

## **BIOGRAPHY AND ABBREVIATED CURRICULUM VITAE**

**Leonard A. Shabman**  
**January 2019**

### **Professional Employment**

I became a Senior Fellow at Resources for the Future on July 1, 2002 after 30 years on the faculty in the Department of Agricultural and Applied Economics at Virginia Tech, where I also served (10 years) as the Director of the Virginia Water Resources Research Center. I received my Ph.D. from Cornell University in 1972.

During my time at Virginia Tech I taught classes ranging from freshman level to advanced Ph.D. I served as major adviser for over 20 Ph.D. students and an equal number of MS students. As Water Center director I administered a research grant program, maintained a statewide newsletter and formed as well as led an Academic Advisory Committee that provided technical support to Virginia DEQ implementation of the state's TMDL program.

I also have held positions in government. As staff economist at the United States Water Resources Council in 1978 I led the development of the economic valuation procedures for water resource project investments that remain in effect today.

As Scientific Advisor to the Assistant Secretary of Army, Civil Works, from 1985-86, I directed the development of the Corps of Engineers' initial dam safety program, monitored the Corps' early efforts to apply tools of risk analysis to its planning and engineering programs, and the oversaw the agency response to the eruption of Mt. St Helens. The dam safety program and applications of the tools of risk analysis are now well established within the agency. Following my time at the Office I continued to direct policy development that resulted in the Corps Ecosystem restoration mission area and in the Federal mitigation banking programs under Section 404 of the Clean Water Act.

As the Arthur Maass-Gilbert White Scholar at the Corps of Engineers Institute for Water Resources, I prepared a report on the engineering and policy decisions leading up to Hurricane Katrina. The lessons learned from that report became the basis for a new Corps emphasis on "shared responsibility" for flood risk decision making. I also participated in the development of guidelines for the new Corps levee safety program.

As Senior Fellow at RFF the primary focus of my current work includes modernizing federal water resources planning procedures, assessing the feasibility of private-public partnerships for funding inland waterways and flood control infrastructure, and reimagining the design of post-flood disaster aid and the national flood insurance program.

A major effort during my time at RFF was working with cattle ranchers, agencies of the state of Florida, USDA and other federal agencies to create the now operational, and unique in the nation, Northern Everglades Payment for Environmental Services Program.

### **Advisory Roles**

In 2004 I was honored to be named an Associate of the National Academies of Science. In 2018 I received the Warren Hall medal lifetime achievement award from the Universities Council on Water Resources.

I served ten years on the National Academies of Sciences, Water Science and Technology Board. I have chaired or been appointed to numerous Academies Committees covering a wide array of water resource management topics. A *selected number* of committees include: Restoration of Aquatic Ecosystems, Flood Control for the American River, CA., Wetlands Mitigation (Vice chair), Corps of Engineers: Planning and Technical Review Procedures (Chair), Assessing Progress Toward Restoring the Everglades, Missouri River Sediment Management (Chair), Florida Water Quality Standards (vice-chair), Future of the Inland Waterways (member), Analysis of Costs and Benefits of Reforms to the National Flood Insurance Program (Chair), and Decision Framework for Toutle River System at Mount St. Helens (consultant) .

My professional work has balanced time spent in research with advisory activities in order to have a direct bearing on the design and execution of water and related and resources policy. I frequently provide advice to federal and state agencies and to non-governmental organizations on a wide variety of water and related land resources issues. I have held leadership positions on governmental advisory committees in places as diverse as the Great Lakes region, the Missouri River Basin, Chesapeake Bay, South Florida and Coastal Louisiana. I have listed a *selected number* of committees and boards below.

Virginia State Water Commission. Appointed by Governor Charles Robb. 1982-83.

Water Supply Advisory Committee for Southeastern Virginia. Appointed by Virginia Secretary of Commerce and Resources. 1983-84.

