study/Mitigated Negative Declaration (IS/MND) will be sufficient for CEQA compliance. We recommend that a biologist is retained to conduct a biological survey for CEQA. We also recommend that a long-term maintenance plan should be incorporated into the project permits. This will allow for the removal of sediment and debris and manage vegetation in the Project area without needing to obtain additional regulatory approvals in the future, saving both time and money.

While not part of the scope listed in the RFP, we can identify grant opportunities and write grant applications to fund final design and implementation. FlowWest has a successful track record of identifying and winning state and federal funding for similar projects. In the last two years alone, we’ve won California Department of Water Resources Urban Streams Restoration grants for two of our design projects, California Department of Fish and Wildlife Fisheries Restoration Grant Program grants for three of our design projects, a US Fish and Wildlife Service grant for a fish passage improvement project, a Wildlife Conservation Board Stream Flow Enhancement Grant, and a State Land Commission Grant. We can bring the same strategic grant pursuit approach to FOC.



Team Organization Chart

FlowWest believes that establishing clearly defined roles and responsibilities is fundamental to any successful project. The FOC will not have any question who to turn to when questions arise, and who will be responsible for which tasks. The following organizational chart shows our staff who will lead each component of the project. Key staff responsibilities are further described below.



Team Organization

Anthony Falzone, C.F.M., M.L.A., will be the Project Manager and Principal Geomorphologist. He is a founding partner of FlowWest with two decades of experience in the field of water resources and geomorphology. Mr. Falzone will be ultimately responsible for leading the project to the satisfaction of the FOC. Anthony holds a B.A. and M.L.A. from UC Berkeley, and he has devoted his career to stream restoration work. He will be the primary point of contact for FOC.

Anthony's project management experience includes local projects including the Wildcat Creek Sediment Source Analysis project for the East Bay Regional Park District, Lower Silver Creek in San Jose for Santa Clara Valley Water District, and Rancheria Creek in Sonoma County for the Dry Creek Rancheria. In addition, Anthony has been the project manager for a series of projects for the Klamath Tribes in southern Oregon for the past seven years. Mr. Falzone places the highest emphasis on the client relations component of project management and has developed long-term relationships with all of his clients. As the project manager for the Wildcat Creek sediment analysis project, he was responsible for field data collection and data analysis, development of sediment reduction alternatives, and selection of preferred alternatives in the adjacent watershed. This experience has given Anthony an in depth understanding of hydrology, sediment dynamics, and geomorphic processes in the East Bay Hills. His experience on Lower Silver Creek in San Jose included 10 years of geomorphic and riparian vegetation post-project monitoring in this urban channel. The detailed experience documenting the implementation of a multi-stage and multi-benefit project in a former flood control channel gives him a unique insight into restoration and flood control in the urban environment.

Mr. Falzone is also an active member of the Wildcat-San Pablo Creeks Watershed Council (WSPCWC). The Council is the oldest watershed council in California and provides a collaborative forum for planning among agencies and stakeholders for Wildcat and San Pablo Creeks. Anthony chairs the Financing Committee that focuses on identifying grant opportunities for restoration projects in the watershed. He work with American Rivers to develop a list of potential projects in the watersheds to prioritize grant funding and developed a simple web-based map to summarize restoration opportunities in the watersheds. As part of his involvement in the WSPCWC Anthony has developed working relationships with agency representatives and key stakeholders in the watershed.

Anthony has worked alongside Paul Frank on other local restoration and flood control projects in the East Bay. These projects include Ardenwood Creek in Fremont, Arroyo Mocho in Livermore, and Arroyo De La Laguna in Pleasanton. Anthony was responsible for geomorphic analysis on these projects that further contributes to his understanding of local geomorphic processes and land use induced changes in the local stream.

"As a member of the Wildcat-San Pablo Creeks Watershed Council I'm really eager to continue working in the watershed. I'm excited to share what I have learned from the Wildcat Creek Sediment Source Analysis project for the East Bay Regional Park District and other local projects. I've discussed this project with other stakeholders on the WSPCWC including Paul Detjens from Contra Costa County Flood Control and Water Conservation District. I'm looking forward to working with Cinda MacKinnon and Michael Bowen and share their enthusiasm for turning our conceptual design into an implemented project."

Paul Frank, P.E., CES will be the Principal Hydraulic Modeler for this project. Paul is a licensed Civil Engineer and Certified Ecological Designer with 16 years' experience designing numerous habitat and mitigation projects in streams and wetlands around the world. Academically trained in ecology, fluvial geomorphology, and engineering, he brings a multi-disciplinary approach to all his projects that equally values the hydraulic, habitat, and physical processes at work in aquatic ecosystems. Professionally, Mr. Frank has experience contributing to large-scale water resources solutions on various Technical Advisory Committees in northern California and navigating challenging and diverse stakeholder groups when implementing projects. Additionally, for the last ten years Paul has served as a Director for the Friends of Sausal Creek (FOSC) non-profit organization where he has helped implement a watershed Master Plan and major urban creek daylighting project.

Team Organization

Paul has recently served as the Project Manager and Lead Engineer three large urban stream enhancement projects for the Alameda County Flood Control and Water Conservation District (Ardenwood Creek in Fremont) and for the Zone 7 Water Agency (Arroyo De La Laguna in Pleasanton and Arroyo Mocho in Livermore). These projects combine for over 2.5 miles of urban/suburban stream reconfiguration and enhancement and over \$15 million in construction. The keys to these projects have been my ability to lead large teams of biologists, engineers, environmental compliance specialists, and physical scientists to develop design solutions that solve flood hazards, provide ecological uplift, and provide measureable benefits to local community stakeholders.


“I’m really excited about this project and the opportunities it provides. I live just over the hill from the site in Oakland and frequent this stretch of Camino Pablo and Orinda Way on my bike. I’ve enjoyed conversations with FOC board member Michael Bowen about his passion for this project. Most of all, I’m excited to bring my 16 years of professional experience and decade of leadership at a similar “Friends of” creek organization to FOC. Over the last ten years I’ve contributed to growing FOCS from an organization with two part-time staff and a ~\$50,000 annual budget to one with three full-time staff, a \$200,000 annual budget, and an endowment of >\$100,000. I’m eager to bring all my experiences to FOC to make the Downtown Orinda San Pablo Creek Project the best it can be!”

Mike Urkov, M.A., is an environmental planner and scientist with demonstrated success in California water resources, including leading environmental compliance and permitting for large-scale river and fisheries restoration. Mr. Urkov has over twenty years of experience in California watersheds. He recently led CEQA and NEPA compliance efforts for the successful implementation of the Red Bluff Diversion Dam Fish Passage Improvement Project, a \$250 million project with a wide range of environmental compliance challenges. Mike has a M.A. from the University of New Mexico and a B.S. from UC Berkeley. For this project, Mike will be responsible for completing CEQA.

Mark Tompkins, Ph.D., P.E. will be the Principal Engineer for this project. He is a founding partner of FlowWest and an expert in stream restoration and habitat enhancement design, including optimizing urban Bay Area channels for habitat value. Mark will provide overall guidance on the project, participating in establishment of project goals, development of the quality control plan, incorporation of geomorphic design criteria, and playing a key role in conceptual design development.

Colin Hanley, P.E. will be the Project Senior Engineer. He has 13 years of experience designing restoration projects, including five years as a design engineer for the California Department of Water Resources Fish Passage Improvement Program. He is a licensed civil engineer and will be responsible for the technical engineering work and CADD drawings. He holds a B.S. in civil engineering from UC Davis and he brings experience surveying, developing conceptual designs, estimating construction costs, developing final designs, providing construction support, and monitoring projects after construction.

Team Skills

									
Team Member	Mark Tompkins, P.E., Ph.D.	Anthony Falzone, M.L.A., C.F.M.	Paul Frank, P.E., M.S.	Mike Urkov, M.A.	Christine Day, M.A.	Colin Hanley, P.E.	Ama Constantino, E.I.T., M.S.	Bethany Hackenjos, E.I.T., M.S.	Gordy Cooper, E.I.T.
Project Management	X	X	X	X			X		
Data Review	X	X	X	X	X	X	X	X	X
Data Gap Analysis	X	X	X	X	X	X	X	X	
Field Data Collection Planning and Management		X				X		X	X
Field Data Collection		X				X		X	X
Surveying (total station, GPS)		X	X			X		X	
Geomorphology and Hydrology Studies	X	X	X			X	X	X	X
Fish Passage Design	X	X	X			X			
Floodplain Restoration	X	X	X	X	X	X	X	X	X
Civil Engineering	X		X			X	X	X	X
Ecological Design			X						
HEC-RAS 1D and 2D Modeling			X				X	X	
Alternatives Analysis	X	X	X	X					
Engineering Feasibility / Cost Estimating	X		X			X	X	X	X
CADD						X			X
GIS Analysis and Map Production		X					X	X	
Design Charrette and Facilitation	X	X	X			X	X		
Report Writing and Production	X	X	X	X	X	X	X	X	X
CEQA Compliance		X		X					
Environmental Permitting		X		X	X		X		
Funding and Grant Identification	X	X	X	X					
Granting Writing	X	X	X	X	X	X	X		

Team Personnel



Anthony Falzone, M.L.A.
Principal Geomorphologist

Role: Project Manager
Lead: Project Management, Geomorphic Analysis & Report

M.L.A., Environmental Planning, University of California, Berkeley
B.A., Economics, Minor Forestry, University of California, Berkeley

Anthony Falzone is a geomorphologist and Certified Floodplain Manager (# US-12-06605) with extensive fluvial geomorphology, river ecology/restoration, flood control, and hydraulics experience in California and nationally. He has over 17 years of consulting experience focused on planning and conducting restoration and flood control projects in river corridors. Mr. Falzone is a leader in the application of advanced technology to the collection of field data and analysis of spatial data in river corridor ecosystems. He is experienced in watershed assessment, technical writing, and project management.

- **Dry Creek Rancheria Climate Adaptation Plan, CEQA, & Stream Flow Enhancement Projects; Geyserville, California. 2015-present.** Mr. Falzone is the project manager for an implementation project for stream flow enhancement and restoration on a tributary and a portion of the mainstem of the Russian River. Mr. Falzone helped secure restoration funding by leading the development of a Climate Adaptation Plan (CAP) for the Dry Creek Rancheria (\$174,616). The CAP included a systematic assessment of the watershed and aquatic and riparian species; water resource needs; and uses of treated wastewater from DCR facilities. Mr. Falzone worked with Sonoma County Planning and Resource Management Department to complete CEQA for the proposed project. Mr. Falzone leveraged this initial study and CEQA to obtain \$3.4 million for implementation of stream flow enhancement and restoration actions on Rancheria Creek and the Russian River from the Wildlife Conservation Board Stream Flow Enhancement Program.



Paul Frank, P.E., CED
Principal Engineer

Role: Principal Modeler
Lead: Hydraulic Modeling

M.S., Civil and Environmental Engineering, UC Berkeley
B.A., Environmental Sciences, UC Berkeley

Paul Frank is an ecological engineer with 15 years of engineering consulting experience practicing hydraulic, hydrologic, and flood analysis and modeling; fish passage design; sediment transport and fluvial geomorphology; and ecosystem conservation, restoration, and water resources and supply planning. He is a recognized expert in hydraulic and sediment transport analysis and modeling. Models he has developed have driven multi-objective river basin management programs in major river valleys such as the San Joaquin, Sacramento, Stanislaus, and Salinas and the San Francisco Bay.

- **Ardenwood Creek Flood Protection and Restoration Project. Alameda County Flood Control and Water Conservation District. 2012-2017.** Served as project manager for reconfiguration of approximately two miles of flood control channel in Fremont, California, including creation of new riparian corridor and approximately eight acres of constructed habitat wetlands to mitigate project impacts. Led a two-year design effort and served as engineer of record for the \$7 million+ construction project, and manager of hydrologic/hydraulic, biological, engineering, and permitting/compliance teams. Performed construction oversight during 2016 construction season.

