



William A. Harman III, P.G.

Principal Fluvial Geomorphologist

Biographical sketch

Mr. Harman is the founder and principal of Stream Mechanics, a small company dedicated to advancing the science and application of stream restoration. Through the course of his 34-year career, he has participated in hundreds of stream restoration projects, representing a wide variety of settings and techniques. He has authored or co-authored numerous peer-reviewed journal articles, proceeding papers, assessment/design manuals, and technical guidance documents. He has developed bankfull regional curves and reference reach data sets in many regions throughout the United States.

Through partnerships with the U.S. Fish and Wildlife Service and Environmental Protection Agency, Mr. Harman was the principal investigator for the development of numerous tools and guidance documents that are used by practitioners throughout the United States. Examples include a Natural Channel Design Review Checklist, Stream Functions Pyramid Framework, and the Stream Quantification Tool. Mr. Harman teaches stream restoration workshops to federal, state, and local agencies, universities, and private engineering/consulting firms. He is a frequent invited speaker during plenary sessions of national stream restoration conferences.

Mr. Harman is also a co-founder and Senior Fluvial Geomorphologist of Ecosystem Planning and Restoration (EPR) where he provides staff training on in-stream assessment and design. He participates in stream restoration projects by providing function-based stream assessments, natural channel design support, quality assurance, construction observation, and other services.

Prior to forming Stream Mechanics and EPR, he was Vice President of Ecosystem Restoration with Michael Baker Corporation. Mr. Harman was a founder of Buck Engineering and River Works, which specialized in ecosystem restoration design and construction, respectively. Prior to starting these two companies, Mr. Harman was on the faculty at NC State University, where he co-founded and led the NC Stream Restoration Institute (now the NC Stream Restoration Program). Mr. Harman's combination of academic and private-sector experience provide a unique skill set for teaching stream restoration principles and applications.

Contact

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Licenses

Professional Geologist
✓ License number 1844
North Carolina, 2002

Education

M.A., 1996, Geography and Earth Science, University of North Carolina at Charlotte

B.S., 1991, Geography, Appalachian State University



Work Experience

- Principal, Stream Mechanics, 2010 to present
- Principal, Ecosystem Planning and Restoration, 2012 to present
- Vice President and Ecosystem Restoration Technical Services Manager, Michael Baker Engineering, Inc., 2006-2010
- Principal and Founder of Buck Engineering, 2000-2006
- Founder and Chairman of the Board of River Works, 2005-2006
- Extension Associate, NC Cooperative Extension Service, 1996-2000
- Natural Resources Extension Agent, NC Cooperative Extension Service, 1991-1996

Select Projects

- Data Collection and Analysis to Support Further Development of Select MiSQT Reference Curves – Mr. Harman worked with the Water Resources Division of the Department of Environment, Great Lakes, and Energy (EGLE) to collect reference reach data for the purposes of refining bankfull regional curves and SQT reference curves. The work included data collection, data analysis, and a written report recommending changes to SQT reference curves.
- Stream Assessment and Restoration Workshops – Mr. Harman provides workshops to government agencies, non-profit organizations, and private consultants. The workshop titles include: Natural Channel Design Review Checklist, Stream Functions Pyramid Framework and Quantification Tool, Assessing and Restoring Headwater Mountain Streams, Stream Quantification Tool Field Camp, and Project Demonstration Workshops. More information about the workshop is available at www.stream-mechanics.com/workshops.
- Various Projects with the U.S. Bureau of Land Management (BLM), Alaska Regional Office – Mr. Harman has worked with the BLM since 2012 to develop a stream assessment and design program to improve stream reclamation techniques and evaluation associated with placer mining. Specific projects have included numerous workshops on the Stream Functions Pyramid Framework and Project Demonstration Projects. Four demonstration projects have been designed and constructed to show miners better techniques for reclamation. These projects are monitored and the lessons learned are incorporated into new workshops. A regional curve and reference reach data set have been developed and a report provided to share the results. A Natural Channel Design manual was developed for stream reclamation in the Alaska Interior. Finally, research was completed on characterizing the geomorphology of beaded streams along the Arctic Coastal Plain. Results were used to regionalize an Arctic Coastal Plain Stream Quantification Tool.
- Function-Based Stream Assessment of Friday and Eureka Creeks in Denali National Park. Mr. Harman worked with the National Park Service to perform a function-based assessment of two watersheds in Denali National Park that have historic damage from placer mining. Stream Mechanics is teaching park staff (geologists, biologists, and

hydrologists) how to perform the assessments, analyze the data, and then determine the restoration potential for the two watersheds.