Task Force on Natural Resources and Environment, Virginia Governor's Commission on the Future, 1983-84.

Department of Interior, Office of Policy Analysis. Public policy incentives for conversion of forested bottomlands to agricultural use, 1985-1987.

Virginia Marine Resources Commission, Fishery Management Advisory Committee, 1985-87.

United States Co-chair, Social and Economic Functional Group, International Joint Commission on the Great Lakes, 1987-1989.

Virginia Blue Ribbon Oyster Panel. Appointed by the Commissioner of Virginia Marine Resources Commission, 1991.

Review Panel on Phosphorus Control for the Lake Okeechobee Basin, South Florida Water Management District, Florida, 1995.

Chesapeake Bay Commission, Technical Advisory Panel to the Bi-state Blue Crab Harvest Management Committee, 1996-1999.

National Technical Review Committee (NTRC), Louisiana Coastal Area (LCA) plan, Corps of Engineers New Orleans District, 2002- 2003.

Missouri River Recovery Program, Social Economic Review Team, 2014- 2015

Chair, Science and Engineering Board, Louisiana Coastal Protection and Restoration Authority – 2014- 2016.

## **Selected Publications**

(\* ) no senior author assigned

My publications include over 300 book chapters, journal papers, technical reports and outreach papers on topics related to decision making on all aspects of water resources and water quality management. I have listed a *selected number* of publications to illustrate both my emphasis on interdisciplinary research and outreach, and the wide range of water policy topics addressed.

### *Selected Journal Papers*

Shabman, L. and S. Batie. "The Economic Value of Natural Coastal Wetlands: A Critique." *Coastal Zone Management Journal* 4.3 (Fall 1978): 231-247.

Shabman, L. and M. Bertelsen. "The Use of Development Value Estimates in Wetland Permit Decisions." *Land Economics* 55.2 (May 1979): 213-222.

Park, W. and L. Shabman. "Distributional Constraints on the Acceptance of Non-Point Pollution Control Plans." *American Journal of Agricultural Economics* 64.3 (August 1982): 455-462.

Cox, W. and L. Shabman\*. "Virginia's Water Law: Resolving the Interjurisdictional Transfer Issue." *Virginia Journal of Natural Resources Law* 3.2 (Winter 1984):181-234.

Shabman, L. "Emerging Concepts for the Conduct of State Water Resources Planning." *Water Resources Bulletin* 20.2 (April 1984): 203-209.

Shabman, L. "Water Resources Management: Policy Economics for an Era of Transition." *Southern Journal of Agricultural Economics* 16.1 (July 1984):53-65.

Shabman, L. and O. Capps. "Benefit Taxation for Environmental Improvement: A Case Example from Virginia's Soft Crab Fishery." *Land Economics* 61.4 (November 1985): 398-408.

Shabman, L. "Natural Resource Economics: Methodological Orientations and Policy Effectiveness." *American Journal of Agricultural Economics* 67.5 (December 1985): 030-1034.

Osborn, C. T., J. Schefter, and L. Shabman\*. "The Accuracy of Water Use Forecasts: Evaluation and Implications." *Water Resources Bulletin* 21.1 (February 1986): 101-109. (**Awarded best article in V-21 of Water Resources Bulletin.**)

Shabman, L. and S. Batie. "Mitigating Damages from Coastal Wetlands Development: Policy, Economics, and Financing." *Marine Resource Economics* 4 (1987): 227-248.

Bosch D. G. and L. A. Shabman. "The Decline of Private Sector Oyster Culture in Virginia: Causes and Remedial Policies." *Marine Resource Economics* 6 (1989): 227-243.

Shabman, L. "Environmental Hazards of Farming: Thinking About the Management Challenge." *Southern Journal of Agricultural Economics* 22:1, (July 1990): 11-21.

Thunberg, E. and L. Shabman. "Determinants of Landowner's Willingness to Pay for Flood Hazard Reduction." *Water Resources Bulletin* 27.4 (August 1991): 657-665.