- **Arroyo Mocho Floodplain and Riparian Forest Restoration Project. Zone 7 Water Agency. 2015-Ongoing.** Currently serving as Principal Engineer designing a project to restore floodplain and riparian forest, reduce flood risk, and improve water quality 1.5-mile reach of Arroyo Mocho near Livermore, CA. Assisted Client in securing at least \$500,000 (with another \$3 million in grants pending at this time) in grant funding to implement project.

Team Personnel



Colin Hanley, P.E.
Sr. Environmental Engineer

Role: Fish Passage Engineer
Lead: Alternative Development & Design

B.S., Civil and Environmental Engineering, University of California, Davis

Colin Hanley is a water resources engineer with over ten years of experience designing restoration and habitat enhancement projects. Mr. Hanley has experience leading topographic surveys, developing topographic basemaps for habitat assessment and design development, conducting hydrologic and hydraulic analyses, developing design drawings and specifications, evaluating construction costs, securing grant funding, and performing construction oversight for a wide range of habitat restoration and water resources engineering projects.

- **Dennett Dam Removal Project. Tuolumne River Trust. 2016.** Colin led the development of topographic basemap development and final engineering design drawings, specifications, and construction cost estimates for removal of Dennett Dam on the Tuolumne River. The design called for removal of a dam built in the 1930's, and restoration of the Tuolumne River to improve conditions for fish and wildlife, and to remove a dangerous hazard for recreational swimmers.
- **Great Valley Grasslands Floodplain Restoration Project. American Rivers and California Department of State Parks. 2017.** Colin is leading the technical work developing a conceptual alternatives analysis and 2D hydraulic modeling for restoration of a San Joaquin River floodplain. The work under development includes developing LiDAR topographic basemaps, stakeholder engagement, development of alternatives, hydraulic modeling, and development of engineering drawings and cost estimates.



Mark Tompkins, P.E., Ph.D.
Principal River Restoration Eng.

Role: Principal Engineer

Ph.D., Environmental Planning, University of California, Berkeley
M.S., Environmental Engineering, University of Illinois
B.S., Civil Engineering, University of Illinois

Dr. Tompkins is an engineer, scientist, and planner with extensive experience developing and implementing creek ecosystem restoration projects. He has over 19 years of experience focused on river restoration, applied fluvial geomorphology, flood management, and aquatic ecology. Over the past decade Dr. Tompkins has planned, designed, and implemented dozens of restoration projects on the Sacramento and San Joaquin Rivers and many of their tributaries, urban Bay Area streams, the Bay Delta and its watershed, the Klamath River, and many other river systems across the country.

- **Principal Hydraulic Engineer; Sausal Creek Watershed Project; Friends of Sausal Creek; Oakland, California. 2010-2012.** Finalized and calibrated HEC-RAS model to evaluate hydraulic conditions under existing conditions and proposed conditions with watershed improvements. Assisted in the development of watershed hydrology model to quantify the benefits of stormwater management BMPs in the watershed. Interpreted implications of model output for the restoration potential of Sausal Creek and the geomorphic stability of creek conditions.
- **Senior Fluvial Geomorphologist and Channel Relocation Design Lead; Trinity River Corridor Project; City of Dallas, Texas. 2006 – 2009.** Designed and conducted comprehensive geomorphic and hydrologic assessments of the Trinity River watershed and project area in Dallas. Led field data collection effort. Developed initial channel relocation and restoration design alignment and geometry. Refined initial design through collaborative work with multiple teams. Developed channel design criteria. Drafted geomorphic assessment and basis of design report.

Team Personnel



**Anna Constantino, EIT
Water Resources Engineer**

Role: Staff Water Resources Eng.

M.S., Environmental & Water Resources Engineering
University of Texas, Austin
B.S., Civil Engineering, Illinois Institute of Technology

Anna is a water resources engineer specializing in the analysis of topographic data to understand hydrologic and geomorphic processes. She also has unique experience in data analysis and visualization tool development and is passionate about integrating innovative approaches from the tech sector into the natural resources sector.

- **Lower Deer Creek Flood and Ecosystem Improvement Project, Phase 1. Deer Creek Watershed Conservancy; Vina, California. 2017-Ongoing.** Completing environmental compliance documents, supporting studies, and evaluations to advance the implementation of multi-benefit improvements on lower Deer Creek. The project directly addresses degraded habitat—a limiting factor for Chinook salmon and steelhead passage and rearing in lower Deer Creek, and catastrophic flooding that destroys farmland and infrastructure every five to ten years. Ms. Constantino is the Project Manager and is also working on the baseline hydrologic and geomorphic conditions analysis, as well as developing data-driven outreach content to support the environmental documentation.

- **Arroyo Mocho Floodplain and Riparian Forest Restoration Project. Zone 7 Water Agency; Livermore, California. 2015-Ongoing.** Ms. Constantino is developing a 2D hydraulic model to present existing and proposed conditions in the Arroyo Mocho project reach, and to inform the design of riparian forest restoration and flood enhancements in the urban arroyo. The restoration design aims to: enhance riparian vegetation, attenuate peak flows of the 25-year storm event, reduce potential for erosion impacts, improve sediment continuity and existing native vegetation.



**Bethany Hackenjoes, EIT
Water Resources Engineer**

Role: Staff Engineer/ Modeler

M.S., Environmental Engineering, University of California, Berkeley
B.S., Civil Engineering, University of California, Berkeley

Bethany is a water resources and ecological engineer with 7 years of experience focused on water quality engineering, hydraulic modeling, and riparian and wetland restoration. Her experience is associated with projects throughout California. Her approach involves integrating sound technical and analytical engineering practice with strong computer programming and data analytics skills. She is committed to the advancement of adaptive data analysis and visualization tools into the sphere of environmental decision-making and collaboration.

- **Salinas Valley Channel Maintenance Program Hydraulic Model. 2015.** Bethany worked with Paul Frank to develop the 2D HEC-RAS hydraulic model spanning over 90 miles of the Salinas Valley to be used by MCWRA for the Salinas River Channel Maintenance Program. Her work involved making revisions to the model geometry, modifying land covers and terrains to simulate proposed vegetation clearing actions, setting up and running model plans; as well as, reviewing, interpreting, and reporting on model results.

- **Ardenwood Creek Flood Protection and Restoration Project. Alameda County Flood Control & Water Conservation District (ACFCWD). 2017–Present.** Bethany collected groundwater monitoring data; permitted, supervised a new groundwater well installation; and built-out a HEC-RAS 1D/2D coupled hydrodynamic model for the Project. The hydrodynamic model was composed using elements from an existing Mike 11 model, flow output from HEC-HMS, and survey data. The complete model is currently being used to evaluate baseline hydraulic conditions following construction on the Ardenwood Creek improvement project and investigate implementation of 7 conceptual flow conveyance alternatives.

Team Personnel



Gordon Cooper
Junior Engineer

Role: Junior Engineer

B.S., Civil Engineering,
California State University, Chico

Gordon is a junior engineer who is pursuing a career in the field of water resources. He is seeking to hone his skills further through working on projects with hydraulic and environmental challenges. Gordon has recently joined of the FlowWest team!

- **Arroyo Mocho Restoration Design. 2018.** Gordon assisted in the design of Zone 7's restoration of Arroyo Mocho Creek through drawing detailed plans with AutoCAD Civil 3D and analyses on Microsoft Excel. His work included assisting in the design of a flood attenuation basin, detailing erosion protection devices, working with topographic survey data, reading and editing plans, cost estimation, and culvert analyses.
- **Dry Creek Rancheria Restoration Design. 2018.** Gordon has assisted in the restoration and watershed management concerning Dry Creek. His work thus far has consisted of realigning the Russian River and the design of a river confluence, floodplains, and mitigation wetlands to support a riparian habitat using AutoCAD Civil 3D.
- **Deer Creek Geomorphic Analysis. 2018.** Gordon is involved with analyzing the geomorphology of Deer Creek with the goal of improving habitat conditions and reducing project maintenance. He is currently using AutoCAD Civil 3D and GIS to analyze the geomorphology of the project area.



Christine Day
Environmental Planner

Role: Environmental Planner

M.A., Anthropology, California
State University
B.S., Environmental Sciences, San
Diego State University

Ms. Day is an environmental planner with FlowWest with 2 years of CEQA/NEPA experience focusing on projects that have impacts to water resources. Her experience is associated with projects throughout California, particularly with small, low income communities. Her role in those projects was CEQA/NEPA review and to help communities with the CEQA/NEPA process and the permitting process required for their projects. Ms. Day just recently started with FlowWest and before worked with the State Water Resources Control Board.

- **Deer Creek – CEQA/NEPA Analyst; Deer Creek Water Conservancy. Vina, California.** The Deer Creek project directly addresses degraded habitat that is a limiting factor for Chinook salmon and steelhead passage and rearing in lower Deer Creek, and catastrophic flooding that destroys farmland and infrastructure every five to ten years. Ms. Day's role in the project is assisting in the completion of CEQA and NEPA compliance documents. She is also assisting in the creation of an interactive CEQA/NEPA document to help the general public understand the project better.
- **Dennet Dam – Permitting; Tuolumne River Trust.** This project includes the removal of a dam in the Tuolumne River that has been a fish passage barrier and has also been the cause of death for local youth. Ms. Day's role in the project was to help understand the parameters of the permits so ensure a good faith effort to protect the environmental resources of the Tuolumne River.

Team Personnel



Mike Urkov
Water Resources Planner

**Role: Environmental Planning
& Compliance**

M.A., Water Resources Administration, University of New Mexico
B.S., Political Economy of Natural Resources, University of California, Berkeley

Mike Urkov is a senior water resources planner for FlowWest with over 17 years of consulting experience focused on environmental planning for inter-disciplinary and multi-stakeholder projects that span the breadth of water resources issues – from flood protection to water conservation to endangered species habitat. Mr. Urkov has managed technical projects and consulting tasks worth more than \$20 million dollars over the past 10 years, with associated capital construction budgets in excess of \$200 million.

- **Dennett Dam Removal - Environmental Permitting; Tuolumne River Trust. Modesto, California.** Led efforts to acquire environmental approvals and permits for Dennett Dam on the Tuolumne River in Modesto, California. Requirements included compliance with compliance / permitting under CEQA, California Department of Fish and Wildlife, Regional Water Quality Control Board, State Lands Commission, San Joaquin Valley Unified Air Pollution Control District, Army Corps of Engineers, NOAA-Fisheries, US Fish and Wildlife Service, and the Central Valley Flood Protection Board. The dam is scheduled to be removed in 2017.

- **Central Valley Project Improvement Act - Structured Decision-Making; Bureau of Reclamation. Sacramento, California.** Project manager for analytical support of CVPIA analytics for decision-making relating to salmon doubling goal. Supported data integration of salmon population model, including decision support for policy-level decision-making. Project Manager for effort to review and update tools used for Structured Decision Making (SDM) in CVPIA. SDM models are used in CVPIA to provide a data-driven method for allocating resources towards the CVPIA fish doubling goal.

Comments on Preliminary Scope of Services

The preliminary scope in the RFP aligns very well with FlowWest’s expertise and our track record of implementing successful urban stream restoration and flood control projects in the Bay Area. We are very familiar balancing the need to balance flood risk reduction with environmental stewardship.

Our team is experienced in providing all the expertise needed to accomplish the project objective of completing a conceptual design. We have developed urban stream restoration projects from conceptual design through final design, environmental documentation, permitting, construction oversight, and monitoring. This perspective gives us a solid design foundation with conceptual design, and it will pay off as the FOC prepares to take the project through the rest of the design and implementation milestones. We know what it takes to get urban stream restoration projects funded and implemented, and we take pride in our simple, pragmatic approach. We’ve relied on this approach to establish a good working relationship with the regulatory agencies, and while other firms may see them as an adversary, we work with them as a valuable partner in achieving project goals.

