

ERIC W. LARSEN
Associate Research Scientist
Department of Environmental Design
Landscape Architecture Program
University of California, Davis
Home: (530) 795-9596
Office: (530) 752-8336

EDUCATION

Ph.D. Civil Engineering, Environmental Water Resources Division. University of California, Berkeley, 1995. Dissertation Title: "Mechanics and Modeling of River Meander Migration."

M.S. Civil Engineering, Environmental Water Resources Division. University of California, Berkeley, 1986.

B.A. Engineering and Applied Physics, Harvard University, 1969.

CONSULTING

As a consulting technical advisor in fluvial geomorphology and hydraulic engineering, I have applied my expertise in quantitative fluvial geomorphology and river mechanics in coordination with numerous consulting firms, state and federal agencies, and non-profit groups. I have most recently focused on the interaction between geomorphic processes of natural channel development and how the fluvial geomorphic processes interact with processes of riparian habitat formation. My interdisciplinary training and experience in hydraulic engineering, fluvial geomorphology, and riparian habitat formation provide a basis for strong interdisciplinary work with teams.

I was recently appointed by the City of Winters City Council as a technical advisor (geomorphologist) to the Winters Putah Creek Committee advising on stream related issues (Appointment 2007-2010.) I was selected as a technical advisor to the Solano County Water Agency coordinating closely with Putah Creek stream keeper, Rich Marovich, to advise on ongoing restoration issues on Putah Creek. I was appointed by the Yolo County Board of Supervisors to be the advising geomorphologist to the Yolo County Board of Supervisors and Yolo County Department of Parks and Resources (Cache Creek Technical Advisory Committee: Appointment 2007-2009). I have recently served as a technical advisor and an expert witness for the National Audubon Society and the Center for Biological Diversity on matters related to Federal Energy Regulatory Commission dam re-licensing for selected Southern California streams. I have also recently provided technical advice and expert witness testimony in deposition for a flood dispute on San Antonio Creek, Ventura County, California.

RESEARCH INTERESTS

As a Research Scientist in the Environmental Design Department and Landscape Architecture Program at UC Davis, and formerly in the Geology Department, my primary focus has been to establish an interdisciplinary research program that addresses pressing issues in river management and restoration. I collaborated with colleagues and students from a wide range of disciplines. I have developed new techniques to analyze river channel bank erosion and river meander migration. The results have major

implications for river channel management, because they can help predict areas of riparian habitat formation. This type of interdisciplinary work is in great demand, yet has been only sparsely represented in the literature. My research not only adds to the existing body of knowledge regarding the relationship between bank erosion, channel migration, and habitat formation, but also advances the field by introducing new techniques for modeling changing (or regulated) river flows and their effects on habitat formation. I am in the process of expanding this work; my colleagues and I are developing a comprehensive model that integrates river flow rate, channel migration, and riparian vegetation recruitment and establishment.

TEACHING INTERESTS

- Continuum mechanics applied to the physical processes of fluvial geomorphology, bank erosion, meander migration dynamics, and sediment transport.
- Modeling physical processes of hydrology integrating engineering, geology, planning, and ecology, with emphasis on channel processes and riparian habitat formation.
- Quantitative fluvial geomorphology: inter-disciplinary curricula related to geology, hydrology, engineering, ecology, planning, and environmental restoration.
- Quantitative restoration design of river and wetland channels.

