

## **David S. Biedenharn**

Research Hydraulic Engineer

U.S. Army Corps of Engineers, Engineer Research Development Center, Vicksburg MS

dbiedenharn@tulane.edu

601-529-4685

School of Science & Engineering

## **Education**

BS, 1978 Wood Science, Mississippi State University

BS, 1979, Civil Engineering, Louisiana Tech University

MS, 1983, Civil Engineering, Colorado State University

PhD, 1995, Civil Engineering, Colorado State University

## **Biography**

Dr. Biedenharn is a professional engineer with over forty years of experience in hydraulics, river engineering, sedimentation, channel restoration, and fluvial geomorphology. He is presently a Research Hydraulic Engineer with the USACE Engineer Research Development Center (ERDC).

His work experience includes the planning and hydraulic design of flood control and navigation channels, levees, bank stabilization measures, grade control structures, channel restoration projects, as well as numerous geomorphology and regional sediment management investigations. While at Corps' Mississippi Valley Division office, he conducted river engineering and geomorphic studies on the Mississippi River and its tributaries, and served as Channel Improvement Coordinator for the Mississippi River Channel Improvement Project, a comprehensive water resources project with an annual budget of over \$100,000,000.

Dr. Biedenharn has served as the Principal Investigator on numerous Corps research efforts involving the development of design guidance and tools for grade control and streambank stabilization structures, regional sediment management, and channel restoration geomorphic assessments. He was the Corps' lead for the development of the Sediment Impact Analysis Method (SIAM) model, which is a rapid assessment and design tool that allows the user to incorporate sediment continuity into the channel design process. He is currently leading the development of an innovative new geomorphic model that will have the ability to capture long-term morphologic trends in a probabilistic manner.

Dr. Biedenharn has developed and taught numerous workshops, seminars and Corps training courses on streambank erosion, and stabilization, channel restoration, river engineering, geomorphology and regional sediment management. In Dr. Biedenharn's current position he is leading a team of young and mid-career engineers and scientists

within the Corps on numerous research projects related to river engineering channel restoration, regional sediment management, geomorphology, and channel stabilization.

## Experience

U.S. Air Force 1969-1973.

USACE, Vicksburg District 1979 -1989.

USACE, Lower Mississippi Valley Division 1989 - 1996.

USACE, ERDC 1996 – 2007 (retired from federal service).

Biedenharn Group, LLC 2007 – 2015

USACE, ERDC 2015 – present

## Selected Publications

Dr. Biedenharn has authored more than 100 professional publications in peer reviewed journals, conference proceedings, handbooks, manuals, textbooks and chapters in books. Selected publications are listed below.

Biedenharn, D.S., Killgore, K.J., Little, C.D. Jr., Murphy, C.E. and Kleiss, B.A. 2018. Attributes of the Lower Mississippi River Batture. MRG&P Tech Note No. 4. U.S. Army Corps of Engineers, Vicksburg, MS. 14 p.  
<http://dx.doi.org/10.21079/11681/26582>

Biedenharn, D.S., C.D. Little, J.B. Dunbar, and R.A. Gaines, 2018, "The Influence of Geology on the Morphologic Response of the Lower Mississippi River," MRG&P Tech Note No. 17. U.S. Army Corps of Engineers, Vicksburg, MS. 55 p.  
<http://dx.doi.org/10.21079/11681/26566>

Thorne, C. R., D. S. Biedenharn, C.D. Little, Jr., K. Wofford, T. McCullough, C.C. Watson, 2017, "Bed Material Sizes, Variability, and Trends in the Lower Mississippi River and their Significance to Calculated Bed Material Loads," MRG&P Tech Note No. 16. U.S. Army Corps of Engineers, Vicksburg, MS. 31 p.  
<http://dx.doi.org/10.21079/11681/25809>

May, D.P., and D.S. Biedenharn, 2017, "Mississippi River 2016 Winter Stage Trends," MRG&P Tech Note No. 15. U.S. Army Corps of Engineers, Vicksburg, MS. 31 p.  
<http://dx.doi.org/10.21079/11681/25604>

Allison, M.A., D.S. Biedenharn, and C.D. Little, 2017, "Suspended Sediment Loads and Tributary Inputs into the Mississippi River below St. Louis, MO, 1990–2013: A Comparison with the Keown et al. (1981) Report," MRG&P Tech Note No. 12. U.S. Army Corps of Engineers, Vicksburg, MS. 120 p.  
<http://dx.doi.org/10.21079/11681/22782>