Given the thorough nature of the preliminary scope in the RFP, our comments are limited to the following suggestions to add two optional tasks to the project:



Task 5: Environmental Compliance and CEQA. We recommend adding CEQA to the scope. Most implementation grants available from the State of California require that CEQA is completed before the grant is awarded. We feel that the best strategy for this project is to include CEQA with the conceptual design with the goal of obtaining implementation funding that will pay for final design. We feel that completing CEQA will significantly improve implementation funding success for the project.



Task 6: Grant Support. We recommend adding a final task to the project that includes grant support. FlowWest has been successful at obtaining funding for projects and we have a proven track record of successful grant applications. We have collaborated with a variety of non-profits and public agencies on a series of successful grant pursuits over the last few years including, Dry Creek Rancheria, Zone 7, Deer Creek Conservancy, the Klamath Tribes, the Tuolumne River Trust, Jackson Family Wines, California Department of State Parks, Alameda County Water Conservation and Flood Control District, and Big Valley Rancheria. We have worked on grants that have awarded over \$7 million in the past three years. We feel that reallocating some the funding from conceptual design to CEQA and grant support will increase the likelihood that this project will be funded for implementation and accelerate the completion of a successful project.

Work Plan

This project will be managed by Anthony Falzone, a founding partner of FlowWest, with over 20 years of experience designing stream restoration projects. Anthony's background as a geomorphologist and Certified Floodplain Manager make him extremely well-suited to lead this project from conceptual design forward to implementation, and his extensive experience will help identify potential stumbling blocks far in advance and guide the project forward. This section describes how FlowWest proposes to carry out the scope of work to develop a conceptual design for stream restoration and flood

1

Data review and topographic survey

a. *Review of existing data and studies*

FlowWest will review the available past project data and studies provided by FOC. To develop this proposal we have reviewed the following documents:

- Friends of Orinda Creeks, 2018. Restoration Action Plan for Downtown San Pablo Creek
- National Flood Insurance Program, 2009. Flood Insurance Rate Map Panel 264, 268, 406
- Mackinnon Environmental Consulting, 1999. Map of Downtown San Pablo
- Waterways Restoration Institute, 2001. Preliminary Restoration Plan Orinda, California
- Matt Lamborn, 2000. San Pablo Creek Rehabilitation & Urban Re-integration Plan

b. *The City of Orinda will prepare a topographic survey of San Pablo Creek by mid-summer 2018.*

FlowWest will conduct an additional day of survey work to capture features needed for the HEC-RAS model, but not captured during the City of Orinda survey

FlowWest will coordinate with the City to ensure alignment of data collection priorities, then conduct an additional day of survey work to capture features needed for the HEC-RAS model, but not captured during the City of Orinda survey.

c. *Review of present revegetation plan for adequacy*

FlowWest will review the revegetation plan for adequacy.

d. *Identify data gaps and make recommendations for additional data collection, if needed*

FlowWest will identify data gaps and make recommendations for additional data collection, if needed. We anticipate that a biological survey will be required for the optional environmental compliance task and an additional day in the field to augment the City's survey (Task 1b).

2

Development of concept level design alternatives

a. *Establish the minimum additional ROW critical to the success of the project*

FlowWest will evaluate historical aerial photographs, run geomorphic design calculations, and evaluate the feasibility of expanding the width of the active channel and floodplain corridor in consultation with FOC and the City. We will take an inventory of existing infrastructure and buildings, review existing flood maps, and will incorporate the cost (provided by FOC) of adding right-of-way to the corridor through easements or acquisitions. The success of the project depends on establishing clear goals, and a thorough evaluation of opportunities and constraints. The optimum additional ROW width along the corridor will flow from these goals, opportunities, and constraints.

Work Breakdown

b. *Propose three concept level designs of creek and floodplain alternatives (with input from FOC's outreach efforts with landowners); a trail will be included*

FlowWest will facilitate a design charrette with the project stakeholders to identify three conceptual designs, each including a trail.

c. *Develop HEC-RAS hydraulic model, to evaluate capacity and geomorphic function of alternatives under baseflow and three flood flow scenarios (Q10, 50, 100)*

Paul Frank, P.E. will manage development of the hydraulic model with technical work by Bethany Hackenjos, M.S., E.I.T. Our modelers specialize in developing hydraulic models for stream restoration projects and clearly communicating results to stakeholders. We will estimate the 10, 50, and 100-year flows by using the United States Geological Survey StreamStats application. Currently, the channel does not convey the 50-year design flow. A one-dimensional hydraulic model will be developed to model the base flow and three flood flows. The existing conditions and each alternative will be modeled with a focus on drawing out the differences between each alternative.

d. *Recommend preferred alternative*

We will take the concepts from the design charrette, add detail, and develop an alternatives analysis to identify a preferred alternative. The alternatives will be evaluated based on a set of criteria identified in the design charrette, including recreational opportunity, ecological function, flood capacity, bank protection, and estimated project cost. We will develop a matrix comparing each alternative, and write a brief memo summarizing the analysis and identifying a preferred alternative.

e. *Prepare cost estimate for optimum alternative;*

We will develop a cost estimate for the project based on quantities of construction components, including earthwork, grade and bank stabilization measures, trails, and revegetation. Our cost estimates will not include the cost of property acquisition, unless property values are provided by FOC.

f. *Conduct several design meetings with City staff and FOC to review project design assumptions and feasibility*

In addition to the design charrette with all stakeholders, we will meet with the City and FOC at the beginning of the project and before finalizing our report to solicit input, collect feedback, and ensure the design incorporates appropriate assumptions and a clear understanding of project goals.

3

Preparation of 30% preliminary design for proposed alternative

Colin Hanley, P.E. will lead development of 30% design drawings for the proposed alternative. Colin has over a decade of experience leading development of engineering design drawings for stream restoration projects. The designs will be developed using AutoCAD Civil 3D software, with a surface of the existing conditions and key existing features, including landmarks, existing culverts, existing roadways and parking lots, buildings, and aerial imagery. The software will be used to model the proposed channel modifications to show the proposed contours, bank protection and grade control elements, and a conceptual revegetation plan. The drawings will show the existing creek alignment, the proposed realignment, limits of disturbance, an existing and proposed channel profile, typical cross sections, and details of grade control and bank protection elements with enough detail to clearly communicate the design.

Work Breakdown

4

Project management and final report

As mentioned above, the project will be managed by Anthony Falzone, who will provide direction and guidance to the team. A final report will summarize the design process, including the project goals, constraints, and opportunities analysis, the stakeholder engagement process, a description of the alternatives analysis, the hydraulic modeling, and the 30% design process. FlowWest will schedule monthly calls with FOC to provide updates on the conceptual design status.

5

(Optional) Environmental compliance & CEQA

In our experience, projects that have CEQA completed are eligible for more grant opportunities. We recommend that FOC incorporates CEQA into this project to improve the potential to obtain funding and complete final design and implement the project. We believe that CEQA can be completed with a Mitigated Negative Declaration (MND) is appropriate for project because effects can be reduced to a less-than-significant level.

Efforts under this task include identifying a lead agency for the preparation of a Draft MND, coordinating biological studies to complete the Draft MND, preparation of an internal Administrative Draft MND for review by FOC, public review of a Public Draft MND (including responses to comments during the public review), and preparation of a Final MND. The Draft and Final MND would include a project description sufficient to evaluate project impacts, assessments of potential impacts for each resource area (including impacts from the biological studies), and mitigation where appropriate. To facilitate efficient review by FOC, the Administrative Draft will be substantially complete to a level appropriate for public review. Review of the draft will also include Administrative Drafts of notification documents associated with public reviews which includes a Notice of Completion. The Public Draft will include a final project description sufficient to disclose project impacts, assertive statements on potential impacts for resource areas, and proposed mitigation. Lastly, the collection of documentation of responses to any comments received during public review will be used to create a Final MND that can be used for potential funding and permitting for implementation of the project.

6

(Optional) Grant support

Under this optional task, FlowWest will help research and apply for potential grants to fund future implementation of the creek restoration project. As the Chair of the Financing Committee of the Wildcat-San Pablo Creeks Watershed Council, Anthony Falzone, is ideally suited to identify grant opportunities for this project.

Some grants that this project could be eligible for include:

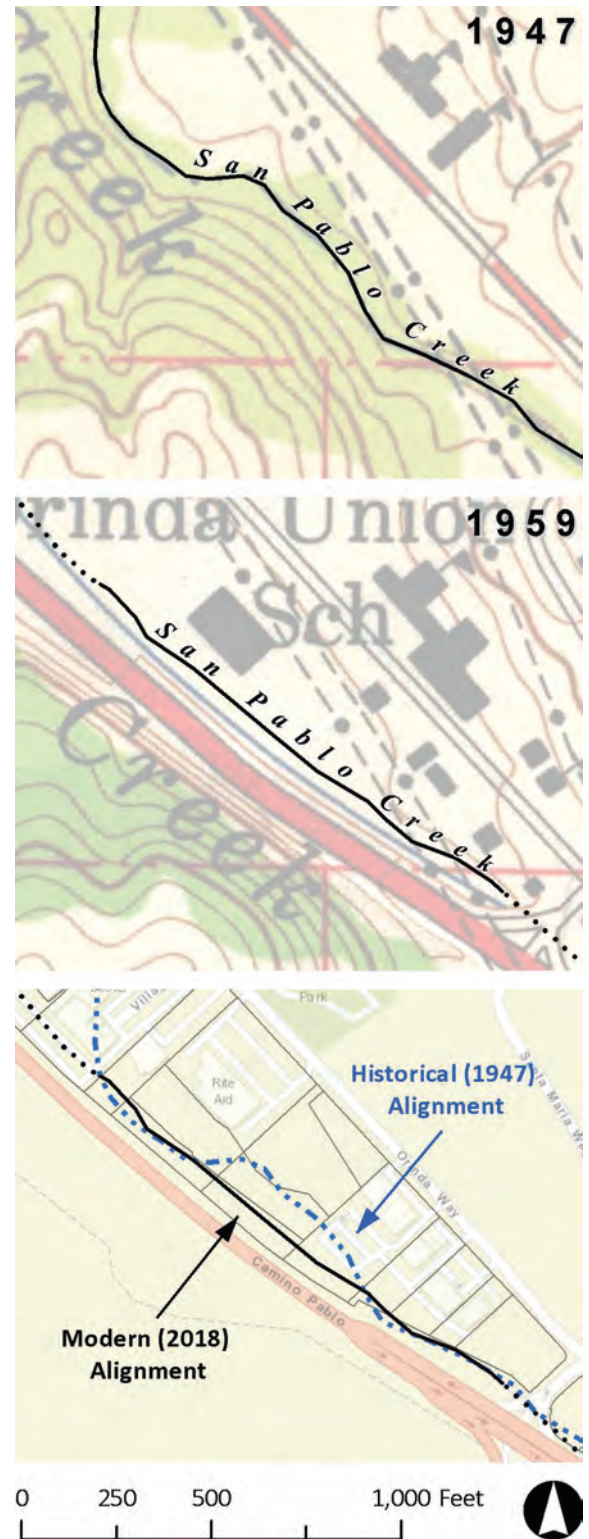
Grant	Agency
California River Parkways Grant Program	California Natural Resources Agency
California Urban Rivers Grant Program	California Natural Resources Agency
Proposition 1 Restoration Grant Program	California Department of Fish and Wildlife
Urban Streams Restoration Program	California Department of Water Resources
Small Grants Program	Clif Bar Family Foundation

