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 ENGINEERING REGISTRATION
California Civil No. C71681

AREAS OF PRACTICE
- Aquatic Organism Passage
- River Engineering
- Dam Removal
- Fishways
- Stream Restoration
- Estuarine Restoration
- Wetland Enhancement
- Geomorphic Assessment
- Professional Resources Development

AFFILIATIONS
- Former Secretary/ Treasurer Bioengineering Section of American Fisheries Society
- California Salmonid Restoration Federation Committee Member
- California Fish Passage Forum Engineering Subcommittee
- California Trout

EXPERIENCE

Principal engineer involved in water resources engineering with emphasis in riverine and estuarine systems. Michael has been the owner and manager of Michael Love & Associates since 1999. He has extensive interdisciplinary experience in fisheries, and fluvial geomorphology, combined with an expertise in fish passage engineering, channel hydraulics, watershed hydrology. Michael has pioneered techniques that emphasize geomorphic-based approaches to solving watershed-based problems. He is responsible project management as well as detailed civil design including concept, drawings, specifications and construction services. He has authored state and Federal publications on fish passage design and assessment and reducing impacts of roads on the aquatic environment, and regularly serves as an instructor on these topics.

Bear Gulch Fish Passage and Protection Projects

Lead engineer for design of two new surface water intakes. Project included design of two cone-style intake screens and screenbay with sediment sluice, development of unique serpentine-style pool and weir fishway with automated gates for forebay control, establishment of in-stream flow monitoring strategies, and design of measuring weirs. Project involved close collaboration with NMFS engineer and biologist to ensure hydraulic conditions met Federal crteria.

Client: California Water Service Company
Completed: Ongoing, Station 3 Constructed 2013.

Fish Passage Design and Implementation (Part XII) and Fish Passage Inventory and Assessment (IX) of the CDFW Salmonid Stream Habitat Restoration Manual, CA

Primary author for two sections of the CDFW's fisheries restoration manual convering fish passage assessment and design. Part IX provides detailed survey and hydraulic methods to assess passage at stream crossings. Part XII provides engineering design procedures for crossing replacements, geomorphic channel design, nature-like fishways, weirs, baffles and a variety of techincal fishways. This document serves as the basis of the Fisheries Restoration Grants Program Regional General Permit with the USACE.

Client: California Department of Fish and Wildlife
Completed: 2003 (Part IX) and 2009 (Part XII)

Salmon Creek Estuary Restoration, Humboldt Bay National Wildlife Refuge

Developed a restoration plan and served as project engineers for implementation of a multi-phased estuary and stream restoration project for a Federal wildlife refuge. Lead the design of two muted tide gate structures, a mile of slough channels, saltmarsh restoration in diked and subsided lands, off-channel ponds for use by salmonids and marine aquatic species, and a water diversion structure used to wet-up waterfowl habitat while providing bi-directional fish passage.

Client/Landowner: US Fish & Wildlife Service and PCFWWRA
Completed: 2012.

Caspar Creek Fishways for Passage over Flow Measuring Weirs

Developed hydraulic designs and provided construction oversite for two pool and weir fishways within the Caspar Creek Experimental Forest to improve fish passage over existing flow measurement weirs without affecting their accuracy. Required close collaboration with NMFS and USFS to develop project specific design criteria. Projects included use of roughened riffles for downstream grade control, adjustable gates for flow bypasses, removable weirs for summer juvenile passage, and view ports to support fish passage monioring and research.

Clients: 5 Counties Salmonid Conservation, CalFire and USFS.
Completed: Constructed 2008-2009

USFS FishXing Fish Passage Software and Learning Systems

Lead developer for the widely used fish passage and culvert hydraulics software, available at fishxing.org. Co-author of the User Manual and chief editor for the collection of fish passage case studies available at the website. Mr. Love developed the fish locomotion and energetics modeling algorithms, which can be applied to a wide variety of species. He also assisted with compiling fish swim speeds that are included with the software and widely cited as the most comprehensive swim speed data base available.

Client: US Forest Service and Federal Highways Administration.
Completed: Ongoing project since 1997.

Alameda Creek Fishways

Served as the project 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 a vertical slot fishway with auxiliary water and lamprey ramps, a boulder roughened channel leading from the flood control channel to the fishway entrance, a juvenile out-migrant spillway, and a juvenile plunge-pool below the dam. Evaluated numerous operational scenarios to evaluate impacts to migrating steelhead. Currently evaluated downstream channel stability to determine potential future channel degradation and impacts to the fishway entrance.

Client: Alameda County Water District
Completed: Ongoing since 2011.

Steamboat Falls Fishway Alternatives Analysis and Concept Design, North Umpqua River Basin

Provided a fish passage evaluation of an existing 1950's era enclosed fishway over a bedrock waterfall and developed modifications to the fishway to improve fish passage for summer and winter steelhead and spring Chinook salmon. Additionally, developed conceptual design alternatives for a secondary fishway constructed of bedrock. Report provided a alternatives analysis and recommendations.

Client/Landowner: The North Umpqua Foundation, ODFW, and US Forest Service.
Completed: Final Report, February 2010.

Martin Slough Estuary Enhancement Project, Humboldt Bay

Project hydraulic engineer and hydrologist, developed conceptual designs to restore limited estuarine function to a diked and drained slough channel that crosses through a municipal golf course and cattle ranch. Project involves constructing off-channel marsh and pond habitats and increasing the tidal prism using a muted tide regulated with a series of two-way tide gates. Conducted tidal and water quality modeling and established stable slough channel dimensions based on empirical relationships.

Client/Landowner: Redwood Community Action Agency, City of Eureka, and CourseCo.
Completion: Preliminary Design Completed 2011. Final Design Ongoing.

SELECTED PUBLICATIONS

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

Bates, K and M Love. *In press*. **National Stream Crossing Retrofits for Aquatic Organism Passage**. USDA Forest Service, San Dimas Technology & Development Center.

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**. USFS San Dimas Technology & 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