- On-call Contract with the U.S. Environmental Protection Agency. Mr. Harman serves as a program coordinator for this contract. Projects have included regionalizing the Stream Quantification Tool in Wyoming, Colorado, Minnesota, Alaska, and Wisconsin. Mr. Harman provided technical support, data collection, data analysis, steering and technical team facilitation, and training. Mr. Harman also led the development of a document that provides a framework for applying a unit of measure to stream assessment output to inform stream mitigation debit and credit determination methods. Other tasks under this contract have included stream mitigation standard operating procedure evaluations for various U.S. Army Corps of Engineers districts.
- The Policy and Practice of Stream Mitigation: A Handbook for States, Tribes, and Local Governments – Mr. Harman worked as a sub-consultant to the Environmental Law Institute on a National Wetland Program Development Grant funded by the U.S. Environmental Protection Agency. The goal of this project was to support the development and refinement of science-based stream mitigation programs. To reach this goal the project assessed stream mitigation practice, policy, and science—yielding six outputs: (1) a white paper summarizing an assessment of stream mitigation policy; (2) a white paper summarizing an assessment of stream mitigation practice; (3) a white paper summarizing an assessment of stream mitigation science; (4) a white paper summarizing an analysis of stream mitigation policy and practice; (5) a handbook on stream mitigation for states, tribes, and local governments; and (6) an outreach article, webinar, and presentation.
- Natural Channel Design Review Checklist – Mr. Harman co-developed a natural channel design review checklist with Richard Starr, U.S. Fish and Wildlife Service (Rich now works for EPA). The development of the checklist and corresponding workshop was funded by the U.S. Environmental Protection Agency. The checklist is available on EPA’s web page and is intended for regulators and agency staff who review natural channel designs. Workshops have been provided for EPA, the U.S. Army Corp of Engineers, state 401 staff, U.S. Fish and Wildlife Service, U.S. Forest Service, other state and federal agencies, and private consultants.
- Stream Functions Pyramid: A Framework for Assessing Stream Functions – Mr. Harman developed a Stream Functions Pyramid concept and co-developed a framework to assist practitioners and regulators with developing stream assessments and restoration projects that focus on improving stream functions. A workshop and document was prepared for the U.S. Environmental Protection Agency with support from the U.S. Fish and Wildlife Service.
- Program Support for the San Antonio River Authority (SARA) – Mr. Harman was a sub-contractor to Michael Baker Corporation to provide program support services. These services include overall assistance with developing SARA’s stream restoration program, and technical assistance with regional curve development, preparation of a natural channel design standard operating procedure (SOP), a demonstration project, mitigation

banking, and watershed assessments. In addition, Mr. Harman provided a variety of workshops, including: 1. Introduction to stream restoration and geomorphic assessment workshop, and 2. Introduction to stream restoration design. These workshops were offered to SARA staff, City and County staff, and private consultants. Mr. Harman also provided a 3-part workshop series to assist local practitioners in applying SARA's SOP.

- Monitoring Two Dam Removal Projects in the Boardman River Watershed for the Grand Traverse Band of Ottawa and Chippewa Indians, Traverse City, Michigan. Mr. Harman monitored the hydraulic and geomorphological change in the Boardman River after two large dams were removed. The dams were over 40 feet tall and used to provide hydroelectric power for decades. The dams were removed due to age and disuse of the power plants. Monitoring includes river profiles, cross sections, bed material sampling, vegetation assessments, large wood assessments and more. The purpose is to show how the functional capacity of the river changes as it evolves from a lake back into a river.

Publications (Select Examples)

Clinton, D.R., G.D. Jennings, W.A. Harman, J.M. Patterson, L.O. Slate, and J. Williams. 1999. NC reference stream channel morphology relationships. In: Olson, D.S., and J.P. Potyondy (Eds). Wildland Hydrology, Proc. AWRA Conf., Bozeman, MT. pp. 393-400.