Example Design

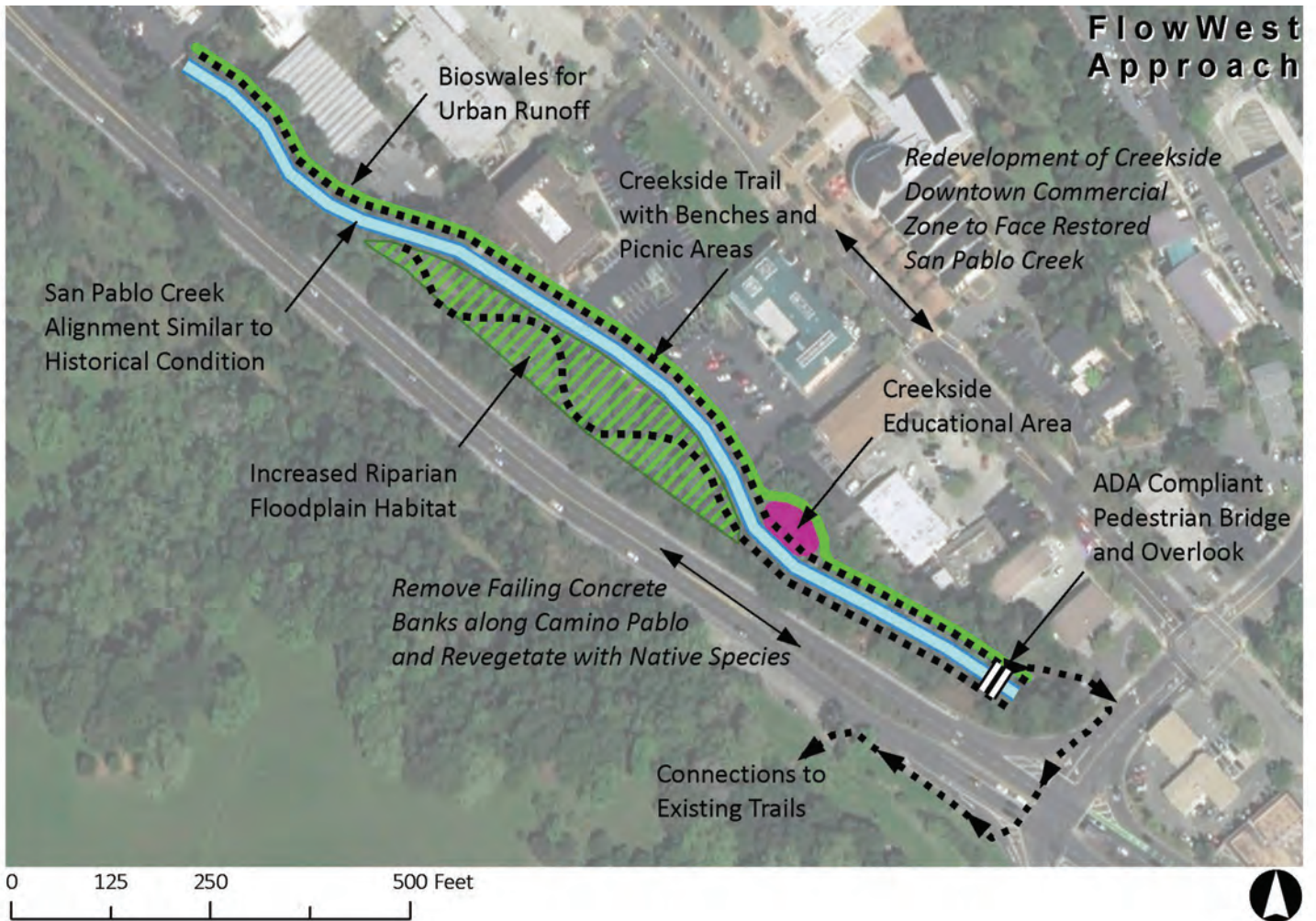
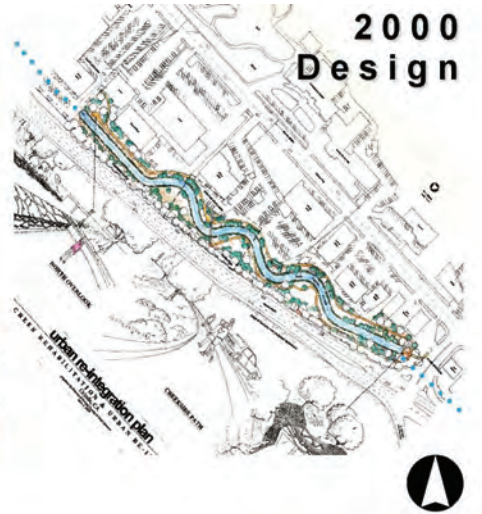
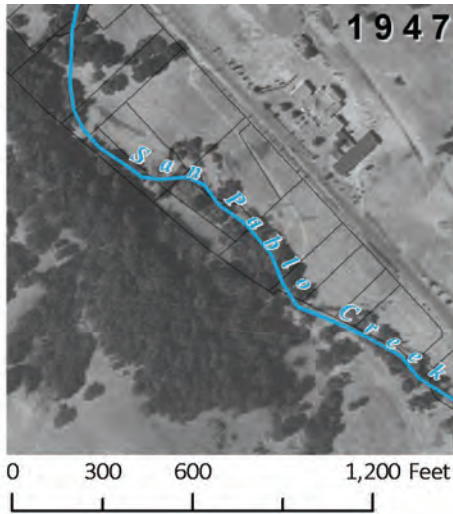
Example Design for Downtown San Pablo Creek Restoration Project

We have already visited San Pablo Creek, and have already begun to think about possibilities for the site. While we are eager to discuss FOC's ideas for the site, the figure below illustrates potential design concepts we might consider if selected. We started our design process by reviewing the historical topographic maps and historical aerial photographs from the 1940s and 1950s. We used the 1947 USGS 1:24,000 scale topographic map to delineate the original channel alignment. This alignment matches the channel corridor in the 1946 aerial photograph. The channel was straightened in the early 1950s when Camino Pablo was constructed. We propose restoring the historical alignment that has one meander in Downtown Orinda. We feel that a single meander is appropriate for the site and that multiple meanders as shown in the 2000 design is likely to blow out during high flows. We feel that maintaining multiple meanders will require significant bank armoring that will reduce habitat value and the natural feel of the creek. We proposed modeling the existing condition as the no action alternative, the 2000 conceptual alignment and cross sections, and our proposed alignment.

Our example conceptual design includes a trail on both sides of the creek with a pedestrian bridge connecting the both sides of the creek from the Chevron Station. The pedestrian bridge will provide access to the both the restored riparian forest and the De La Veaga Trailhead on the opposite side of Camino Pablo. We plan to setback the banks on both sides of the channel and remove the existing shotcrete that is failing. The existing sheet pile grade control structures will be replaced with redwood logs that cross the channel. We will use velocity estimates from the hydraulic model to determine if the toe of slope needs to be armored with boulders. If boulders at the toe of slope are required, we will specify planting willow stakes between rocks to maintain a natural channel feel. By increasing the cross sectional area of the channel we can maintain flood conveyance while also increasing the riparian vegetation planted in the active channel area. We also envision a bio-swale along the parking lot side of the channel to capture pollutants from the parking lot runoff. Our design includes an educational area with seating that looks out over San Pablo Creek. This area can be used for educational programs for local students with interpretative signs to identify native riparian vegetation. As the City of Orinda considers redevelopment of the downtown, buildings could be changed to front the restored channel that could serve as an amenity for restaurants, multi-story housing developments, and pedestrian visitors and residents. The revitalization and redevelopment of downtown San Luis Obispo is a great model for this type of redevelopment.



Example Design



Schedule

FlowWest developed the following proposed schedule to provide conceptual designs and select a preferred alternative by December, 2018. If the optional task to complete CEQA is selected the project will be completed by February, 2019 assuming that we can find a lead agency willing to work with FOC. We will develop conceptual level design alternatives by the middle of September, 2018. Lastly, the final version of the Basis of Design report will be completed by the end of December, 2018.

Schedule San Pablo Creek Restoration Project																													
Assumes City of Orinda survey completed by mid July																													
Task #	Task Description	July 2018				August 2018				September 2018				October 2018				December 2018				January 2018				February 2019			
		Weeks from notice to proceed:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	Data Review and Topographic Survey Infill																												
2	Development of Concept Level Design Alternatives																												
3	Preparation of 30% Preliminary Design for Proposed Alternative																												
4	Project Management and Final Report																												
5	California Environmental Quality Act (CEQA) Compliance (Optional)																												
6	Grant Writing and Support (Optional)																												

Client References and Representative Projects

Wildcat Creek (East Bay Regional Park District)



Reference:

Joe Sullivan
East Bay Regional Park District
Fisheries Program Manager
(510) 544-2329
jsullivan@ebparks.org
2950 Peralta Oaks Court
Oakland, CA 94605

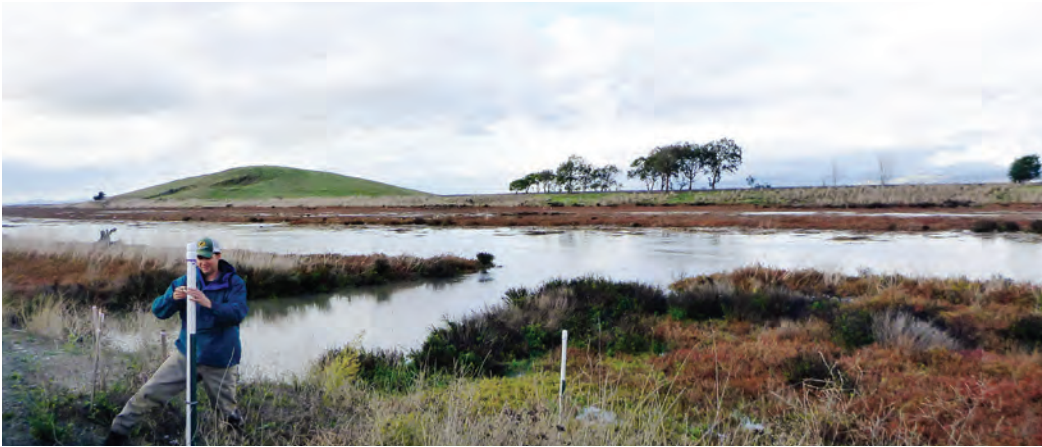
Wildcat Creek drains from its headwaters in the East Bay Hills through Tilden Regional Park to San Pablo Bay. The Wildcat Creek Watershed Erosion and Sediment Control Project combined geomorphic analysis, environmental planning, and civil engineering to identify sediment sources that improved the understanding of sediment sources and transport in the study area. We developed sediment control solutions and design concepts to improve sediment management in the Wildcat Creek watershed in collaboration with EBRPD, Contra Costa Water Conservation and Flood Control District, California Department of Fish and Wildlife, State Regional Water Quality Control Board, the City of Berkeley, and local stakeholders.

The high rates of erosion in the watershed have led to numerous issues for the EBRPD, including instability in the mainstem and tributary channels of Wildcat Creek and sediment accumulation in Jewel Lake and Lake Anza. Management concerns related to current sediment supply and transport conditions include impacts to resident fish (including native rainbow trout, three-spine stickleback, and Sacramento perch) and other species such as Western Pond Turtle and Red-legged Frog; degradation of infrastructure and recreational facilities; and expenses associated with maintenance of EBRPD's facilities. Additionally, EBRPD is concerned with maintaining healthy, sustainable ecosystems throughout the upper watershed providing a recreation amenity for the public.

We conducted a sediment investigation to identify sediment sources and sediment dynamics in the study area and developed both specific design solutions and recommendations on methods for erosion control. We produced conceptual level design solutions to control erosion and sediment deposition that we presented at three design charrettes for a range of erosion control alternatives. For each alternative, we developed cost estimates, identified permitting and environmental compliance issues, and determined the sediment reduction to evaluate the costs and benefits of each design alternative. We performed a constraint and opportunity analyses, and produced a comprehensive set of recommendations for project implementation and long-term maintenance. Sediment control actions ranged from dissipation of stormwater at outfalls to realignment of Wildcat Creek around Jewel Lake. Lastly, we produced a report summarizing the sediment source analysis we conducted, conceptual designs for sediment control actions, public design charrettes, and our recommendations for implementation of the highest ranked sediment control actions.

