

William J. Trush, PhD

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BACKGROUND

William Trush has been senior ecologist for McBain & Trush, Inc., an environmental consulting firm in Arcata since 1995. As an adjunct professor to the Humboldt State University Fisheries Department, he has taught courses in stream ecology, river restoration, and coastal stream management since 1990. He specializes in integrating fluvial and ecological processes in river ecosystems: particularly floodplain/riparian dynamics, aquatic vertebrate and invertebrate life history requirements, the snowmelt hydrograph, and channelbed dynamics. McBain & Trush helped develop maintenance flow recommendations for the Trinity River and has formulated guidelines prescribing annual flow releases in regulated rivers for the USFS. Dr. Trush was on the Scientific Review Team (1999) for NMFS and the CA Resources Agency evaluating current California Forest Practice Rules with respect to anadromous salmonids in northern California, and has testified for the North Coast Regional Water Quality Control Board on establishing water quality standards related to cumulative watershed impacts. He is one of two scientists directing a stream restoration plan approved by SWRCB for Los Angeles Department of Water and Power on two tributaries to Mono Lake. This plan has focused on recovering shallow groundwater processes in floodplains and side-channels to restore cottonwood forests along Rush Creek. Dr. Trush is working on a steelhead restoration plan for Alameda Creek and developing instream flows for the Shasta River that will restore salmon habitat and facilitate red willow re-colonization. He has co-instructed with Dr. Luna Leopold and Scott McBain a 3-day course on river channels at the Teton Science School in Wyoming from 1990 up to Luna's death in 2006. In 2009-2010, he served on the United Water Conservation District VFDD Fish Passage Panel to identify stream passage flows for successful adult steelhead migration in the Santa Clara River Basin. Dr. Trush recently completed a geomorphic/ecological study funded by the SWRCB on the role of the snowmelt hydrograph in maintaining healthy river ecosystems in steep bedrock dominated rivers of the Sierra Nevada.

EDUCATION

- ◆ **Doctor of Philosophy (1991), Wildland Resource Science**
Department of Forestry and Natural Resources, University of California, Berkeley
Dissertation Title: *The Influence of Channel Morphology on Spawning Steelhead Trout in South Fork Eel River Tributaries.*

- ◆ **Master of Science (1979), Zoology,**
Center for Environmental Studies, Virginia Polytechnic Institute and State University,
Blacksburg, VA
Thesis Title: *The Effects of Area and Surface Complexity on the Structure and Formation of Stream Benthic Communities.*

- ◆ **Bachelor of Science (1974), Zoology**
Pennsylvania State University, University Park, PA

EXPERIENCE

- ◆ **Senior Ecologist and CEO (1995-present), McBain and Trush, Inc.**
 - Mono Lake Restoration, Los Angeles Department of Water and Power (1993-present). Served as a

court-appointed member to the Mono Lake Restoration Technical Committee to advise restoration strategies and biological sampling programs for several tributaries entering Mono Lake (1993-1995). Presently serving as a senior scientist for Los Angeles Department of Water and Power directing the stream restoration and monitoring with another senior scientist.