PUBLICATIONS

1. 2000 Kondolf, G.M., E.W. Larsen, and J.G. Williams. 2000. *Measuring and Modeling the Hydraulic Environment for Assessing Instream Flows*. North American Journal of Fisheries Management 20:1016-1028.
2. 2002 Larsen, E.W. and S.E. Greco. 2002. *Modeling Channel Management Impacts on River Migration: A Case Study of Woodson Bridge State Recreation Area, Sacramento River, California, USA*. Environmental Management 30(2):209-224.
3. 2003 Golet, G.H., D.L. Brown, E.E. Crone, G.R. Geupel, S.E. Greco, K.D. Holl, D.E. Jukkola, G.M. Kondolf, E.W. Larsen, F.K. Ligon, R.A. Luster, M.P. Marchetti, N. Nur, B.K. Orr, D.R. Peterson, M.E. Power, W.E. Rainey, M.D. Roberts, J.G. Silveira, S.L. Small, J.C. Vick, D.S. Wilson, and D.M. Wood. 2003. *Using Science to Evaluate Restoration Efforts and Ecosystem Health on the Sacramento River Project, California*. In P.M. Faber (editor). 2001 Riparian Habitat and Floodplains Conference Proceedings, Sacramento, CA. Riparian Habitat Joint Venture, 368-385.
4. 2004 Micheli, E.R., J.W. Kirchner, and E.W. Larsen. 2004. *Quantifying the Effect of Riparian Forest Verses Agricultural Vegetation on River Meander Migration Rates, Central Sacramento River, California, USA*. River Research and Applications, 20:537-548.
5. 2004 Rains, M.C., J.F. Mount, and E.W. Larsen. 2004. *Simulated Changes in Shallow Groundwater and Vegetation Distributions under Different Reservoir Operations Scenarios*. Ecological Applications, 14(1):192-207.
6. 2004 Rains, M.C., J.F. Mount, and E.W. Larsen. 2004. *Local Shallow Groundwater Drawdown and Baseflow Cessation Due to Regional Groundwater Pumping*. In R. Lowrance (editor). Riparian Ecosystems and Buffers: Multi-Scale Structure, Function, and Management. 2004 AWRA Summer Specialty Conference

- Proceedings, Olympic Valley, California. American Water Resources Association, Middleburg, Virginia, 1-6
7. 2006 Larsen, E.W., E.H. Girvetz and A.K. Fremier. 2006. *Assessing the Effects of Alternative Setback Channel Constraint Scenarios Employing a River Meander Migration Model*. Environmental Management, 37(6):880-897.
 8. 2006 Golet, G.H., M.D. Roberts, E.W. Larsen, R.A. Luster, R. Unger, G. Werner and G.G. White. 2006. *Assessing Societal Impacts when Planning Restoration of Large Alluvial Rivers: A Case Study of the Sacramento River Project, California*. Environmental Management, 37(6):862-879.
 9. 2006 Stubblefield, A.P., M.I. Escobar and E.W. Larsen. 2006. *Retention of Suspended Sediment and Phosphorus on a Freshwater Delta, South Lake Tahoe, California*. Wetlands Ecology and Management, 14:287-302.
 10. 2006 Larsen, E.W., A.K. Fremier and S.E. Greco. 2006. *Cumulative Effective Stream Power and Bank Erosion on the Sacramento River, California, USA*. Journal of American Water Resources Association, 42(4):1077-1097.
 11. 2006 Larsen, E.W., A.K. Fremier, and E.H. Girvetz. 2006. *Modeling the Effects of Variable Annual Flow on River Channel Meander Migration Patterns, Sacramento River, CA, USA*. Journal of American Water Resources Association, 42(4):1063-1075.
 12. 2006 Yarnell, S., J.F. Mount, E.W. Larsen. 2006. *The Influence of Relative Sediment Supply on Riverine Habitat Heterogeneity*. Geomorphology, 80:310-324.
 13. 2007 Larsen, E.W., E.H. Girvetz and A.K. Fremier. 2007. *Landscape Level Planning in Alluvial Riparian Floodplain Ecosystems: Using Geomorphic Modeling to Avoid Conflicts between Human Infrastructure and Habitat Conservation*. Landscape & Urban Planning, 79:338-346.
 14. 2007 Greco, S.E., A.K. Fremier, E.W. Larsen, and R.E. Plant. 2007. *A Tool for Tracking Floodplain Age Land Surface Patterns on a Large Meandering River with Applications for Ecological Planning and Restoration Design*. Landscape and Urban Planning, 81:354-373.
 15. 2008 Dixon, M.D., J.C. Stromberg, J. Price, H. Galbraith, A.K. Fremier, and E.W. Larsen. In press. *The Potential Effects of Climate Change on the Upper San Pedro Riparian Ecosystem: Boon or Bane? (Chapter 3)*. In: J. Stromberg and B. Tellman (Editors), *Riparian Area Conservation in a Semi-Arid Region: The San Pedro River Example*. University of Arizona Press.