Client References and Representative Projects

Ardenwood Creek (Alameda County Flood Control & Water Conservation District)



Reference:

Rohin Saleh
Alameda County Flood Control
& Water Conservation District
Supervising Civil Engineer
(510) 670-5487
rohin@acpwa.org
399 Elmhurst Street
Hayward, CA 94544

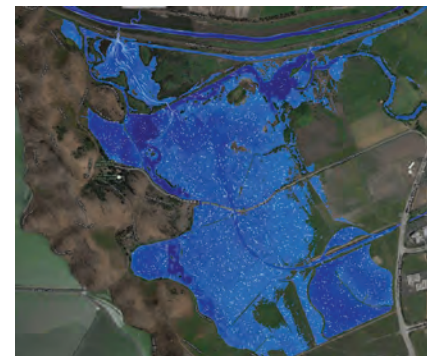
FlowWest has been working since 2012 with the Alameda County Flood Control and Water Conservation District (District) to plan, design, and permit an urban creek restoration project in the Bay Area. In addition, FlowWest has assisted the District in evaluating alternatives for improved flood performance of a key tributary to Alameda Creek flowing through agricultural parcels and Coyote Hills Regional Park.

Ardenwood Creek is a major tributary of Alameda Creek (the Southern SF Bay's largest tributary) that originates from storm sewer systems in Fremont. It flows through Patterson Ranch, an agricultural parcel recently acquired by the East Bay Regional Park District (EBRPD) and then a series of freshwater ponds and marshes in Coyote Hills Regional Park adjacent to the Bay before joining Alameda Creek.

The Ardenwood Creek Restoration and Flood Protection Project is a multi-objective creek enhancement project including environmental planning, hydrodynamic modeling, and civil design work that improved flood control performance to protect nearby businesses and homes, enhanced wetland and riparian habitat, and required little ongoing maintenance that could impact the natural environment.

FlowWest's services included:

- Topographic and bathymetric surveys of the stream channel and pond and wetland complex, resulting in a high resolution Digital Elevation Model of the Project area,
- Installation of a network of stream gages and groundwater monitoring wells to characterize surface and subsurface flow patterns throughout the project area,
- Development of hydraulic and hydrologic models of the project area that informed design and evaluated a range of potential improvements to the system,
- Design of a new creek channel that mimics local channel forms with floodplain wetlands, a main channel sized to appropriately convey both low and high flows,
- Expansion of culverts at two major roadway crossings to increase capacity and prevent flooding,
- Design of two large freshwater wetland complexes (~5 and ~50 acres each) to enhance habitat, buffer high storm flows, and improve groundwater recharge.



Client References and Representative Projects

Arroyo Mocho (Alameda County Flood Control)



Reference:

Michael Bowen
Project Manager
Coastal Conservancy
(210) 286-0720
mbowen@scc.ca.gov
1330 Broadway, 13th Floor
Oakland, CA 94612

FlowWest has been working with the Five Counties Salmonid Conservation Program to assess an existing fish barrier on a tributary to the South Fork Eel River and design fish passage improvements to enhance Chinook and Coho salmon habitat in Fish Creek. This effort has included review of past (failed) studies of fish passage improvement at this site and extensive outreach to stakeholders including California State Parks, California Department of Fish and Game, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and California Department of Transportation. Our technical work on this project has included the full suite of fish passage barrier evaluations, geomorphology investigations to guide our fish passage improvement design, hydraulic flow routing, and hydrologic runoff modeling.

We initiated the technical studies by reviewing past hydrologic runoff modeling and determined that previously developed hydrology was insufficient for this effort. We used regional regression models to determine runoff values for a range of recurrence interval events. Next, we conducted a comprehensive geomorphic investigation of the project area that included a review of previous geomorphic studies, characterization of channel bank and bed materials, and a detailed survey of channel geometry and longitudinal profile.

We used the survey data that we collected to develop a hydraulic flow routing model that we then used to develop fish passage improvement designs by assessing the hydraulic conditions created by each alternative design and comparing those with accepted fish passage criteria. The result of our alternative evaluations was a preferred fish passage improvement design. FlowWest also developed a redwood tree and bank erosion risk analysis using the hydrology, hydraulic, and geomorphology studies described above. This project has given the FlowWest Team unique insights on the importance of geomorphology, hydraulic flow routing, and hydrologic runoff studies to effective fish passage design.

Client References and Representative Projects

Dry Creek Rancheria



Reference:

Chris Ott
Environmental Director
Dry Creek Rancheria
(707) 486-7199
chris.ott@riverrockcasino.com
P.O. Box 607
Geyserville, CA 95441

The Dry Creek Rancheria Band of Pomo Indians is a federally recognized Indian tribe located in Sonoma County, California. The Dry Creek Rancheria was established on June 1, 1915. Loss of traditional lands was a direct result from the decades of forcible relocation and today, the original Dry Creek Pomo habitation area is flooded by the water from the Warm Springs Dam and Lake Sonoma. The Tribe wants to participate in regional restoration and management efforts on both Rancheria Creek and the Russian River.

FlowWest Principal, Anthony Falzone, initially helped Dry Creek Rancheria apply for a Climate Adaptation Grant from the Bureau of Indian Affairs (BIA) in 2014, then completed the plan in 2016, completed CEQA for a Prop 1 grant in 2017, wrote the grant application in 2017, and is currently implementing the project.

Climate Adaptation Plan: FlowWest Principal, Anthony Falzone, first met with the Dry Creek Rancheria in 2014 to discuss watershed based restoration on the Rancheria. FlowWest identified the Climate Adaptation Grant Program and helped Dry Creek Rancheria apply for the grant. After the \$174,000 grant was awarded, FlowWest analyzed climate impacts on the Rancheria and developed a watershed based restoration roadmap for Dry Creek Rancheria's property along Rancheria Creek and the Russian River. FlowWest identified the Wildlife Conservation Board (WCB) Prop 1 program as a potential funding source for implementation of the Climate Adaptation Plan recommended restoration actions.

CEQA Compliance: To obtain the WCB Stream Flow Enhancement and Restoration Grant, the Dry Creek Rancheria hired FlowWest to complete CEQA within three months to meet the grant deadline. Mike Urkov, FlowWest Senior Environmental Planner, worked closely with the lead agency, Sonoma County Permit & Resource Management Department, to successfully complete CEQA.

WCB Stream Flow Enhancement and Restoration Project: FlowWest drafted the grant application for the WCB Stream Flow Enhancement Program, and is currently implementing the 16 restoration actions in the \$5 million project. Dry Creek Rancheria obtained \$3.4 million in funding to complete final design and start on implementation of the project from the WCB. FlowWest tasks include project management, permitting, design, grant writing, construction management, and monitoring.

Additional Urban Restoration Projects

FlowWest Urban Restoration Projects

Project	Client	Location
Arroyo Moch Flood Control and Restoration Project	Zone 7	Livermore, CA
Ardenwood Flood Control and Restoration Project	Alameda County Flood Control and Water Conservation District	Hayward, CA
Kelsey Creek Fish Passage Improvement Project	Elem Indian Colony	Kelseyville, CA
Arroyo De La Laguna Bank Stabilization Project	Zone 7	Pleasanton, CA
Dennett Dam Removal and Restoration Project	Tuolumne River Trust	Modesto, CA
Blankstein Wetlands	HT Harvey (BART)	Freemont, CA
Lower Silver Creek Geomorphic and Sediment Transport Design Guidance and Post-Project Monitoring*	Santa Clara Valley Water District	San Jose, CA
Assessment of an Urban Watershed and Implementation of Urban Stormwater Retrofit Projects on Sausal Creek*	City of Oakland	Oakland, CA
Hanson Property Restoration Project	The Nature Conservancy	Ventura, CA
Las Flores Creek Restoration*	City of Malibu	Malibu, CA
Four Mile Run Restoration Master Plan	City of Alexandria	Alexandria, VA
Ala Wai Watershed Project*	US Army Corps of Engineers	Oahu, HI
Trinity River Corridor Program*	City of Dallas	Dallas, TX
Kallang River Bishan Park Restoration *	Singapore Public Utilities Board	Singapore

* FlowWest Principals working as NewFields or CH2M Hill.

Resumes

Anthony Falzone, M.L.A., CFM

Principal Geomorphologist

Mr. Falzone is a geomorphologist and Certified Floodplain Manager (# US-12-06605) with extensive fluvial geomorphology, river ecology/restoration, flood control, and hydraulics experience in California, nationally, and internationally. He has over 16 years of consulting experience focused on developing, conducting, and compiling monitoring data to adaptively manage land use disturbances and restoration projects in river corridors. Mr. Falzone is also a leader in the application of advanced technology to the collection of field data and analysis of spatial data in river corridor ecosystems. This interdisciplinary expertise enables Mr. Falzone to develop innovative solutions to the most complex river management challenges. He is experienced in river restoration, flood management, watershed assessment, technical writing, and project management.

Education

M.L.A., Environmental Planning, University of California, Berkeley, 2001

Thesis Title: *“Geomorphic Assessment of the Stanislaus River: Goodwin Dam to Oakdale, California”*

B.A., Economics, Minor Forestry, University of California, Berkeley, 1996

Distinguishing Qualifications

- Evaluates fluvial geomorphology, sediment transport, and hydrology of streams.
- Channel restoration, bank stabilization, and fish passage design experience.
- Develops sediment budgets to identify sediment sources and proposes solutions to manage sediment.

Representative Projects – FlowWest

Project Manager; Wildcat Creek Watershed Erosion and Sediment Control Project East Bay Regional Park District; Oakland, California. Sediment periodically fills Jewel Lake in Tilden Regional Park, which requires costly dredging. FlowWest performed a constraint and opportunity analysis to produce a comprehensive set of recommendations, including a channel bypass for Jewel Lake. Mr. Falzone managed the collection of erosion and sediment source data through a systematic field effort and led the development of engineering design alternatives for erosion and sediment control implementation and long-term maintenance. Mr. Falzone presented results at three public meeting and one meeting to the East Bay Regional Park District Board of Directors.

Senior Geomorphologist; Kelsey Creek Fish Passage Project, Elem Tribe, Kelseyville, CA. Facilitated stakeholder driven design process between the USFWS, Lake County, and the Elem Tribe to replace a failed fish ladder and restore fish passage for the Clear Lake hitch, a California listed species. Hitch live in Clear Lake, but migrate up tributaries to spawn. Kelsey Creek is one of three creeks that still support hitch runs and removal of this barrier is critical to the success of the species. FlowWest collected field data to characterize the channel geometry and channel bed composition for the hydraulic model and design documents. Mr. Falzone managed hydrologic and hydraulic modeling of the existing and proposed site conditions. FlowWest developed alternative designs and selected a

roughened ramp passage channel as the preferred alternative to support hitch passage without jumps.

Geomorphologist; Little Miami River Corridor Project; ENTRAN (for Ohio Department of Transportation); Dayton, OH. Mr. Falzone conducted geomorphic analysis to assess potential bridge crossing locations over the Wild and Scenic Little Miami River. Historical channel conditions were analyzed and interpreted, and channel bank migration rates were calculated. Historical hydrologic data was synthesized, informing the flood frequency analysis and flow duration curve development. Mr. Falzone provided guidance on relative strengths of proposed bridge crossings with respect to expected channel change and hydraulic forces. Analytical results and recommendations were summarized in a technical report and presentation for project stakeholders.

Clear Creek Waste Water Treatment Plant Outfall Replacement; Hydraulic Modeling for In-channel Construction; City of Redding, California. Mr. Falzone performed HEC-RAS modeling to assess the potential impact of obstructing flow in the Sacramento River for different outfall construction techniques. The HEC-RAS model was used as a decision support tool to determine which construction technique had the least impact on the levee on the opposite side of the channel. A historical geomorphic assessment was conducted to assess the stability of the Sacramento River at the project site.

Hydraulic and Geomorphic Design; Restoration and Bank Stabilization of Las Flores Creek; City of Malibu; Southern California. The Las Flores Stream Restoration Project was part of a park creation project in a steep canyon susceptible to flooding and landslide hazards. The purpose of the restoration was to reconnect the channel to its floodplain to arrest further channel incision and avoid landslide hazards and. Bioengineering bank stabilization and instream structures were designed to further reduce erosion and incision during the riparian vegetation establishment period and to enhance instream and riparian habitat. Mr. Falzone performed hydrologic, hydraulic, and fluvial geomorphologic analyses, designed channel platform alignment and cross section geometry, and coordinated grading design plans with CAD technician and civil engineer to enhance the riparian habitat.