Harman, W. 2024. Data Collection and Analysis to Support Further Development of Select MiSQT Reference Curves. Water Resources Division of the Department of Environment, Great Lakes, and Energy, Lansing, MI.

Harman, W., M. Varner, E. Lamb, and D McLeod. 2023. Stream Design and Reclamation Guide for Interior Alaska. Bureau of Land Management. BLM Technical Report 65.

Harman W, James A, Nadeau T-L, Topping B, Kondratieff M, Boyd K, Athanasakes G, Wheaton J. 2021. Stream Mitigation Accounting Metrics: Exploring the Use of Linear-based, Area-based, and Volume Units of Measure to Calculate Impacts and Offsets to Different Stream Archetypes. U.S. Environmental Protection Agency, Washington D.C., EPA 840-R-21-003

Harman, Will. 2018. Application of Natural Channel Design Techniques in Sub-Arctic Alaska. U.S. Department of Interior, Bureau of Land Management, Anchorage, Alaska.

Harman, W.A., K.L. Tweedy, W.S. Hunt, J. Calmbacher, T. Norton, K. Van Stell, C.H. Kaiser, G.C. Villarreal, A. L. Bush. 2015. Natural Channel Design Protocol, v2. San Antonio River Authority, San Antonio, TX.

Harman, W., R. Starr, M. Carter, K. Tweedy, M. Clemmons, K. Suggs, C. Miller. 2012. A Function-Based Framework for Stream Assessment and Restoration Projects. US Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds, Washington, DC. EPA 843-K-12-006.

Harman, W., R. Starr. 2011. Natural Channel Design Review Checklist. US Fish and Wildlife Service, Chesapeake Bay Field Office, Annapolis, MD and US Environmental Protection

Agency, Office of Wetlands, Oceans, and Watersheds, Wetlands Division. Washington, DC. EPA-B-12-005.

Harman, W.A., D.E. Wise, M.A. Walker, R. Morris, M.A. Cantrell, M. Clemmons, G.D. Jennings, D. Clinton, and J. Patterson. 2000. Bankfull Regional Curves for North Carolina Mountain Streams. In: Kane, Douglas (Ed.) Proc. Water Resources in Extreme Environments, AWRA Specialty Conference, Anchorage, Alaska. May 1-3, 2000. Pp. 185-190.

Harman, W.A., and G.D. Jennings. 1999. Case studies of stream restoration projects in North Carolina. In: Proc. Nat. Nonpoint Source Monitoring Wkshp., Morro Bay, CA. p. 24.

Harman, W.A., G.D. Jennings, J.M. Patterson, D.R. Clinton, L.O. Slate, A.G. Jessup, J.R. Everhart, and R.E. Smith. 1999. Bankfull hydraulic geometry relationships for NC streams. In: Olson, D.S., and J.P. Potyondy (Eds). Wildland Hydrology, Proc. AWRA Conf., Bozeman, MT. pp. 401-408.

Harman, W.A., and G.D. Jennings. 1998. Natural stream processes. River Course Fact Sheet # 1. NCCES, Raleigh, NC. AG-590-1. 4 pp.

Harman, W.A., and G.D. Jennings. 1998. Application of the Rosgen stream classification system in North Carolina. River Course Fact Sheet # 2. NCCES, Raleigh, NC. AG-590-2. 8 pp.

Harman, W.A. 2000. Finding Bankfull Stage in North Carolina Streams. River Course Fact Sheet # 3. NCCES, Raleigh, NC. AG-590-3. 4 pp.

McCandless, Tamara L., Richard R. Starr, and William A. Harman, 2015. Bankfull Regional Curves for the Alleghany Plateau/Valley and Ridge, Piedmont, and Coastal Plain Regions of Maryland. *Journal of the American Water Resources Association (JAWRA)* 1-13. DOI: 10.1111/1752-1688.12332

Metcalf, C.K., S.D. Wilkerson, and W.A. Harman. 2009. Bankfull Regional Curves for North and Northwest Florida Streams. *Journal of the American Water Resources Association (JAWRA)* 45(5):1260-1272. DOI: 10.1111/j.1752-1688.2009.00364.x.