Little, C.D., D.S. Biedenharn, M.A. Allison, T. McCollough, and K. Wolford, 2017, "Channel Geometry Trends of the Mississippi River, Old River Control Complex

- to St. Louis, Missouri,” MRG&P Tech Note No. 11. U.S. Army Corps of Engineers, Vicksburg, MS. 120 p. <http://dx.doi.org/10.21079/11681/22801>
- Biedenharn, D.S., M.A. Allison C.D. Little, C.R. Thorne, and C.C. Watson, 2017, “Large-scale Geomorphic Change in the Mississippi River from St. Louis, MO, to Donaldsonville, LA, as Revealed by Specific Gage Records,” MRG&P Tech Note No. 10. U.S. Army Corps of Engineers, Vicksburg, MS. 53 p. <http://dx.doi.org/10.21079/11681/22744>
- Killgore, K.J., Hartfield, P., Slack, T., Fischer, R., Biedenharn, D., Kleiss, B., Hoover, J., and Harrison, A. 2014. Conservation Plan for the Interior Least Tern, Pallid Sturgeon, and Fat Pocketbook Mussel in the Lower Mississippi River (Endangered Species Act, Section 7(a)(1)). MRG&P Tech Note No. 4. U.S. Army Corps of Engineers, Vicksburg, MS. 101 p. <http://hdl.handle.net/11681/3190>
- Biedenharn, D.S., W.A. Stroupe, and J.H. Brooks, 2014, “A Review of the Lower Mississippi River Potamology Program,” MRG&P Tech Note No. 1. U.S. Army Corps of Engineers, Vicksburg, MS. 53 p. <http://hdl.handle.net/11681/3192>
- Watson, C. C., D.S. Biedenharn, and C.R. Thorne, 2013, “Analysis of the Impacts of Dikes on Flood Stages in the Middle Mississippi River,” *Journal of Hydraulic Engineering*, 139(10), 1071-1078.
- Watson, C.C., R.R. Holmes, and D.S Biedenharn, (2013), “Mississippi River Streamflow Measurement Techniques at St. Louis, Missouri,” *Journal of Hydraulic Engineering*, 139(10), 1062-1070.
- Biedenharn, D. S., C.C. Watson, and C.R. Thorne, (2008) Fundamentals of Fluvial Geomorphology, Chapter 6 in *Sedimentation Engineering, Processes, Measurements, and Practice*, ASCE Manuals and Reports on Engineering Practice No.110, M. Garcia (ed.), ASCE, New York.
- Biedenharn, D.S., and C.C. Watson, 2007 “Grade Stabilization Techniques” Technical Supplement 14G, USDA-NRCS Stream Restoration Design Handbook, Part 654 National Engineering Handbook.
- Soar, P. J., C.R. Thorne, O.P. Harmar, D.S. Biedenharn, and F. Pinkard F, 2007, “Channel Geometry Analysis of the Lower Mississippi River,” In: Gupta, A. (ed.), *Large Rivers: Geomorphology and Management*. John Wiley and Sons, Chichester ,UK, 553-570.
- Biedenharn, D. S., L.J. Hubbard, C.R. Thorne, and C.C. Watson, 2006, “Understanding Sediment Sources, Pathways and Sinks in Regional Sediment Management: Application of Wash Load and Bed-Material Load Concept,” *ERDC TN SWWRP-06-04*, Vicksburg, Mississippi: Waterways Experiment Station. <http://libweb.wes.army.mil/uhtbin/hyperion/TN-SWWRP-06-4.pdf>