- Mad River Gravel Mining Assessment, Humboldt County (1992-present). Conducted geomorphic and anadromous fish habitat evaluation of instream gravel mining on the Mad River, Humboldt County. Presently serving on the Scientific Design and Restoration Committee.
- Trinity River Maintenance Flow Study, Hoopa Valley Tribe (1991-1997). Developed flow and sediment management recommendations downstream of Trinity and Lewiston dams to rehabilitate channel morphology and reverse negative impacts caused by the dams. Applies the approach of restoring a scaled-down dynamic alluvial river as a foundation for salmon recovery to be used as the long-term solution for dams coexisting with healthy salmon populations.
- Trinity River Scientific Framework Process, Trinity River Restoration Program (2001-present). After signing of the ROD and prior to staffing the new Restoration Program, assisted the Program during the interim period to continue improving the scientific components of the program. Organized and led two workshops. First workshop (June 2001) gathered agency, tribal, and stakeholder technical participants to refine scientific uncertainties in order to prioritize FY 2002 funding for the Restoration Program. Then assembled the results of the workshop, developed the draft FY 2002 budget (\$11 million), and presented budget to the agency and tribal managers for review and approval. Second workshop (February 2002) gathered outside and internal scientists to review primary uncertainties and begin developing an overall Sampling and Monitoring Strategy for the Restoration Program. Currently participating as a member of the planning team for conducting the Scientific Framework Process, which will result in completing the Sampling and Monitoring Strategy.
- Klamath River Expert Testimony for Klamath River Settlement, Northcoast Environmental Center (2007-present). Participated as part of the Klamath Independent Review Process to conduct analysis of models and assumptions used to develop management scenarios in the Klamath River Settlement to determine how well Klamath River flows anticipated under both interim and long-term conditions are likely to support restoration of sustainable fisheries for Chinook salmon and other native fishes. Analyses include hydrograph analysis, future flow predictions, physical habitat availability, fluvial geomorphology and channel condition, water temperature and other water quality parameters, and impacts of fish diseases on current and future Chinook populations.
- Clackamas River FERC Relicensing Project, Portland General Electric (2001-2006). Conducted fluvial geomorphology, hydrology, and fish habitat evaluations to help develop instream flow and coarse sediment management strategies as part of the FERC relicensing process on the Clackamas River and Oak Grove Fork of the Clackamas River. Collected and analyzed field data, integrated for applicability in management strategies, and assisted collaborative relicensing group (agencies, NGO's, stakeholders) with technical components of relicensing effort.
- Member of Science Panel for recommending changes to the California Forest Practice Rules as part of a Memorandum of Understanding between California Resources Agency and NMFS (1998-1999).
- Member of United Water Conservation District VFDD Fish Passage Panel to identify stream passage flows for successful adult steelhead migration in the Santa Clara River Basin (2009-2010).

◆ **Director (1991-1995), Humboldt State University Institute for River Ecosystems**

The Institute mission is to further our understanding, preservation, and management of river ecosystems. My duties include fiscal management, proposal development, and research. The River Institute managed the following projects:

- 1) Development of a new assessment procedure and handbook for designing culvert systems on logging roads.
- 2) Evaluation of geomorphic indices for detecting cumulative impacts to northern California streams.
- 3) Maintenance flow recommendation procedures for a Sierra Nevada river.
- 4) Facilitate review of a proposed USFS maintenance flow methodology.
- 5) Effects of suspended sediment on stream ecology.

Research projects (with Dr. Terry Roelofs as co-principal investigator) with the Fisheries Department of Humboldt State University included:

- 1) Assessment of Benbow Dam effects on anadromous fish populations in the South Fork Eel River.
- 2) Limnological and fisheries investigation of Stone Lagoon, CA.
- 3) Cutthroat trout restoration program for McDonald Creek, Humboldt County, CA (for the Department of Parks and Recreation).
- 4) Salmon fisheries investigation for the lower Smith River, CA.

TEACHING EXPERIENCE

◆ **Adjunct Professor (1989-present), Fisheries Dept., Humboldt State University, Arcata, CA**

Instructor for the following courses: Coastal Stream Management, Technical Writing for Fisheries, Restoration of Aquatic Ecosystems, Watershed Dynamics and Restoration, Conflict Resolution in Natural Resources Management, Marsh Ecology, Stream Ecology, Graduate Fisheries Seminar, and Fisheries Techniques.

◆ **Instructor (1990-2005), Teton Science School, Kelly, WY**

Co-instructor for a three day workshop on fluvial processes and stream restoration with Dr. Luna Leopold.

◆ **Instructor (1987-1988), Landscape Architecture Dept., University of California Berkeley**

Instructor for: Hydrology for Environmental Planners and Ecological Analysis.

REFERENCES

- ◆ **Dr. Terry Roelofs, HSU Fisheries Department**
- ◆ **Dr. Andre Lehre, HSU Geology Department**
- ◆ **Dr. Robert Gearheart, HSU Department of Environmental Resources Engineering**

PUBLICATIONS

Bates, K.K. et al. 2010. Vern Freeman Dam Fish Passage Conceptual Design Report. Prepared for the United Water Conservation District. September 15, 2010.

McBain and Trush, Inc. 2007. Pulse Flow Guidelines: Managing the Annual Snowmelt Hydrograph and Winter Floods in Regulated Boulder-Bedrock Sierra Nevada Rivers. California Energy Commission, PEIR Energy-Related Environmental Research.

