

Sara G. Hickman, Senior Analyst

Veritas Economic Consulting

1851 Evans Road, Cary, NC 27513

PRACTICE AREAS

- Survey Research
- Survey Design
- Fisheries Economics
- Econometrics
- Water Resource Economics

EXPERTISE

- Quality Assurance/Quality Control Management
- Survey Management
- Survey Design and Administration
- Survey Analysis

EDUCATION

B.A., Political Science,
Minor in Security Studies,
East Carolina University,
Greenville, NC, 2009

RECENT PUBLICATIONS

- Neenan, Bernard, Jason Kinnell, Matthew Bingham, and Sara Hickman. 2016. "Consumer Preferences for Electric Service Alternatives." *The Electricity Journal* 29:62–71.
- Bingham, M.F., Z. Li, K.E. Mathews, C. Spagnardi, J. Whaley, S. Veale [Hickman], and J. Kinnell. 2011. "An Application of Behavioral Modeling to Characterize Urban Angling Decisions and Values." *North American Journal of Fisheries Management* 31:257–268.

Mrs. Hickman is a Senior Analyst and Veritas' QA/QC Manager. She specializes in survey research to collect, compile, validate, and analyze economic data on consumers' market and non-market decisions. Her expertise includes quality assurance/quality control management (QA/QC), survey management, survey design and administration, and survey analysis. Mrs. Hickman has worked with survey projects that estimates baseline risk fish consumption, angler site characteristic decisions, preferences for electricity service plans and residential solar, and behavioral changes to fluctuating lake levels. Specific examples of Mrs. Hickman's survey research experience and expertise include each of the following:

- Managed QA/QC and helped administer the 2013 New Jersey Outdoor Recreation Survey and analyzed survey data.
- Managed QA/QC and helped develop intercept and mail surveys for the 2013 Alaska Outdoor Recreation Survey and developed the recreation demand models for fishing, hunting, recreational boating, and snow machining.
- Managed QA/QC for a discrete choice experiment to estimate electricity customers' preferences for electricity service plans (Neenan et al. 2016).

KEY PROJECTS

Managed QA/QC for the 2018 Electricity Service Plan Knowledge, Interests, Intentions, and Perceptions Survey

Managed QA/QC, helped pretest and administer, and analyzed the results of the 2016 Residential Solar Survey

Managed QA/QC for of the 2014 Electricity Service Plan Survey to measure customer preferences for alternative electricity service plans

Managed QA/QC and helped administer the 2013 New Jersey Outdoor Recreation Survey and analyzed survey data

Supported the design, administration, and analysis of the 2012 Texas Electric Vehicle Survey

Supported the design, administration, and analysis of all the electric vehicle surveys.

Experience

Veritas Economic Consulting, LLC, Cary, NC

Senior Analyst, 2018 to present

Analyst, 2012 to 2018

Associate Economist, 2009 to 2011

Administrative Assistant/Research Assistant, 2008 to 2009

East Carolina University Political Science Department, Greenville, NC

Research Assistant, 2009

Project Experience

Survey Research, Design, and Administration

- Managed QA/QC and helped design, pretest, and administer for the 2018 Electricity Service Plan Knowledge, Interests, Intentions, and Perceptions Survey.
- Managed QA/QC for a discrete choice experiment to estimate electricity customers' preferences for electricity service plans (Neenan et al. 2016).
- Managed QA/QC, helped pretest and administer, and analyzed the results of the 2016 Residential Solar Survey.
- Managed QA/QC for a survey to measure customer preferences for alternative electricity service plans.
- Managed QA/QC, helped develop intercept and mail surveys for the 2013 Alaska Outdoor Recreation Survey, and developed the recreation demand models for Alaska Energy Authority's Susitna-Watana Hydroelectric Project.
- Managed QA/QC and developed and administered the 2013 Customer Electricity Service Plan Preferences surveys to measure customer preferences for alternative plans.
- Managed QA/QC and helped administer the 2013 New Jersey Outdoor Recreation Survey and analyzed survey data.
- Participated in design, pretesting and administration of surveys to assess customer expectations of electric vehicles throughout the U.S.
- Supported the design, administration, and analysis of the 2012 Texas Electric Vehicle Survey.
- Supported the design and analysis of the 2011-2012 Lower Passaic River Creel/Angler Survey.
- Supported the development of a preference function of urban angler site-choice decisions to estimate the benefits of urban angling improvements.
- Supported the administration and analysis of the 2011 TVA Electric Vehicle Survey.
- Supported the design, pretesting, administration, and analysis of the 2010 TVA and Southern Company Electric Vehicle Survey.
- Supported the design, development, and administration of the 2010 Survey of Water Users to assess water withdrawal needs at facilities in the Upper Great Lakes Region.

Regulatory Compliance and Policy Analysis

- Evaluating the economic impacts of retrofitting existing power plants with closed-cycle cooling.