- Harmar, O P, N.J. Clifford, C.R. Thorne, and D.S Biedenarn, 2005 “Morphological Changes of the Lower Mississippi River: Geomorphological Response to Engineering Intervention”, *River Research and Applications*, Volume 21, Issue 10, 1107 – 1131.
- Bledsoe, B.P., C.C. Watson, and D.S. Biedenarn, 2002, “Quantification of Incised Channel Evolution and Equilibrium,” *Journal of the American Water Resources Association*. 38:861-870.
- Watson, C. C., D.S. Biedenarn, and B.P. Bledsoe, 2002. “Hydrologic Response in Incised Channels,” *Journal of American Water Resources Association*, 38:151-160.
- Skinner, K.S., D.S. Biedenarn, and C.R. Thorne, 2002, “Regional Sediment Management: a Review of Contemporary Practice”, *Ecohydrology and Hydrobiology*, vol. 2(1-4), 233-240.
- Biedenarn, D.S., C.R. Thorne, P.J. Soar, R.D. Hey, and C.C. Watson, 2001, “Effective Discharge Calculation Guide,” *International Journal of Sediment Research*, Vol. 16, No. 4, pp 445-459
- Biedenarn, D.S., C.R. Thorne, and C.C. Watson, 2000, “Recent Morphological Evolution of the Lower Mississippi River,” *Geomorphology*, 34:227-249.
- Watson, C.C., and D.S. Biedenarn, 2000, “Comparison of Flood Management Strategies,” Chapter 14, *Inland Flood Hazards Human, Riparian, and Aquatic Communities*, Ellen Wohl, Editor, Cambridge University Press.
- Biedenarn, D.S., R. R. Copeland ,C.R. Thorne, P.J. Soar, R.D. Hey, and C.C. Watson, 2000, “Effective Discharge Calculation: A Practical Guide,” ERDC Technical Report, U.S. Army Engineer Research and Development Center, ERDC/CHL TR-00-15, Vicksburg, MS.
- Copeland, R.R., D.S. Biedenarn, and J.C. Fischenich, 2000, “Channel Forming Discharge,” Hydraulic Engineering Technical Note, ERDC/CHL CHETN-VIII-5, U.S. Army Engineer Research and Development Center, Vicksburg, MS.
- Fripp, J.D., C.R. Fischenich, and D.S. Biedenarn, 2000, “Low Head Stone Weirs,” ERDC Technical Note, EMRRP-SR-16, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
- Biedenarn, D.S., and R.R. Copeland, 2000, “Effective Discharge Calculation,” ERDC Technical Note, ERDC/CHL CHETN-VIII-4, U.S. Army Engineer Research and Development Center, Vicksburg, MS.

- Watson, C.C., and D.S. Biedenharn, 1999, "Design and Effectiveness of Grade Control Structures in Incised River Channels of North Mississippi, USA," Chapter 17, Incised River Channels: Processes, Forms, Engineering, and Management, (Darby, S.E. and Simon, A., Eds.), John Wiley & Sons.
- Biedenharn, D.S., C.D. Little, and C.R. Thorne, 1998, "Magnitude-Frequency Analysis of Sediment Transport in the Lower Mississippi River," U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS, Miscellaneous Paper CHL-99-2.
- Watson, C.C., and D.S. Biedenharn, 1998, Discussion of "Characterization of Stream Meanders for Stream Restoration," *ASCE Journal of Hydraulic Engineering*, 125(2):216.
- Biedenharn, D.S., and C.C. Watson, 1997, "Stage Adjustments in the Lower Mississippi River," *Regulated Rivers: Research & Management*, 13:517-536.
- Biedenharn, D.S., and C.R. Thorne, 1994, "Magnitude-Frequency Analysis of Sediment Transport in the Lower Mississippi River," *Regulated Rivers: Research & Management*, 9:237-251.
- Biedenharn, D.S., and T.N. Waller, 1991, "Hydraulic Aspects of Grade Control Structures," Proceedings of the 1991 National Conference on Hydraulic Engineering, American Society of Civil Engineers, Nashville, TN.
- Biedenharn, D.S., P.G. Combs, G.J. Hill, C.F. Pinkard, and C.B. Pinkston, 1989, "Relationship Between Channel Migration and Radius of Curvature on the Red River," International Symposium on Sediment Transport Modeling, American Society of Civil Engineers, New Orleans, LA.
- Biedenharn, D.S., C.D. Little, and C.R. Thorne, 1987, "Magnitude and Frequency Analysis in Large Rivers," Proceedings of the 1987 National Conference on Hydraulic Engineering, American Society of Civil Engineers, Williamsburg, VA.
- Biedenharn, D.S., 1983, "Channel Response on the Little Tallahatchie River Downstream of Sardis Dam," Proceedings, RIVERS '83, American Society of Civil Engineers, New Orleans, LA

## **Courses Taught**

- RCSE 6800 – Introduction to River Science and Engineering  
RCSE 6810 – River and Stream Restoration  
RCSE 6830 – River Mechanics and Management