- Shabman, L. and K. Stephenson. "The Possibility of Community-Wide Flood Control Benefits: Evidence from Voting Behavior in a Bond Referendum." *Water Resources Research* 28.4 (April 1992): 959-964.
- Santopietro, G. and L. Shabman. "Can Privatization Be Inefficient?: The Case of the Chesapeake Bay Oyster Fishery." *Journal of Economic Issues* 26.2 (June 1992): 407-419.
- Shabman, L. and P. Norris. "Economic and Environmental Considerations for Nitrogen Management in the Mid-Atlantic Coastal Plain." *American Journal of Alternative Agriculture*. 7.4 (1992): 148-156.
- Shabman, L. and R. Kramer. "The Effects of Agricultural and Tax Policy Reform on the Economic Return to Wetland Drainage in the Mississippi Delta Region." *Land Economics*. 69.3 (August 1993): 85-126.
- Shabman, L., D. King, and P. Scodari. "Wetlands Mitigation Success Through Credit Market Systems." *Wetlands Journal*. Vol. 5:2 (Summer 1993): 9-13.
- Shabman, L. and Stephenson, K. "A Critique of the Self-Interested Voter Model: The Case of a Local Single Issue Referendum." *Journal of Economic Issues*. 28:4 (December 1994). 1173-1186.
- Shabman, L. and K. Stephenson. "Environmental Policy Reform: A Taxonomy of Economists' Perspectives." *Journal of Agricultural and Applied Economics*. 28.1 (July 1996): 117-125.
- Shabman, L. and K. Stephenson. "Searching for the Correct Benefit Estimate: Empirical Evidence for an Alternative Perspective." *Land Economics*. 72.4 (November 1996): 433-449.
- Shabman, L. and K. Stephenson, P. Scodari. "Wetlands Credit Sales as a Strategy for Achieving No Net Loss: The Limitations of Regulatory Conditions." *Wetlands*. 18.3 (September 1998): 471-481
- Amacher, G., L. Shabman, J. Sullivan, L. Zepp, . "Reforestation of Flooded Farmland." *Journal of Forestry*. 96.5 (May 1998): 10-17.
- Stephenson, K., P. Norris, L. Shabman. "Watershed Based Effluent Trading: The Nonpoint Source Challenge." *Contemporary Economic Policy*. 16 (October 1998): 412-421
- Shabman, L., and M. Fina. "Some Unconventional Thoughts on Sprawl." *William & Mary Environmental Law and Policy Review*, 23:3 (Fall 1999): 739-775.
- Shabman, L. and Stephenson, K. "Environmental Valuation and Its Economic Critics" *Journal of Water Resources Planning and Management*, 126:6, (November-December, 2000): 382-388. (**Awarded best policy paper for v. 126**)
- Shabman, L. Zepp, L, King, D. and Wainger, L. "Reforesting Frequently Flooded Agricultural Land: Will a Market for Carbon Sequestration Credits Be Enough?" *American Journal of Alternative Agriculture*, 17: (2002): 1-9.
- Smith E., K. Ye, C. Hughes and L. Shabman, "Assessing Violations of Water Quality Standards Under Section 303 (d) of the Clean Water Act", *Environmental Science and Technology*, 25:3 (February 2001): 606-612.

Shabman, L. K. Stephenson and W. Shobe, “ Effluent and Emission Trading Programs: Reflections on the Air and Water Experiences”, *Environmental Practice*, v. 4, July 2002.

Shabman, L. and E. Smith. “Implications of Applying Statistically Based Procedures for Water Quality Assessment”, *Journal of Water Resources Planning and Management*, 129:4 (July 2003):330-337.

Shabman, L. and W. Cox, “Urban Water Supply Planning and the Environment: Extending the Reach of Section 404 of the Clean Water Act”, *Virginia Journal of Environmental Law*, 23 (Spring 2004):75-111.

