Michael Love, P.E.

Principal Engineer

Michael Love & Associates
Hydrologic Solutions

Contact Information
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Education
B.S. 1996
Environmental Resources Engineering, Humboldt State University, California

Professional Registration
California Civil No. C71681

Areas of Practice
- Aquatic Organism Passage
- River Engineering
- Geomorphic Assessment
- Estuarine Restoration
- Stream Restoration
- Wetland Enhancement
- Fishways
- Dam Removal
- Professional Resources Development
- Physical Hydraulic Model Research

Organizations
- California Salmonid Restoration Federation
- American Fisheries Society (past Secretary/ Treasurer)
- Joint Committee on Fisheries Engineering and Science

Awards
- SRF Golden Pipe Award (2006)
- US Forest Service AFSC Team Award (2004)

Experience

Principal engineer working with riverine and estuarine systems. Founder and Principal of Michael Love & Associates, Inc. since 1999, Michael has extensive interdisciplinary experience in fisheries and fluvial geomorphology, combined with expertise in channel and estuarine hydraulics, watershed hydrology and fish passage engineering. He has extensive experience analyzing drainage structures of various types while also pioneering techniques emphasizing geomorphic-based approaches to solving watershed-based problems. He served as a lead developer for the USFS fish passage and culvert hydraulics software and user manual, *FishXing*. His publications include the California DFW *Fish Passage Design Manual* (2009) and *Fish Passage Assessment Manual* (2003).

Example Projects

Neefus Gulch Dam Removal, Culvert Replacement, & Wood Loading, Navaro, CA)

Led geomorphic assessment, design, and preparation of civil engineering plans and specifications for removal of an 18-ft tall earthen dam with on-site storage for the 5,000 cubic yards of accumulated sediment and restoration of historical channel, replacement of undersized downstream culvert crossing, and installation of large wood structures throughout the downstream incised channel to capture released sediments and raise streambed. Conducted detailed geomorphic assessments, hydraulic analysis and calculations, and stability analysis of large wood. Coordinated with landowners, including multiple presentations to community. Oversaw construction and post-construction monitoring.

Client: Trout Unlimited **Completed:** Constructed 2024

Jameson Creek Fish Passage Improvement Project (Fortuna, CA)

Project fish passage engineer, designed a 348-ft long pools and chute roughened channel through a 125-ft long pre-cast box culvert. Developed fish passage flows and conducted hydraulic analysis in HEC-RAS and spreadsheet calculations for evaluating channel stability and passage conditions. Developed engineered streambed material and layout of key rocks within the channel. Provided engineering support during construction and performed follow-up monitoring, including characterizing velocities using LSPIV at fish passage flows.

Client: City of Fortuna **Completed:** Constructed 2020

Martin Slough Estuarine Enhancement Project (Eureka, CA)

Lead designer for enhancing Martin Slough, Humboldt Bay. Tasks included developing a finite control-volume model for analyzing and selecting replacement tide gates to restore tidal influence within diked and drained tideland in support of estuarine enhancements and fish passage while improving drainage on adjacent pasture and golf course. Sized tidal channels using empirical relationships and developed layouts of four off-channel ponds and additional tidal marshes. Oversaw development of RAS-1D unsteady model with water quality module for analyzing seasonal salinity fluctuations. Provided oversight during 5 phases of construction.

Client: Redwood Community Action Agency **Completed:** Construction 2023

Riverside Ranch - Eel River Estuary Levee Modifications Project (Ferndale, CA)

Principal engiener analyzing influences of constructed levees around CDFW Riverside Ranch on local floodplain inundation pattern. Analyzed mulitiple alternatives to eleviate off-site levee impacts, including modifying tide gates and lowering levee sectiosn. Oversaw development of 2D HEC-RAS hydrodymanic model of Eel River and southern floodplain/estuary, from ocean bar to 7 miles upriver. Modeled river flood events combined with tidal influence using collected stage data to calibrate and validate results. Collaborated with CDFW, and land owners to identify perferred alternative for implementation.

Client: Humboldt County RCD **Completed:** Constructed 2024

Alameda Creek Fishways (Freemont, CA)

Served as the fish passage engineer for a keystone project in the recovery of anadromous steelhead to Alameda Creek watershed. Lead workshops with the water district and NMFS engineer and biologists to establish project design criteria. Conducted hydrologic and hydraulic analysis and developing layout for two vertical slot fishways with auxiliary water and lamprey ramps, a vortex pool and chute fishway, a juvenile out-migrant spillway, and a juvenile plunge-pool below the dam. Built scaled physical model of pool and chute fishway in HSU flume and assessed performance. Evaluated numerous operational scenarios to evaluate impacts to migrating steelhead. Evaluated downstream channel stability to determine potential future channel degradation and impacts to the fishway entrance.

Client: Alameda County Water District **Completed**: Constructed 2023

US 101 Eureka-Arcata Corridor Tidal Monitoring and Tide Gate Replacements (Humboldt Bay, CA)

Co-principal investigator monitoring pre- and post-proejct water levels and water quality conditions in tidal channels along the Erueka-Arcata Saftey Corridor for 12 month periods prior and subseqnet to 2020 Caltrans tide gate replacements. With Cal Poly Humboldt EngineeringDept., lead installation and operation of water level and temperture, salinity, and disovled oxygen loggers in tidal channels at 14 sites. Conducted ADCP measurments of tide gate discharge at various outflows to evaluate fish passage conditions. Provided analysis and interpretation of collected data to characterize influence of freshwater inflows and leakage from gates that produce diverse brackish habitats upstream of gates.