Selected Publications and Presentations

Falzone, A., K. Kennedy, and S. Ryan. 2016. Tribal Cooperation and Design of a Multi-objective Fish Passage Structure on Kelsey Creek, California. Floodplain Management Association 2016 Conference, Sacramento, California. (presentation and published abstract)

Falzone, A. and J. Sullivan. 2015. Wildcat Creek Sediment Source Analysis and Erosion Control Alternatives. 12th Biennial Stat of the San Francisco Estuary Conference. Oakland, September 17 (Poster).

A Falzone. 2014. Use of Two Dimensional Hydraulic and Sediment Transport Modeling in Design of Salmonid Rearing Habitat in the Sacramento River Floodplain. Association of State Floodplain Managers 2014 Conference. Seattle, Washington. (presentation and published abstract)

Paul Frank, P.E., CED

FlowWest Project Manager and Principal Engineer

Relevant Experience

Mr. Frank is an ecological engineer experienced in river and wetland planning, analysis, and project implementation. He has over 15 years of engineering consulting experience leading teams that implement complex wetland and stream mitigation and habitat enhancement projects. Mr. Frank has experience with designing and constructing multi-objective river and wetland projects in North America, Europe, Asia, and the Middle East. He is adept at developing project mitigation components that satisfy regulatory requirements and that are practical, ecologically uplifting, and blend the needs of infrastructure and the natural environment.

Mr. Frank is an experienced project manager comfortable leading teams of diverse practitioners during all phases of project implementation from planning and studies, to engineering design and analysis, environmental permitting and compliance, construction documents, and construction management and monitoring. He is currently leading teams developing constructed riparian and wetland sites for both Alameda County Flood Control and Water Conservation District in western Alameda County and the Zone 7 Water Agency in eastern Alameda County.

Education

M.S., Civil and Environmental Engineering, University of California, Berkeley
B.A., Environmental Sciences, University of California, Berkeley

Professional Registrations

Registered Civil Engineer: California (#73768)
Certified Ecological Designer, American Ecological Engineering Society (#0001)

Representative Projects

Ardenwood Creek Flood Protection and Restoration Project. Alameda County Flood Control and Water Conservation District. 2012-2017. Served as project manager and technical lead for reconfiguration of approximately two miles of flood control channel in Fremont, California, including creation of new riparian corridor and approximately eight acres of constructed habitat wetlands to mitigate project impacts. Led a two-year design effort and served as engineer of record for the \$7 million+ construction project, and manager of hydrologic/hydraulic, biological, engineering, and permitting/compliance teams. Performed construction oversight during 2016 construction season.

Blanco Drain Natural Treatment Systems, Monterey County Resource Conservation District (RCD), Salinas Valley, California. 2015-2017. The Blanco Drain in the Salinas Valley conveys agricultural tile drain water from farms to the Salinas River and onward to the Pacific Ocean. Mr. Frank worked with the Monterey County RCD and local landowners/growers in the Salinas Valley to develop two passive natural treatment systems to remove nutrients and other pollutants from the drain water – a treatment wetland and microbial bioreactor. The innovative treatment wetland system will be constructed within the Blanco Drain and require no energy input to function; it will also be designed to bypass storm flows. The project design required significant regulatory negotiation to secure approval to proceed with the project.

Patterson Ranch Mitigation Wetlands Project. Alameda County Flood Control and Water Conservation District. 2014-2016. Led the design team that developed a 50-acre constructed mitigation wetland for the District to mitigate impacts from other District projects. The wetland was designed to integrate with the Ardenwood Creek Flood Protection and Restoration project and serve stormwater detention functions in addition to creating new wetland habitat.

Pajaro River Agricultural Preserve Hydrologic Monitoring and Design Recommendations. Santa Clara County Open Space Authority. 2016. Developed and implemented a stream gaging and hydrologic monitoring plan for an agricultural parcel at the confluence of Llagas Creek and the Pajaro River. The data collection effort served to determine the appropriate measures to implement on the parcel to optimize flow patterns and inundation to support the restoration of seasonal wetlands and riparian habitat on the site. Produced report of results and series of design recommendations for restoration actions.

Arroyo Mocho Floodplain and Riparian Forest Restoration Project. Zone 7 Water Agency. 2015-Ongoing. Currently serving as Project Manager and Principal Engineer for a multi-disciplinary team designing a project to restore floodplain and riparian forest, reduce flood risk, and improve water quality 1.5-mile reach of Arroyo Mocho near Livermore, CA. Assisted Client in securing at least \$500,000 (with another \$3 million in grants pending at this time) in grant funding to implement project. The total anticipated cost of project improvements will be almost \$7 million.

Arroyo De La Laguna Bank Stabilization Project. Zone 7 Water Agency. 2017-Ongoing. Currently serving as Project Manager and Principal Engineer for an emergency stabilization action to repair a 40-foot high, 300-foot long bank failure adjacent to houses along Arroyo De La Laguna in Pleasanton, CA. Successfully secured permits from USACE, CDFW, and Regional Water Quality Control Board within five months of start of design and approximately one month from submittal of application. Project will be constructed at a cost of approximately \$1 million in Fall 2017.

Great Valley Grasslands Floodplain Restoration Project. American Rivers. 2011-Ongoing. Developed hydraulic models, conceptual designs, and performed restoration planning for a project that would breach levees along the San Joaquin River a restore floodplain function to approximately 250 acres of native grasslands in the Central Valley.

Khirbet Kanafar Constructed Wetland and Riparian Enhancement Project, USAID Litani River Management System Program, Bekaa Valley, Lebanon. 2012-2013. Mr. Frank worked with USAID to assess the feasibility of implementing constructed wetlands in the Bekaa Valley in eastern Lebanon. After assessing numerous potential sites and the few remaining natural wetland analogues in the Valley, Mr. Frank designed an approximately 8 acre demonstration project incorporating wetland treatment, restoration of seasonal floodplain wetland habitat, and restoration of riparian vegetation along the Litani River – including managing an international team of collaborators. The project was constructed in 2013 and is the first of its kind in Lebanon.

Progetto Integrato di Fusina, Thetis, SpA. Venice, Italy. 2006-2010. Performed numerous tasks for the engineering design and construction oversight of a 250-acre constructed wetland for wastewater treatment adjacent to the Venice Lagoon in Italy. Led an international design team in developing plans and specifications for the constructed wetland system. Performed all hydrologic, water quality, and hydrodynamic modeling and design analysis, performed or coordinated all aspects of the final design, including wetland layout, berms, hydraulics and flow operation, and planting and grading plans, and developed wetland system operation and maintenance manual. The project was completed in 2011 and is the largest constructed wetland system in western Europe.

Colin Hanley, P.E.

Senior Water Resources Engineer

Mr. Hanley is a water resources engineer with over ten years of experience designing restoration and habitat enhancement projects. Mr. Hanley has experience leading topographic surveys, developing topographic basemaps for habitat assessment and design development, conducting hydrologic and hydraulic analyses, developing design drawings and specifications, evaluating construction costs, securing grant funding, and performing construction oversight for a wide range of habitat restoration and water resources engineering projects.

Education

B.S., Civil and Environmental Engineering, University of California, Davis

Professional Registration

Registered Civil Engineer: California (#74867)

Representative Projects

Dennett Dam Removal Project. Tuolumne River Trust. 2016. Colin led the development of topographic basemap development and final engineering design drawings, specifications, and construction cost estimates for removal of Dennett Dam on the Tuolumne River. The design called for removal of a dam built in the 1930's, and restoration of the Tuolumne River to improve conditions for fish and wildlife, and to remove a dangerous hazard for recreational swimmers.

Yellowjacket Creek Fish Passage Improvement Project. Jackson Family Wines. 2017. Colin led development of topographic basemaps and final designs for a fish passage improvement and grade stabilization project in a tributary to Sonoma County's Redwood Creek. Colin developed final design drawings and specifications, construction cost estimate, and a design report.

Sycamore Creek Restoration Project. Santa Cruz County RCD. 2009. Colin conducted topographic surveys, engineering designs, specifications, and construction cost estimates for this stream restoration and bank stabilization project through the Sycamore Creek Vineyard in Morgan Hill, CA. He led the pre-project topographic mapping, conceptual design, final design, construction monitoring, and as-built surveying for the project that stabilized the channel and riparian vegetation through the vineyard.

Great Valley Grasslands Floodplain Restoration Project. American Rivers and California Department of State Parks. 2017. Colin is leading the technical work developing a conceptual alternatives analysis and 2D hydraulic modeling for restoration of a San Joaquin River floodplain. The work under development includes developing LiDAR topographic basemaps, stakeholder engagement, development of alternatives, hydraulic modeling, and development of engineering drawings and cost estimates.

Trout Creek Restoration Project. Town of Truckee, Truckee. 2008. Colin led development of detailed construction cost estimate to inform design alternative selection, and prepared construction plans for the large scale stream restoration and flood control project through downtown Truckee. The plan called for restoring natural geomorphic function to the creek, improving water quality and ecological function, and providing 100 year flood protection.

Caprini Low Water Crossing Fish Passage Improvement Project. California Department of Water Resources. 2013. This project improved access to spawning habitat for fish in the upper Calaveras River. Colin led the development of topographic mapping and engineering design drawings to replace a low water crossing that was a barrier to passage of salmon and steelhead in Mormon Slough. He led the conceptual design, final design, construction monitoring, and surveying.

Budisellich Dam Fish Passage Improvement Project. California Department of Water Resources. 2012. Colin led the development of topographic mapping, engineering design drawings, construction cost estimates, construction monitoring, and as-built surveys for a roughened channel fishway project in Stockton Diverting Canal in the City of Stockton.

St Helena Comprehensive Flood Protection Project. City of St Helena. 2009. Colin led the development of topographic basemaps and engineering design drawings for the Napa River floodplain terrace and streambank stabilization components of a multi-objective flood risk reduction and habitat enhancement project constructed in 2009.

Yolo Bypass Habitat Restoration and Fish Passage Improvement Project. California Department of Water Resources Division of Environmental Services. 2015. Colin evaluated the feasibility of reducing fish stranding and providing upstream passage for salmonids and sturgeon between the Yolo Bypass floodplain and Sacramento River. After successfully proving the concept, he participated in the development of a suite of design alternatives for improving upstream fish passage and enhancing floodplain connectivity in Yolo Bypass.

Cottonwood Dam Fish Passage Improvement Project. California Department of Water Resources. 2014. Cottonwood Dam blocks access to habitat for salmon and steelhead on Miners Ravine in Granite Bay, CA. Colin led a topographic survey of the project site and developed conceptual design alternatives to compete for grant funding to restore the stream through the existing reservoir.

Georgiana Slough Non-Physical Barrier Project. California Department of Water Resources Bay-Delta Office. 2012. Colin worked on the first year's implementation of a non-physical barrier pilot project to study the effectiveness of a new technology for directing juvenile salmon down the lower Sacramento River as the emigrate through the Delta. Colin performed a literature review of studies showing fish survival by passage route, participated in meetings with fisheries agency staff, participated development of the project study design, and assisted with project implementation.

Natomas Levee Improvement Program. Sacramento Area Flood Control Agency. 2009-2010. Colin was a designer on the large-scale, ambitiously scheduled series of projects improving flood protection in Sacramento's Natomas Basin. Responsibilities included design of flood control and irrigation pumping stations; designing site layout, sizing pumps and discharge pipes, applying hydraulic modeling software to evaluate alternatives, coordinating with consultants and stakeholders, estimating construction costs, and overseeing the production of construction drawings.

Mark R. Tompkins, P.E., Ph.D.