Selected Limited Distribution

1. 1985 Larsen, E.W., Philip Williams and Associates. *Rush Creek Marsh Enhancement Plan*. Report prepared for Marin Co. Open Space 1-82
2. 1988 Shen, H.W. and E.W. Larsen. *Migration of the Mississippi River*. Report for the Waterways Experiment Station, U.S. Army Corps of Engineers, Vicksburge, Mississippi 1-121.
3. 1991 Larsen, E.W. *Parker Creek Plug Bed Mobility Analysis and Data, Mono County, California* 1-67.
4. 1991 Larsen, E.W. and others. *Parker Creek Plug Restoration Plan*. p.1-21 with appendices.
5. 1992 Larsen, E.W., Trihey & Associates. *Description and evaluation of Restoration Alternatives for Lower Lee Vining Creek, Mono County, California* 1-71.
6. 1992 Larsen, E.W. *Bed Surface and Subsurface Particle Size Characterization, Rush Creek, Mono County,*

California 1-188.

7. 1992 Larsen, E.W. *Bed Surface and Subsurface Particle Size Characterization. Lee Vining Creek, Mono County, California* 1-260.
8. 1992 Larsen, E.W. and others, Trihey & Associates. *Comparison of Historic and Existing Conditions on Lower Lee Vining Creek, Mono County, California* 1-86.
9. 1992 Larsen, E.W. *1992 Pilot Project Treatment for Lee Vining Creek, Mono County, California* 1-35.
10. 1992 Larsen, E.W. *Stability of Bar-Pool Pilot Projects, Lee Vining Creek, Mono County, California* 1-56.
11. 1992 Larsen, E.W., Trihey & Associates. *Overview of Representative 1992 Restoration Treatments, Lee Vining Creek, Mono County, California* 1-41.
12. 1993 Larsen, E.W., Trihey & Associates. *Summary Comparison of Pre-1941 and Post-1941 Conditions Affecting Fish Populations in Lower Rush Creek, Mono County, California* 1-114.
13. 1994 Larsen, E.W. *A Study of Pool Morphology in Pre-1941 Channel Segments of Lower Rush Creek, Mono County, California* 1-78.
14. 1999 Rutten, L.T., J.F. Mount, and E.W. Larsen. *Quantitative assessment of the response to changing sediment supply, North Fork, American River, California*. Technical Completion Report. Part of Water Resources Center Project UCAL-WRC-W-788.
15. 1999 Kondolf, M., T. Griggs, E.W. Larsen, S. McBain, M. Tompkins, J. Williams, and J. Vick. *Flow Regime Requirements for Habitat Restoration along the Sacramento River between Colusa and Red Bluff*. CALFED Bay-Delta Program. SAC/136472/JAN00/002.DOC.
16. 2002 Larsen, E.W., J. Fleckenstein, and E.G. McPherson. *Investigation into Hydrologic Modeling and the Effect of Urban Forests on Runoff Quantity and Quality*. United States Department of Agriculture. Forest Service. Pacific Southwest Research Station. Center for Urban Forest Research. Internal Report Hydro-1, DRAFT.
17. 1999 Magney D. , M. Rains, and E. Larsen. *Harrison Property Bank Stabilization Assessment on San Antonio Creek, Ojai Valley, California*. (PN 99-0081). Prepared for the U.S. Army Corps of Engineers, Ventura, California.
18. 2002 Larsen, E., E. Anderson, E. Avery, K. Dole. *The Controls on and evolution of channel morphology of the Sacramento River: A case study of River Miles 201-105*. Report to the Nature Conservancy. November 1, 2002.
19. 2004 Larsen E. W. and A. Fremier, 2004. *Identification of Riparian and Wetland Vegetation Dependent on Water Supplied by the Amador Canal and An Analysis of Dependence of Jackson Creek Flows on Flow in the Amador Canal*. Report prepared for the Law Offices of J. William Yeates, Attorney- at-Law.
20. 2004 Larsen E. W. *Meander Bend And Gravel Bar Migration Near River Mile 192.75 Of The Sacramento River*. 2004. Phase I report prepared for CALFED Ecosystem Restoration Program, Agreement #ERP-02-PO8-D, Amendment 2. Steering Committee Technical Memorandum.
21. 2005 Larsen E. W. *Future Meander Bend Migration and Floodplain Development Patterns near River Miles 241 To 235, Sacramento River*. 2005. Report prepared for River Partners, Technical Memorandum for CALFED Ecosystem Restoration Program, Agreement #ERP-02-P39.
22. 2005 Larsen E. W. *Meander Bend Migration Near River Mile 178 of the*