Stephenson, K., C. Gowan and L. Shabman, “Ecosystem Valuation in Dam Removal Decisions: The Case of the Elwha River”, *Ecological Economics*, 56 (2006), 508-523.

Day, J. D. Boesch, E. Clairain, G. Paul Kemp, S. Laska, W. Mitsch, K. Orth, H. Mashriqui, D. Reed, L. Shabman, C. Simenstad, B. Streever, R. Twilley, C. Watson, J. Wells, D. Whigham ,” Restoration of the Mississippi Delta: Lessons from Hurricanes Katrina and Rita”, *Science*, 315:5819 (March 23, 2007):1679- 1684

Shabman, L and K. Stephenson\*, “Achieving Nutrient Water Quality Goals: Bringing Market-like Principles to Water Quality Management”, *Journal of American Water Resources Association*. 43:4 (August 2007): 1076- 1089.

Deason, J, G. E. Dickey, J. Kinnell, and L. Shabman (\*), An Integrated Planning Framework for Urban River Restoration Decision Making: Bridging the Differences among Federal Agency Planning Paradigms, *Journal of Water Resources Planning and Management*, 136:6 (November 2010): 688-696. **(Awarded best policy paper in v 136)**

Freedman, P., L. Shabman and K. Reckhow, (\*) “Don’t Debate; Adapt - Adaptive implementation can help water quality professionals achieve TMDL Goals”, *Water, Environment and Technology*, 20:8 (August, 2008): 1023-1031.

Bohlen, P., S. Lynch, L. Shabman, M. Clark, S. Shukla, and H. Swain\*, “Paying for Environmental Services from Working Agricultural Lands”, *Frontiers in Ecology*, 7 (1) (2009):46- 55.

Shabman, L, S. Lynch, and E. Boughton, “Acquiring Water Services from Northern Everglades Ranchlands: Assuring Buyers That They Get What They Paid For”, *Rangelands*, 35:5 (October 2013): 88-92.

Stephenson, K. and L. Shabman\*, “Rhetoric and Reality of Water Quality Trading and the Potential for Market-Like Reform”. *Journal of the American Water Resources Association* 47:1 (201) 15-28.

Stephenson, K and L. Shabman\*. 2017. "Where Did all the Agricultural Nonpoint Source Trades Go?: Lessons from Virginia Nutrient Trading Programs." *Journal of the American Water Resources Association*. 53(5) (2017):1178-1194.

Stephenson, K. and L. Shabman\*. 2017. "Nutrient Assimilation Services for Water Quality Credit Trading Programs: A Comparative Analysis with Nonpoint Source Credits" *Coastal Management*. 45 (1): 24-43.

Kousky, C. and L. Shabman\*, Federal Funding for Flood Risk Reduction in the US: Pre- or Post-Disaster?, *Water Economics and Policy*, 3:1(2017):1-12.

Carolyn Kousky, C. B. Lingle, and L. Shabman, "The Pricing of Flood Insurance" *Journal of Extreme Events*, 4:2 (June 2017): 1-26.

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### *Selected Book Chapters and Monographs*

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Kramer, R. and L. Shabman. "Incentives for Agricultural Development of U.S. Wetlands: A Case Study of the Bottomland Hardwoods of the Lower Mississippi River Valley." *Agriculture and the Environment*. Eds., T. Phipps, P. Crosson, K. Price. Washington, D.C.: Resources for the Future, Inc. 1986. pp. 175-201.

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Shabman L. and W. Cox. "Costs of Water Management Institutions: A Study of Southeastern Virginia." *Scarce Water and Institutional Change*. Ed., K. Frederick. Washington, D.C.: Resources for the Future. February 1986. pp. 134-170.

Shabman, L. "The Benefits and Costs of Flood Control: Reflections on the Flood Control Act of 1936." *The Flood Control Challenge: Past, Present, and Future*. Eds., H. Rosen and M. Reuss. Chicago: Public Works Historical Society. 1988. pp. 109-123.