Principal Engineering Geomorphologist

Relevant Experience

Dr. Tompkins is an engineer, scientist, and planner with extensive experience developing and implementing creek ecosystem restoration projects. He has over 19 years of experience focused on river restoration, applied fluvial geomorphology, flood management, and aquatic ecology. Over the past decade Dr. Tompkins has planned, designed, and implemented dozens of restoration projects on the Sacramento and San Joaquin Rivers and many of their tributaries, urban Bay Area streams, the Bay Delta and its watershed, the Klamath River, and many other river systems across the country. Dr. Tompkins is also an experienced hydraulic modeler with a focus on model development to support multi-benefit creek restoration design.

Education

Ph.D., Environmental Planning, University of California, Berkeley

Dissertation Title: *"Floodplain Connectivity and River Corridor Complexity: Implications for River Restoration and Planning for Floodplain Management"*

M.S., Environmental Engineering, University of Illinois

B.S., Civil Engineering, University of Illinois

Professional Registrations

Registered Civil Engineer: California (#64524); Washington (#51780)

Distinguishing Qualifications

- Instructor and researcher in river restoration practices, applied fluvial geomorphology, river management planning and policy, floodplain connectivity, and compound channel design
- Technical Advisory Committee member for the Cache Creek Improvement Plan and the San Joaquin River Restoration Program
- Experienced river restoration design charette organizer and facilitator
- Experienced hydrologic, hydraulic, and sediment transport modeler
- Experienced fluvial geomorphology and river restoration practitioner

Representative Projects

Principal Hydraulic Engineer; Sausal Creek Watershed Project; Friends of Sausal Creek; Oakland, California. 2010-2012. Finalized and calibrated HEC-RAS model to evaluate hydraulic conditions under existing conditions and proposed conditions with watershed improvements. Assisted in the development of watershed hydrology model to quantify the benefits of stormwater management BMPs in the watershed. Interpreted implications of model output for the restoration potential of Sausal Creek and the geomorphic stability of creek conditions.

Senior Fluvial Geomorphologist and Channel Relocation Design Lead; Trinity River Corridor Project; City of Dallas, Texas. 2006 – 2009. Designed and conducted comprehensive geomorphic and hydrologic assessments of the Trinity River watershed and project area in Dallas. Led field data collection effort. Developed initial channel relocation and restoration design alignment and geometry. Refined initial design through collaborative work with hydraulic and sediment transport modeling team, landscape architecture team, and civic art team. Presented geomorphic assessment and basis of design at project workshop and design charettes. Developed channel design criteria.

Drafted geomorphic assessment and basis of design report. Completed 35% design drawings and report.

Senior River Ecosystem Restoration Engineer; Ala Wai Watershed Project; U.S. Army Corps of Engineers; Honolulu, Hawaii. 2008-2010. Conducted project kick-off and visioning workshops to outline large-scale concepts for flood risk management, ecosystem restoration, and water quality improvement in the Ala Wai watershed. Led stream walks of the three major streams (Makiki, Palolo, and Manoa) in the Ala Wai watershed. Coordinated with USACE on hydraulic modeling. Developed ecosystem restoration objectives, sub-objectives, and metrics for the project. Created an ecosystem valuation model selection matrix and developed protocol for ecosystem model implementation. Developed multi-objective ecosystem restoration measures.

Yellowjacket Creek Fish Passage Restoration; Jackson Family Wines; Sonoma County, California. 2013-present. In close coordination with National Oceanic and Atmospheric Administration (NOAA) Fisheries staff, provided strategic planning and fish passage design expertise to restore access for sensitive salmonids to several miles of Yellowjacket Creek. A historical water diversion structure created an impassable barrier over the past several decades. Dr. Tompkins oversaw site data collection, hydraulic model development, and fish passage design of a structure to restore hydraulic conditions suitable for juvenile and adult salmonid passage.

Independent Technical Advisory Committee Member; San Joaquin River Restoration Program Technical Advisory Committee; California. 2012-present. Member of a 6-person TAC that advises the Restoration Administrator (RA) for the \$800M San Joaquin River Restoration Program (SJRRP). Lead TAC member for the evaluation of floodplain reconnection and restoration projects, infrastructure improvement designs, seepage management, and monitoring and adaptive management program activities. As part of the TAC, Dr. Tompkins is responsible for developing multiple deliverables to the RA including document and design review memos, independent technical analyses, and ongoing communications with the SJRRP staff and consultants. The SJRRP is one of the largest river restoration programs ever undertaken and will restore flows and salmon to the river that have been eliminated from the system for the past forty years.

Additional Professional Experience

UNIVERSITY OF CALIFORNIA, BERKELEY & UNIVERSITY OF CALIFORNIA EXTENSION

Faculty Lecturer for “*Restoration of Rivers and Streams*,” a graduate-level course for environmental engineers, scientists, and planners. Taught, organized, led field trips, and handled all class responsibilities. Fall 2006 semester. Fall 2010 semester.

Instructor for “*Geomorphic and Ecological Fundamentals for River and Stream Restoration*,” a short-course for professionals working in the river and stream restoration field. Delivered lectures, organized and led field exercises, and planned course logistics. Summer 2006 – 2016.

Selected Publications and Presentations

Tompkins, M.R. 2016. Multi-Benefit Flood Management on Deer Creek, Tehama County, CA. Floodplain Management 2016 Conference. Sacramento, CA September 6-9, 2016 (presentation and published abstract)

Tompkins, M.R. 2012. Compound channels for flood management and stream restoration. Wise-Use of Floodplains: Adaptation in America and Europe. Workshop at the University of California, Berkeley. March 9-10, 2012.

ANNA (KLADZYK) CONSTANTINO, EIT

Water Resources Engineer

Anna is a water resources engineer specializing in the analysis of topographic data to understand hydrologic and geomorphic processes. She also has unique experience in data analysis and visualization tool development and is passionate about integrating innovative approaches from the tech sector into the natural resources sector.

Education

M.S., Environmental and Water Resources Engineering, University of Texas, Austin
B.S., Civil Engineering, Illinois Institute of Technology

Professional Registration

Engineer in Training

Representative Projects

Lower Deer Creek Flood and Ecosystem Improvement Project, Phase 1. *Deer Creek Watershed Conservancy; Vina, California. 2017-Ongoing.* The purpose of this project is to complete environmental compliance documents, supporting studies, and evaluations to advance the implementation of multi-benefit improvements on lower Deer Creek. The project directly addresses degraded habitat—a limiting factor for Chinook salmon and steelhead passage and rearing in lower Deer Creek, and catastrophic flooding that destroys farmland and infrastructure every five to ten years. Ms. Constantino is the FlowWest team project manager and is also working on the baseline hydrologic and geomorphic conditions analysis for the project, as well as developing data-driven outreach content to support the environmental documentation.

Arroyo Mocho Floodplain and Riparian Forest Restoration Project. *Zone 7 Water Agency; Livermore, California. 2015-Ongoing.* Ms. Constantino is developing a 2D hydraulic model to present existing and proposed conditions in the Arroyo Mocho project reach, and to inform the design of riparian forest restoration and flood enhancements in the urban arroyo. The restoration design aims to: enhance riparian vegetation, attenuate peak flows of the 25-year storm event, reduce potential for erosion impacts, improve sediment continuity and existing native vegetation.

Land Evaluation and Site Assessment (LESA) Model Development. *Solano County; Solano County, California. 2016. 2016-2017.* Ms. Constantino developed a LESA model for Solano County tool to quantify, communicate and analyze the current and potential agricultural significance of parcels located within the Cache Slough Complex. Ms. Constantino worked directly with the Project Management team and participated in all stakeholder and advisory committee meetings in order to directly translate local landowner and technical expert feedback and values into model parameters. Constantino also wrote the user guide for the tutorial, and taught two workshops on running the model and interpreting the results for Natural Resources Conservation Service and Solano County staff. This project received the Soil and Water Conservation Society CA/NV Chapter's 2017 Honor Award.

Solano County Water Resources Study. *Solano County Department of Resource Management; Solano County, California. 2016.* The purpose of this study was to help Solano County understand and quantify the status and trends of the groundwater basins and surface water systems in the County and to provide guidance on the County's engagement with the Sustainable Groundwater Management Act

(SGMA). Study objectives include: outreach to various stakeholders regarding water resources and land use data, collection and integration of collected data, an assessment of current data gaps across the County, and the development of an agricultural consumptive use model. Ms. Constantino led the data outreach, collection, and cataloging process, and helped to create visualizations of integrated data, modeled applied water demand using the DWR CUP+ model, and synthesized these findings into a County-wide water balance for 2015. Ms. Constantino also worked with FlowWest data scientists to develop an interactive visualization for the diverse data synthesized during this project.

Yellowjacket Creek Fish Passage Improvement Project. 2016. Ms. Constantino supported the fish passage design process to restore juvenile and adult coho salmon and steelhead trout access to 1.9 miles of spawning and rearing habitat on Yellowjacket Creek by modifying a concrete weir structure, constructing a series of boulder step-pools, and installing a fish screen.

Bethany Hackenjos, E.I.T.

Water Resources Engineer

Bethany is a water resources and ecological engineer with 7 years of experience focused on water quality engineering, hydraulic modeling, and riparian and wetland restoration. Her experience is associated with projects throughout California, including the Central Valley and Bay-Delta region. Her approach to environmental consulting involves integrating sound technical and analytical engineering practice with strong computer programming and data analytics skills. She is committed to the advancement of adaptive data analysis and visualization tools into the sphere of environmental decision-making and collaboration.

Education

M.S. Environmental Engineering with Water Quality Engineering Emphasis, University of California, Berkeley, 2011

B.S. Civil Engineering, University of California, Berkeley, 2009

Professional Registrations

Engineer in Training

Representative Projects

Salinas Valley Channel Maintenance Program Hydraulic Model. 2015. In 2015, Bethany worked with Paul Frank to develop the 2D HEC-RAS hydraulic model spanning over 90 miles of the Salinas Valley to be used by MCWRA for the Salinas River Channel Maintenance Program. Her work involved making revisions to the model geometry, modifying land covers and terrains to simulate proposed vegetation clearing actions, setting up and running model plans; as well as, reviewing, interpreting, and reporting on model results.

Great Valley Grasslands Floodplain Reconnection Feasibility Study. California State Parks. 2010–Present. For the past seven years, FlowWest has been working with the California Department of Parks and Recreation to restore seasonal flooding and associated floodplain, aquatic, and riparian habitats to a 400-acre site within the Great Valley Grasslands State Park (located on the San Joaquin River). In support of this project, Bethany developed a detailed 2-D HEC-RAS model of the project site that tied into an existing 1-D model of the San Joaquin River. The 2-D model explored project-specific hydrodynamic conditions at the proposed restoration site for various project alternatives. Model results and analyses were used to investigate site inundation frequency and expected maximum velocities at the proposed levee breaches and flow pathways across the site.

Dennett Dam Removal Project. Tuolumne River Trust. 2016–Present. Dennett Dam is a fish passage barrier and recreational hazard located in Modesto, CA that has been targeted for removal during the summer of 2018. In support of this project, Bethany collected field data and developed a two-dimensional hydraulic model to investigate sediment mobility and scour potential at Dennett Dam under both existing and post-removal conditions. Field work included topographic surveys, bathymetric surveys, land cover mapping, and facies mapping. Model results and analyses were used to support project design, environmental permitting, construction implementation, and dewatering plans.

Cache Creek Resources Management Plan. Yolo County. 2016–Present. Bethany created a two-dimensional hydraulic model and provided technical support to update the water quality monitoring

components of the Cache Creek Area Plan (CCAP). She compiled, analyzed, and synthesized relevant historical water quality and hydraulic information collected by the program during the past 15 years and identified historical hydrologic patterns that may have influenced water quality conditions over the years. With this information, she drafted a programmatic status and trends report aimed to identify spatial and temporal trends in key water quality parameters through the CCAP area. She also developed detailed documentation for the Cache Creek two-dimensional hydraulic model so that it may be used by others to evaluate future conditions and investigate implementation of restoration projects in the designated plan area.