Client: Caltrans District 1 **Completed:** August 2022.

Eagle Canyon Fish Passage Improvements, Battle Creek (Manton, CA)

Principal engineer for fish passage improvements at two sites on North Fork Battle Creek within a difficult to access canyon. The project utilized state-of-the-art survey and remote sensing monitoring to help understand the complex boulder arrangements and develop nature-based solutions. Final design approach involved rearranging and removing colluvial boulders within the canyon using a large crane positioned on the canyon rim and hydraulic rock-splitters split rocks into desired sizes to create a fish passage corridor through an existing barrier for reintroduction of endangered Winter-Run Chinook Salmon. Prepared construction documents and provided oversight during construction of the upper barrier removal.

Clients: CA Dept. of Fish & Wildlife and California Trout **Completed:** Constructed 2021

Salt River Ecosystem Restoration Project (Ferndale, CA)

Project engineer overseeing channel design for Salt River Phase 2B, Francis Creek and Willams Creek. Lead development of project's SRH-2D unsteady-state hydrodynamic model, engineering designs for restoration of Francis Creek reach and sediment basin for collecting fine sediment before entering the Salt River. Lead the layout of large wood structures within the channel and off-channel features to promote scour and provide cover for fish.

Client: Humboldt County RCD **Completed:** Construction 2019

Nickerson Creek Aquatic Organism Passage Improvements (Jedediah Smith State Park, CA)

Principal engineer for design of two road-stream crossing replacements on Howland Hill Road in an ancient redwood grove to restore aquatic organism passage to pristine tributaries of Mill Creek. Conducted topographic and geomorphic surveys, developed stream simulation designs, worked with engineering geologist to address liquefaction potential at crossing, coordinated with State Parks for designating critical root zones for ancient redwoods, and developed final plans and specifications. Oversaw bidding and construction of project and conducted follow-up performance monitoring.

Client: PCFWWRA and CA State Parks **Completed:** Constructed 2015

Strawberry Creek Restoration Project (Orick, CA)

Principal engineer for restoration of lower Strawberry Creek on Redwood National Park and adjoining private ranch lands, restoring a slough channel that flows into the Redwood Creek estuary to improve drainage of agricultural fields, process delivered sediment from upstream, control invasive reed canary grass, and improve Coho Salmon access and habitat. Conducted a geomorphic assessment and developed a restoration plan for the entire lower channel. Conducted extensive topographic surveys and hydraulic analysis. Developed final engineering designs of wetland restoration components compatible with adjoining land-use and designed numerous large wood structures for fish habitat and grade control. Oversaw project construction.

Client: PCFWWRA and Redwood National Park **Completed:** Constructed 2014.

SELECT PUBLICATIONS

Lang, M. and M. Love. 2022. Fish Passage Engineering Project – Site Analysis Final Report. Caltrans Div. of Research Innovation & System Inc., 65A0711.

Nyberg, M., B. Draeger, B. Weekly, E. Cashman, and M. Love. 2016. Analysis of Vortex Pool-and-Chute Fishway. American Journal of Undergraduate Research. Vol. 13, Issue 37, pp 37-57.

Lang, M and M Love. 2014. Comparing Fish Passage Opportunity using Different Fish Passage Design Flow Criteria in Three West Coast Climate Zones. Prepared for the National Marine Fisheries Service. Contract No. AB-133F-12-SE-2021. 60 pages

Love, M and K Bates. 2009. Part XII: Fish Passage Design and Implementation. California Salmonid Stream Habitat Restoration Manual. Calif. Dept. of Fish and Game.

Llanos, A., M. Love, M. Furniss, S. Firor, K Moynan, J. Guntle, and J. Molinos. 2004. Modeling Fish Capabilities and Culvert Hydraulics for Assessment and Design of Road Crossings. Proceedings of 5th International Symposium on Ecohydraulics. Madrid, Spain.

Lang, M, M Love, and Bill Trush. 2004. Improving Stream Crossings for Fish Passage: Final Report. Humboldt State University. Prepared for the National Marine Fisheries Service. April 2004.

Clarkin, K, A Connor, M Furniss, B Gubernick, M Love, K Moynan, S Wilson Musser. 2003. National Inventory and Assessment Procedure – For Identifying Barriers to Aquatic Organism Passage. USFS San Dimas Tech. & Development Center. 72 pp.

Taylor, R and M Love. 2003. Part IX: Fish Passage Evaluation at Stream Crossings. CA Salmonid Stream Habitat Restoration Manual. CA Dept. Fish & Game.

Furniss, M, T. Ledwith, M. Love, B. McFadin, and S. Flanagan. 1998. Response of Road-Stream Crossings to Large Flood Events in Washington, Oregon, and Northern California. USDA Forest Service, San Dimas Technology & Development Center, 9877-1806, 18pp