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Shabman, L. "Water-Use Forecasting - Benefits and Capabilities." *National Water Summary- 1987*. Reston, Va.: United States Geological Survey. 1990. pp. 117-122.

Shabman, L. and D Woolley, "Responding to the Aftermath of the Mount Saint Helen's Eruption: Analysis and Communication of Risk," in *Risk-Based Decision Making in Water Resources*. Y. Haimes and E. Stakhiv, eds., New York: American Society of Civil Engineers. 1989. pp. 45-59.

Shabman, L. "Making Land Settlement Policy In A Federalist System." *Land Ownership and Taxation in American Agriculture*. G. Wunderlich, Ed. Boulder, Colorado: Westview. 1993. pp. 149-168.

Shabman, L. "Bargaining Markets, and Watershed Restoration: Some Elements of a New National Water Policy." *Water Resources Administration in the United States: Policy, Practice, and Emerging Issues*. Ed., Martin Reuss. Michigan: The Michigan State University Press. 1993. pp. 94-104.

- Shabman, L. "Making Watershed Restoration Happen: What Does Economics Offer?" *Rehabilitating Damaged Ecosystems*. Ed., J. Cairns. Chelsea, Michigan: Lewis Publishers. 1995. pp. 35-48.
- Shabman, L. and W. Cox. "Conflict over Eastern Water Transfers: Toward a New Era of Negotiation." *Resolution of Water Quantity/Quality Conflicts*. Eds., E. Loehman and A. Dinar. Westport, Connecticut: Greenwood Publishing Group, Inc. 1995. pp. 189-201.
- Shabman, L. "Water Disputes and Government Response: A Perspective on the Coming Decade." *Resolution of Water Quantity/Quality Conflicts*. Eds. A. Dinar and E. Loehman. Westport, Connecticut: Greenwood Publishing Group, Inc. 1995. pp. 259-267.
- Shabman, L., P. Scodari, and D. King. "Wetland Mitigation Banking Markets." *Mitigation Banking: Theory and Practice*. Eds. L. L. Marsh, D. R. Porter, and D. A. Salvesen. Washington, D.C.: Island Press. 1996. pp. 109-138.
- Shabman, L. "Land Settlement, Public Policy, and the Environmental Future of the Southeast Coast." *Sustainable Development in the Southeastern Coastal Zone*. Eds., F. J. Vernberg, W. Vernberg, and T. Siewicki. Columbia, S.C.: University of South Carolina. 1996. pp. 7-24.
- Shabman, L. "Bargaining, Analysis and Water Management," *Water Resources Update*, March 2000 (116), pp. 71-75.
- Shabman, L and L. Zepp, An Approach for Evaluating Nonstructural Actions with Application to the Yazoo River (Mississippi) Backwater Area, Contract report submitted to US Environmental Protection Agency, Region 43, Atlanta Georgia, 2002
- Shabman, L. "Decision Making and Uncertainty in Ambient Water Quality Management", in *Economics and Ecological Risk Assessment*, in R. Bruins and M. Heberling, eds. CRC Press, 2005, 27 pps.
- Boesch, D, L. Shabman, et. al. "A New Framework for Planning the Future of Coastal Louisiana after the Hurricanes Katrina and Rita" Integration and Application Network University of Maryland Center for Environmental Science, Cambridge, Maryland, 56 pps.
- Shabman, L, K. Reckhow, et al. "Adaptive Implementation of Water Quality Improvement Plans: Opportunities and Challenges", Nicholas School of the Environment, Duke University, NIR 07-03, 2007, 99 pps.
- Shabman, L. "Water Resources and the Challenge of Sustainability", in, *Perspectives on Sustainable Resources in America*, Roger Sedjo, ed. Resources for the Future Press , June 2008, 45pps.
- Woolley, D. and L. Shabman, (\*) *Decision Making Chronology for the Lake Pontchartrain & Vicinity Hurricane Protection Project*, Washington DC. USGPO, 275 pps. 2008.
- Stephenson, K and Shabman, L (\*), "Executing Computer Aided Dispute Resolution"; "The Purpose and Goal for Computer Aided Dispute Resolution"; and, "Bringing Computer Aided Dispute Resolution to Contemporary Water Policy: Some Challenges", *Converging Waters: Integrating Collaborative Modeling with Participatory Processes to Make Water Resources Decisions*, L. Bourget, E.C. (ed.) Alexandria, VA: Institute for Water Resources Maass-White Series, 2011.
- Lynch, S and L. Shabman(\*), Designing a Payment for Environmental Services Program for the Northern Everglades, *National Wetlands Newsletter*, Summer 2011, 4 pp.