- Sacramento River*. 2005. Report prepared for River Partners, Technical Memorandum for CALFED Ecosystem Restoration Program, Agreement #ERP-02-P39.
23. 2005 Larsen E. W. *Future Meander Bend Migration And Floodplain Development Patterns Near River Miles 200 To 191 Of The Sacramento River*. 2005. Phase II report prepared for CALFED Ecosystem Restoration Program, Agreement #ERP-02-PO8-D, Amendment 2. Steering Committee Technical Memorandum.
24. 2004 Larsen, E.W. *Meander Bend Migration near River Mile 178 of the Sacramento River*. 2004. Report for river Partners, Chico, California.
25. 2005 Larsen, E.W. *Future Meander Bend Migration and Floodplain Development Patterns near River Mile 241 to 235, Sacramento River*. 2005. Report for River Partners, Chico, California.
26. 2005 Larsen, E.W. *Future Meander Bend Migration And Floodplain Development Patterns Near River Miles 200 To 191 Of The Sacramento River*. 2005. Phase III report prepared for CALFED Ecosystem Restoration Program, Agreement #ERP-02-PO8-D, Amendment 2. Steering Committee Technical Memorandum.
27. 2006 Winter, S.M. and E.W. Larsen. *Sediment Retention on a Deltaic Floodplain in Response to Climate and Land-Use Changes*. 2006. Report for the California Tahoe Conservancy.
28. 2006 Young, A, E.W. Larsen, E. Girvetz and A. Fremier. *Evaluating River Restoration Design Using a Meander Migration Model on the Trinity River, California*. 2006. Report for the Department of Water Resources.
29. 2006 Larsen, E.W. and M. Rains. *Meander Migration Model Assessment for The 50- And 100-Year Storms, Whitman Property, San Antonio Creek, Ventura County, California*. Coshow Environmental, INC.
30. 2006 Larsen, E.W. and M. Rains. *Meander Migration Model Assessment for the January 2005 Storm, Whitman Property, San Antonio Creek, Ventura County, California*. 2006. Coshow Environmental, INC.

SELECTED PROFESSIONAL EXPERIENCE

Selected Consulting

Associated Hydraulic Engineer and Hydrologist, Philip Williams & Associates. 1984-1987. Mechanics of river and marsh channel restoration design. Hydrology of urban watersheds.

Principal, RIO. 1987-Present.

Provided fluvial hydraulic engineering and quantitative fluvial geomorphology consultation services with an emphasis on the numerical modeling of river and marsh processes. Recent projects include the interaction of the channel and flow processes with riparian habitat development.

Consulting Engineer and Restoration Specialist, Trihey & Associates, Concord, CA. 1990-1995.

- Research scientist on interdisciplinary planning team.
- Hydraulic modeling to restore natural stream channels.
- Oversaw construction of restoration projects.
- Expert witness for court testimony and proceedings.
- Numerical analysis of sediment transport and channel stability.
- Hydraulic modeling for fisheries habitats.

Consulting Hydraulic Engineer and Restoration Specialist, ENTRIX, Inc., Walnut Creek, CA. 1992-2001. Hydraulic modeling of channel restoration and mitigation design, marsh restoration and mitigation design, flushing flow assessments.

National Audubon Society. 1994-present. Retained as science advisor on river and marsh channel restoration for Western Region (California, Nevada, Oregon, Washington).