BART Blankstein Wetland and Riparian Mitigation Site Monitoring. Bay Area Rapid Transit (BART). 2016–2017. Bethany has performed topographic surveys, field observations of erosion patterns, data compilation, and data processing tasks in support of annual post-project monitoring of the Blankstein Wetlands mitigation site. These observations were performed to meet the channel function and stability monitoring and wetland hydrology monitoring requirements in the project’s Mitigation and Monitoring Plan (MMP) and assist with a delineation of jurisdictional habitats to guide recommendations for adjustments to the flashboard weir diverting water into the mitigation site.

Ardenwood Creek Flood Protection and Restoration Project. Alameda County Flood Control & Water Conservation District (ACFCWCD). 2017–Present. Bethany collected groundwater monitoring data; permitted, coordinated, and supervised a new groundwater well installation; and built-out a HEC-RAS 1D/2D coupled hydrodynamic model for the Ardenwood Creek Flood Protection and Restoration Project. The hydrodynamic model was composed using elements from an existing Mike 11 model, flow output from HEC-HMS, and survey data. This unique and complex model includes a total of 28 boundary conditions (derived from a combination of HEC-HMS output and gage data) and 14 hydraulic structures (i.e., culverts and bridges) surveyed by FlowWest. The complete model is currently being used to evaluate baseline hydraulic conditions following construction on the Ardenwood Creek (Zone 5 Line P) improvement project and investigate implementation of 7 conceptual flow conveyance alternatives.

Guadalupe River Flood Control Project Mitigation. United States Army Corps of Engineers, San Francisco District (USACE). 2010. In support of the mitigation requirements for the Guadalupe River Flood Control Project, Bethany proposed design modifications to an existing mitigation design project after a storm event lead to excessive erosion. She conducted site visits at both the mitigation design location and the reference reach—documenting key features and observations to inform the design modifications. Using HEC-RAS 1-D, she investigated as-built water surface elevations and velocities for the flow event and compared those to field observations. The eventual project modification design incorporated both bio-engineering features that could withstand the predicted velocities and channel design changes that would reduce velocities in some areas while meeting the project mitigation requirements.

Specialized Computer Skills

ESRI ArcMap 10.x GIS software

Tableau

R Studio

Exploratory

HEC-RAS 5.x

Gordon Cooper III, E.I.T.

Junior Engineer

Gordon is a junior engineer who is pursuing a career in the field of water resources. He is seeking to hone his skills further through working on projects with hydraulic and environmental challenges. Gordon has recently joined of the FlowWest team!

Education

B.S. Civil Engineering, California State University, Chico, 2017

Professional Registrations

Engineer in Training

Representative Projects

Arroyo Mocho Restoration Design. 2018. Gordon assisted in the design of Zone 7's restoration of Arroyo Mocho Creek through drawing detailed plans with AutoCAD Civil 3D and analyses on Microsoft Excel. His work included assisting in the design of a flood attenuation basin, detailing erosion protection devices, working with topographic survey data, reading and editing plans, cost estimation, and culvert analyses.

Dry Creek Rancheria Restoration Design. 2018. Gordon has assisted in the restoration and watershed management concerning Dry Creek. His work thus far has consisted of realigning the Russian River and the design of a river confluence, floodplains, and mitigation wetlands to support a riparian habitat using AutoCAD Civil 3D.

Deer Creek Geomorphic Analysis. 2018. Gordon is involved with analyzing the geomorphology of Deer Creek with the goal of improving habitat conditions and reducing project maintenance. He is currently using AutoCAD Civil 3D and GIS to analyze the geomorphology of the project area.

Specialized Computer Skills

AutoCAD Civil 3D

ArcGIS

Christine Day

Environmental Planner

Qualifications

Ms. Day is an environmental planner with FlowWest with 2 years of CEQA/NEPA experience focusing on projects that have impacts to water resources. Her experience is associated with projects throughout California, particularly with small, low income communities. Her role in those projects was CEQA/NEPA review and to help communities with the CEQA/NEPA process and the permitting process required for their projects. Ms. Day just recently started with FlowWest and before worked with the State Water Resources Control Board.

Education

B.S., Environmental Sciences, San Diego State University, 2012
M.A., Anthropology, California State University, East Bay, 2016

Technical Skills

ArcGIS 10.x

Representative Projects

Deer Creek – CEQA/NEPA Analyst; Deer Creek Water Conservancy. Vina, California. The Deer Creek project directly addresses degraded habitat that is a limiting factor for Chinook salmon and steelhead passage and rearing in lower Deer Creek, and catastrophic flooding that destroys farmland and infrastructure every five to ten years. Ms. Day's role in the project is assisting in the completion of CEQA and NEPA compliance documents. She is also assisting in the creation of an interactive CEQA/NEPA document to help the general public understand the project better.

Dennet Dam – Permitting; Tuolumne River Trust. This project includes the removal of a dam in the Tuolumne River that has been a fish passage barrier and has also been the cause of death for local youth. Ms. Day's role in the project was to help understand the parameters of the permits so ensure a good faith effort to protect the environmental resources of the Tuolumne River.

Rancheria Creek Restoration Project – Permitting; Dry Creek Rancheria Band of Pomo Indians. Geyserville, California. Rancheria Creek Restoration Project addresses stream flow and habitat restoration within a tributary of the Russian river. The Dry Creek Rancheria Band of Pomo Indians is looking to improve the water resources within their Trust land and land adjacent to it for themselves and for fish habitat. Ms. Day's role is permitting support for implementation of the project.

Central Valley Project Improvement Act – Technical Writer; Bureau of Reclamation. Sacramento, California. Central Valley Project Improvement Act is a project that connects various types of data (gage, survey, model, reports) to support a Structured Decision Making (SDM) model

with the goal of doubling salmon population in the Central Valley. Ms. Day's role in the project is to write the technical reports and helping to acquire data.

Great Valley Grasslands Floodplain Reconnection – CEQA Analyst; Department of Parks and Recreation. Stevinson, California. Great Valley Grasslands Floodplain Reconnection's goal is to reconnect a section of the San Joaquin River in Merced County to a portion of the Great Valley Grasslands State Park through strategic levee breaches and/or removal in combination with strategic abandonment of levee maintenance. Ms. Day's role in this project is assisting in the completion of CEQA compliance documents.

Klamath Riparian Analysis – GIS Aide. Klamath Riparian Analysis project is using innovative new technologies to digitize the landscape of the Klamath Watershed. We are using ArcGIS to train Google Earth Engine to recognize the difference between grass, trees, bare earth, and water. Ms. Day's role in the project is to help digitize areas in ArcGIS.

Mike Urkov

Water Resources Planner

Qualifications

Mr. Urkov is a senior water resources planner for FlowWest with over 17 years of consulting experience focused on environmental planning for inter-disciplinary and multi-stakeholder projects that span the breadth of water resources issues – from flood protection to water conservation to endangered species habitat. Mr. Urkov has managed technical projects and consulting tasks worth more than \$20 million dollars over the past 10 years, with associated capital construction budgets in excess of \$200 million.

Education

BS, Political Economy of Natural Resources, University of California, Berkeley, 1993

MA, Water Resources Administration, University of New Mexico, 1996

Distinguishing Qualifications

- Twenty years of experience performing environmental impact investigations, including aquatic characterization and habitat monitoring and assessment.
- Served as project manager for environmental impact statements (EISs) under NEPA and CA state laws. Conducted environmental investigations and in support of NEPA and ESA documentation.
- Expertise in inter-disciplinary and multi-stakeholder projects, primarily in water resources ranging from flood control, to water conservation to endangered species habitat.
- Project management on technical projects and consulting tasks worth more than \$20 million dollars over the past 10 years, with associated capital construction budgets in excess of \$200 million.
- Demonstrated experience negotiating with regulatory agencies on interdisciplinary issues that encompass, political, economic, biological, and physical disciplines.

Representative Projects

Dennett Dam Removal - Environmental Permitting; Tuolumne River Trust. Modesto, California. Led efforts to acquire environmental approvals and permits for Dennett Dam on the Tuolumne River in Modesto, California. Requirements included compliance with compliance / permitting under CEQA, California Department of Fish and Wildlife, Regional Water Quality Control Board, State Lands Commission, San Joaquin Valley Unified Air Pollution Control District, Army Corps of Engineers, NOAA-Fisheries, US Fish and Wildlife Service, and the Central Valley Flood Protection Board. The dam is scheduled to be removed in 2017.

Central Valley Project Improvement Act - Structured Decision-Making; Bureau of Reclamation. Sacramento, California. Project manager for analytical support of CVPIA analytics for decision-making relating to salmon doubling goal. Supported data integration of salmon population model, including decision support for policy-level decision-making. Project Manager for effort to review and update tools used for Structured Decision Making (SDM) in CVPIA. SDM models are used in CVPIA to provide a data-driven method for allocating resources towards the CVPIA fish doubling goal. Using modern database conventions and analytical tools, the project connects various types of data (gage, survey, model, reports) to the SDM process that is used to support decision-making.

Technical Review of Bay-Delta Conservation Plan (BDCP), Saracino and Mount, Sacramento, California.

Technical lead for review of modeling and assumptions used to assess BDCP alternatives. Used modern data analytic tools developed for large-scale investigations in finance and health care sectors to review modeling output files from BDCP impact analysis. Supported independent academic review of BDCP impact analysis. Found several modeling anomalies, including faulty logic code that incorrectly accounted for 2 million acre-feet at Old and Middle River, resulting in a conflict between Delta smelt and exports.

Red Bluff Diversion Dam Fish Passage Improvement Project – Project Manager; Tehama Colusa Canal Authority; Red Bluff, California.

Project manager for process to analyze fish passage improvements in the Sacramento River floodway. This project evaluated alternatives to existing dam operations, which were identified as an impediment to endangered runs of Chinook salmon, Central Valley steelhead, and green sturgeon. The selected project included construction of a \$200 million pumping plant near the existing canal headworks. The project also included revision to flood maps in the project area. Major issues for this controversial project include impacts to endangered species, recreation in Lake Red Bluff, project financing, and separate federal and state court litigation.

Trinity River Fishery Supplemental EIS/EIR; Trinity County, California; U.S. Fish and Wildlife Service, Hoopa Valley Tribe.

Managed preparation of a NEPA/CEQA document to evaluate additional water releases from existing dams, in conjunction with physical modifications to the stream channel to meet tribal fishing rights. The primary technical underpinning of the impact analyses was interpretation of CALSIM modeling results for the California water system. Key efforts involved coordination of a wide range of special interests, development of feasible alternatives and subsequent impact analysis. Major issues for this controversial project included evaluating impacts on flood control, water quality, power users, agricultural interests, and water contractors in California's Central Valley. The project was eventually settled by the Ninth Circuit Court of Appeals.

Saeltzer Dam Fish Passage and Flow Protection Project Environmental Assessment/Impact Study (EA/IS); Shasta County, California.

Managed preparation of a NEPA/CEQA document and permitting for removal of Saeltzer Dam on Clear Creek, an important spawning tributary for Sacramento Valley chinook salmon. The project required fast-track environmental documentation to comply with endangered species habitat requirements. The project was a high-profile effort, drawing national political attention following final design of the removal effort. Environmental issues included removal of an irrigation ditch that provides water to unpermitted secondary water users and impacts to the floodplain. Removal of sediments behind the dam required detailed analysis and control measures during dam removal because of the potential existence of mercury deposits behind the dam.

Federal Energy Regulatory Commission (FERC) License Amendment, Don Pedro Project, Modesto, California.

Participated in a federally mediated negotiation for a FERC license amendment to the Don Pedro project. This experimental process attempted to resolve contentious issues among the Modesto Irrigation District, Turlock Irrigation District, City and County of San Francisco, U.S. Fish and Wildlife Service, California Department of Fish and Game, and several environmental groups regarding instream flows for the Tuolumne River salmon fishery. Issues addressed included salmon life cycle, instream restoration, agricultural water use, urban water use, and hydroelectric generation.



1624 Franklin Street Suite 901
Oakland, California
510.454.9378
flowwest.com