Lynch,S and L.Shabman,(\*), Designing a Payment for Environmental Services Program for the Northern Everglades Part 2: Jumping Regulatory Hurdles, *National Wetlands Newsletter*, Fall 2011. 4 pp.

Shabman, L and P. Scodari, “Towards Integrated Water Resources Management: A Conceptual Framework for U.S. Army Corps of Engineers Water and Related Land Resources Implementation Studies”, Visiting Scholar Report, 2012-VSP-01, Institute for Water Resources, February 2012, 45pps.

Shabman, L and K. Stephenson , “Market-like Water Quality Trading: Why it Matters and How to Make it Happen”, *Aquanomics*, Randy Simmons and B. Delworth Gardner, eds., Transactions Publishers, pps. 209-224. 2012.

Kousky, C and L.Shabman\* “A new Era of Disaster Aid: Reflections on the Sandy Supplemental” RfF Issue Brief 13-05, December 2013. 6 pps.

Shabman, L and S. Lynch, “Moving from Concept to Implementation: The Emergence of the Northern Everglades Payment for Environmental Services Program”, RfF Discussion Paper 13-27, August 2013.

Shabman, L., P. Scodari, (with contributions from C. Kousky, and D. Woolley), “From Flood Damage Reduction to Flood Risk Management: Implications for USACE Policy and Programs”, USACE Institute for Water Resources, Report 2014-R-02, May 2014, 63 pps plus Appendices.

Kousky, C and L. Shabman\*, “The Realities of Federal Disaster Aid: The Case of Floods”, Resources for the Future Issue Brief 12-02, Apr. 2012.

Kousky, C and L. Shabman\* “A new Era of Disaster Aid: Reflections on the Sandy Supplemental” RfF Issue Brief 13-05, December 2013. 6 pps.

Kousky, C and L.Shabman\*. “Pricing Flood Insurance: How and Why the NFIP Differs from a Private Insurance Company”, RfF DP 14-37, October 2014, 14pps.

Kousky, C and L. Shabman\*, A Proposed Design for Community Flood Insurance, RfF Report, December 2015, 31pps.

Kousky, C and L. Shabman\*, “Understanding Flood Risk Decision Making: Implications for Flood Risk Communication Program Design”, RfF Discussion Paper 15-01, January 2015, 31 pps.

Shabman, L. and J. Boyd., “Speeding the Pace: Decisionmaking for Diversion Project Implementation in Louisiana”. RfF Discussion Paper, August 2017, 45 pps.

Shabman, L. “Fixing Flood Insurance”, Milken Institute Review, 2<sup>nd</sup> Quarter, 2018, pps 68-78.

Kousky, C, H. Kunreuther, B. Lingle, L. Shabman, “The Emerging Private Residential Flood Insurance Market in the United States, Wharton Risk Center, July , 2018, 53 pp.

Stephenson, K and L. Shabman\*, “Ecosystem Valuation and Hydropower Licensing Decisions: Lessons from the FERC Experience”, RfF Discussion Paper, December, 2018, 32 pps.