Associated Hydraulic Engineer and Geomorphologist, Jones and Stokes & Associates. 1995-1996. Hydraulic engineering and numerical modeling of natural rivers related to environmental impacts of flow and sediment manipulation.

State of California, Attorney General's Office; California State Lands Commission. 1996-2000. Hydraulic engineer and expert witness on mechanics of sediment transport of mining debris and mechanics of river bar formation.

RESEARCH GRANTS – PRINCIPLE INVESTIGATOR

1. Title: Numerically Modeling Meander Migration: Upper Sacramento River
Agency: U.S. Fish and Wildlife Service
Amount: \$105,463
Dates: October 1, 1997 – June 30, 2000
Co-PI: None
2. Title: Geomorphic Assessment of Aquatic Habitat of the Foothill Yellow-legged Frog (*Rana Boylii*)
Agency: California Department of Parks and Recreation
Amount: \$6,563
Dates: October 30, 1997 – January 15, 1998
Co-PI: None
3. Title: Geomorphic Assessment of Aquatic Habitat of the Foothill Yellow-legged Frog (*Rana Boylii*)
Agency: California Department of Parks and Recreation
Amount: \$25,000
Dates: December 15, 1998 – October 1, 1999
Co-PI: None
4. Title: Provide Services in Connection with the California Tahoe Conservancy's Wildlife Habitat Enhancement and Stream Environment Zone Restoration
Agency: California Tahoe Conservancy
Amount: \$76,114
Dates: October 1, 1999 – October 31, 2001
Co-PI: None
5. Title: Geomorphic Assessment of Aquatic Habitat of the Foothill Yellow-legged Frog (*Rana Boylii*)
Agency: California Department of Parks and Recreation
Amount: \$27,000
Dates: December 15, 1999 – December 1, 2000
Co-PI: None
6. Title: Further Develop a Numerical River Migration Model and Apply the Model to Specified Altered Conditions on the Sacramento River: Offstream Storage Investigation
Agency: California Department of Water Resources
Amount: \$320,000
Dates: March 1, 2000 – June 30, 2002
Co-PI: None
7. Title: Preliminary Geomorphic Assessment of land use practices: Riparian prescribed burns
Agency: California Department of Parks and Recreation

- Amount: \$25,000
Dates: October 18, 2000 – February 1, 2001
Co-PI: None
8. Title: Preliminary Geomorphic Assessment of land use practices: Riparian prescribed burns
Agency: California Department of Parks and Recreation
Amount: \$5,000
Dates: February 1, 2001 – March 31, 2002
Co-PI: None
9. Title: Provide Services in Connection with the California Tahoe Conservancy's Wildlife Habitat Enhancement and Stream Environment Zone Restoration
Agency: California Tahoe Conservancy
Amount: \$30,000
Dates: June 30, 2001 – December 31, 2003
Co-PI: None
10. Title: Amendment – Investigation and Documentation of Meander bend cutoffs on the Sacramento River
Agency: Department of Water Resources
Amount: \$158,500
Dates: February 1, 2002 – January 31, 2003
Co-PI: None
11. Title: Crayfish Barrier Flume Study: Phase 1 – Initial Design and Materials Assessment
Agency: California Department of Parks and Recreation
Amount: \$21,790
Dates: April 1, 2002 – June 30, 2003
Co-PI: Lev Kavvas, Civil and Environmental Engineering
12. Title: Meander Migration Simulation of the Sacramento River, River Miles 185-201
Agency: The Nature Conservancy
Amount: \$42,500
Dates: May 3, 2002 – October 31, 2002
Co-PI: None
13. Title: Sediment Transport Process in the South and Middle Yuba River Basins
Agency: U.S. Geological Survey
Amount: \$168,700
Dates: July 1, 2002 – May 30, 2004
Co-PI: None
14. Title: Geomorphic Model for Demonstration and Feasibility Assessment of Setback Levees: Bay-Delta River Systems
Agency: CALFED Bay-Delta Program
Amount: \$104,458
Dates: October 2002 – June 2004
Co-PI: None
15. Title: Provide Services in Connection with the California Tahoe Conservancy's Wildlife Habitat Enhancement and Stream Environment Zone Restoration
Agency: California Tahoe Conservancy
Amount: \$125,000
Dates: 2002 - 2003
Co-PI: None