- McBain and Trush, Inc. 2007. Draft Tuolumne River Flow Evaluation from O'Shaughnessy Dam to Early Intake. Proposed Study Plan and Methods. Prepared for San Francisco Public Utilities Commission, USFWS, and Yosemite National Park. 15 p. July 12, 2007.
- McBain and Trush, Inc. 2000. Allocating Streamflows to Protect and Recover Threatened Salmon and Steelhead Populations in the Russian River and other North Coast Rivers of California. Prepared for Trout Unlimited. 38 p. plus appendices. July 27, 2000.
- Trush, W.J., McBain, S.M., and L.B. Leopold. 2000. Attributes of an alluvial river and their relation to water policy and management. *Proceedings of the National Academy of Science* 97: 11858-11863.
- Ligon, F., Rich, A., Rynearson, G., Thornburgh, and W. Trush. 1999. *Report of the Scientific Review Panel on California Forest Practice Rules and Salmonid Habitat*. Prepared for: The Resources Agency of California and the National Marine Fisheries Service, June 1999. 92 p. with appendices
- McBain, S. and W. Trush. 1997. *Trinity River Maintenance Flow Report*. Prepared for: Hoopa Valley Tribe, Fisheries Department, P.O. Box 417, Hoopa, CA 95546, November 1997. 316 p.
- McBain, S. and W. J. Trush. 1996. Thresholds for managing regulated river ecosystems. *Proceedings of the Sixth Biennial Watershed Management Conference*, University of California Water Resources Center Report No. 92, pp.11-13, April 1997.
- Ridenhour, R.L., Hunter, C., and W.J. Trush. 1995. *Mono Basin Stream Restoration Work Plan*, prepared for Los Angeles Department of Water and Power, October 4, 1995. 228 p.
- Trush, W.J., Franklin, R., and S. McBain. 1995. Assessing downstream variation of fluvial processes for recommending maintenance flows in regulated rivers. pp. 122-131, in Cassidy, J.J.(ed.), *Waterpower'95 Volume 1, Proceedings of the International Conference on Hydropower*, American Society of Civil Engineering, San Francisco, CA
- McBain, S. and W.J. Trush. 1995. Channel bed mobility and scour on a regulated, gravel-bed river. pp. 1941-1950, in Cassidy, J.J. (ed.), *Waterpower'95 Volume 3, Proceedings of the International Conference on Hydropower*, American Society of Civil Engineering, San Francisco, CA
- Ligon, F.K., Dietrich, W.E., and W.J. Trush. 1995. Downstream ecological effects of dams: A geomorphic perspective. *BioScience* 45(3):183-192.
- McBain, S. and W.J. Trush. 1995. *River Channel Morphological and Sediment Changes in the Klamath Basin, Oregon and California*, prepared for the Technical Working Group, Klamath Fisheries Task Force, May 1995. 13 p. and appendices
- Trush, W.J. and S. McBain. 1995. Preliminary channel maintenance flow recommendations for the mainstem Trinity River below Lewiston Dam. pp. 8-13, in Ridenhour, R.L. (ed.) *Proceedings of the Trinity River Restoration Colloquium*, Humboldt Chapter of the American Fisheries Society, funded by the U.S. Bureau of Reclamation, 36 p.
- Trush, W.J. 1994. *A Review of the Mt. Hood National Forest Fish Habitat Restoration Program for Mt. Hood National Forest*, USFS, October 15, 1994.
- McBain, S., W. Trush, and W. Smith. 1994. *Developing a Maintenance Flow Methodology: A Sample*

Plan for Steep Bedrock-Controlled Sierra Rivers. Humboldt State University Institute for River Ecosystems, IRE-08-94-01, 95 p.

Trush, W.J. 1994. Should the primary goal for anadromous salmonid restoration in the Klamath Basin be geomorphic? pp.38-42, in Hassler, T.J. (ed.) *Klamath Basin Fisheries Symposium, Proceedings of a symposium held in Eureka, California, 23-24 March 1994*, California Cooperative Fishery Research Unit, 237 p.

Trush, W.J. 1994. Understanding riparian dynamics: A management imperative. pp. 7-8, in *Inter-disciplinarian Perspectives of Riparian Ecosystems*, Humboldt State University, Arcata, CA. September 24, 1994.

Ligon, F., Dietrich, W.E., Power, M., and W.J. Trush. 1993. *Variable Ecological Responses of Large Rivers to Dams*. Presented at the Ecological Society of America Annual Meeting, Symposium for Ecological Approaches to the Study of Large Rivers, University of Wisconsin, Madison, August, 1993.