16. Title: Trinity River Restoration Project
Agency: Department of Water Resources, Division of Planning
Amount: \$218,694
Dates: July 2004 – December 2005
Co-PI: None
17. Title: Upper Truckee River Investigation
Agency: California Tahoe Conservancy
Amount: \$30,000
Dates: September 2004 – December 2004
Co-PI: None
18. Title: Sediment Supply South Yuba River Investigation
Agency: U.S. Geological Survey
Amount: \$61,185.35
Dates: July 2001- December 2004
Co-PI: None
19. Title: Analysis of Sediment Retention on the Upper Truckee River and Trout Creek Floodplain
Agency: California Tahoe Conservancy
Amount: \$60,000
Dates: October 2005 – December 2006
Co-PI: None
20. Title: Lower Putah Creek Coordinating Committee – Stewardship Facilitation
Agency: Solano County Water Agency
Amount: \$30,000
Dates: October 2006 – September 2007
Co-PI: None
21. Title: Investigation of Channel Dynamics on the Upper Truckee River
Agency: California Tahoe Conservancy
Amount: \$60,039
Dates: August 2006 – July 2008
Co-PI: None
22. Title: Sacramento River Monitoring and Assessment Project
Agency: California Department of Fish and Game
Amount: \$300,278
Dates: April 2007 – June 2009
Co-PI: None

SELECTED PROFESSIONAL AND PUBLIC SERVICE 2005-2007

Science advisor: California Tahoe Conservancy; geomorphic reviewer of projects and proposals for the Lake Tahoe Basin.

Science advisor: Water Research Institute of Blue Hill, Maine.

Board of Directors: Water Research Institute of Blue Hill, Maine.

Technical advisor (geomorphologist): Winters Putah Creek Committee: (Appointed by City of Winters City Council: Appointment 2007-2010.)

Technical advisor: Solano County Water Agency in coordination with stream keeper, Rich Marovich.

Technical advisor (geomorphologist): Yolo County Board of Supervisors and Yolo County Department of Parks and Resources. (Appointed by Yolo County Board of Supervisors: Appointment 2007-2009).

Science advisor on CALFED Steering Committee to Address Sedimentation Issues at the M&T/Llano Seco Pumping Plant and Fish Screen Facility

Technical Advisory Committee; CALFED/River Partners; Floodplain Restoration Feasibility Study La BARRANCA Unit Sacramento River National Wildlife Refuge Cooperative Agreement (#11620-00-J331)

Technical Advisory Committee; CALFED/US Fish and Wildlife Service/River Partners: Riparian restoration planning and feasibility study for the Riparian Sanctuary, Llano Seco Unit, Sacramento River National Wildlife Refuge.

Technical Science Advisor: Sacramento River Ecological Flows Study: The Nature Conservancy (TNC)/California Bay-Delta Authority's Ecosystem Restoration Program (CALFED grant ERP-02D0P61)

Technical Advisory Committee; National Park Service Muir Woods.

Technical Advisory Committee; Golden Gate National Recreation Area National Park Service Redwood Creek

Program trainer: U.S. Army Corps of Engineers Annual Watershed Training Program; Hydrologic Engineering Center, Davis, Ca.

Technical Advisory Committee; California Department of Water Resources: Sacramento River North of Delta Off-stream Storage Investigation

Collaboration with Professor Futoshi Nakamura at the University of Hokkaido, Japan.

Technical Science Advisor and Expert Witness: National Audubon Society and San Bernadino Audubon: Southern California Edison Mill Creek FERC relicensing.

Expert Witness: Center for Biological Diversity.

Technical advisory committee/expert witness: Natural Heritage Institute, San Francisco, Ca.

Expert Witness and technical advisor: Old Creek Ranch Flood Damage 2005 - Magney Environmental.