- Evaluated potential economic benefits of alternative restoration decisions for an urban river.
- Assisted in the valuation of more than 100 fisheries throughout the United States, including marine, estuary, lake, and river environments using state-of-the-art economic-valuation methods.
- Assisted in performing transfer-based fishery valuation assessments at dozens of sites throughout the United States.

Electric Vehicles

- Helped develop the National Benefit-Cost Framework of Electric Vehicles that evaluates the impacts of electric vehicle adoption increases on physical, economic, and environmental systems.
- Supported the development of a framework that provides the structure for a comprehensive benefit-cost analysis of strategies to promote the adoption of the electric vehicle by U.S. households.
- Supported the development of a custom model that forecasts location-specific electric vehicle adoption under a variety of scenarios.
- Assisted in the analysis of customer expectations of electric vehicles throughout the U.S.

Custom Models

- Helped design and develop the Fish Consumption Simulation Model which estimates changes in recreator trip-taking behavior and consumption under current and baseline conditions.
- Helped design and develop the Electric Vehicle Adoption Model, which forecasts location-specific electric vehicle adoption under a variety of scenarios.
- Helped develop an economic model to account for and integrate the economic and ecological benefits associated with potential urban river restoration alternatives.
- Supported the design and development of numerous economic models to support benefit-cost analysis of best technology available (BTA) for reducing adverse environmental impacts (AEI) at individual generating stations across the country.
- Supported the design, development and analysis of complex models that explain and predict recreator behavior and visitation frequency for exposure assessments.
- Evaluated the economic impacts associated with recreational development alternatives for Doe Mountain, Tennessee.

Water Resource Economics

- Evaluated the operational and economic impact of fluctuating water levels on municipal water suppliers', manufacturers' and electricity producers' facility operations, intake systems, and outfall systems.
- Provides data modeling support for ongoing evaluation of potential economic benefits resulting from alternative restoration projects
- Used IMPLAN software to help assess economic and community impacts and created simulations to evaluate the economic impact of specific scenarios
- Created a database of 500 intakes and performed a series of chi-square tests on the data
- Conducted research on engineering aspects of water intakes

Natural Resource Damage Assessment (NRDA)

- Helped support the evaluation of the Trustees' recreational model and corresponding damage estimates for the 2007 San Francisco Bay oil spill. Supported the development of a recreational model of baseline park use.
- Provides data modeling support for ongoing evaluation of potential economic benefits resulting from alternative restoration projects.
- Validates data for random utility maximization models.
- Performed research on water levels, compliance plans, and the environmental health of waterways and their corresponding economic impact.
- Used IMPLAN software to help assess economic and community impacts and created simulations to evaluate the economic impact of specific scenarios.
- Created a database and performed a series of chi-square tests on the data.

National Environmental Policy Act (NEPA)

- **Susitna-Watana Hydroelectric Project (Susitna River at Watana Creek, Alaska)**— Developed recreation demand models to evaluate the potential impacts of the Susitna-Watana Hydroelectric Project (<http://www.susitna-watanahydro.org>) on fishing, recreational boating, hunting, and snow machining (Kinnell et al. 2013). The results of Veritas' research are being conducted as part of the Socioeconomic and Transportation Resources Study Plan (AEA 2012) for use in the Federal Energy Regulatory Commission's (FERC) Integrated Licensing Process (ILP). Under the ILP, FERC staff, pursuant to the National Environmental Policy Act (NEPA), will prepare an Environmental Impact Statement (EIS), which FERC will use to determine whether, and under what conditions, to issue a license. As part of the project effort, Veritas has developed and supported the administration of the 2013 Alaska Outdoor Recreation Survey, a survey administered to 10,000 Alaska residents to collect information on their fishing, hunting, boating, and snow machining activities.
- **Comprehensive Assessment of Economic and Ecological Benefits and Incremental Analysis of Potential Urban River Rehabilitation Alternatives –** Developed a conceptual framework and economic model to account for and integrate the economic and ecological benefits associated with potential urban river restoration alternatives. Analysis followed the type of assessment the U.S. Army Corps of Engineers (USACE) would conduct to evaluate the incremental costs and benefits of restoration alternatives following its Principals and Guidelines. The analysis framework is highlighted in Deason, Dickey, Kinnell, and Shabman (2010) which received the 2011 Best Policy-Oriented Paper Award by the American Society of Civil Engineers (ASCE) and the Environmental and Water Resources Institute (EWRI). Other examples of the research efforts and corresponding results from this research can be found in Bingham et al. (2011) and Kinnell et al. (2006).

Other Research and Language Skills

- Performed in-depth research on the terrorist progression in Southeast Asia
- Has moderate level of understanding of Spanish, beginning level Japanese

Software

- Electricity Service Plan Software User Manual (EPRI 2019)

Honors and Awards

Graduated Summa Cum Laude, East Carolina University

GPA: 3.976

Phi Kappa Phi: 2007–2009

National Society of Collegiate Scholars: 2005–2009

Campus Crusade for Christ: 2005–2008

Scholarship Recipient, East Carolina University Honors School Scholarship sponsored by the Dowdy Student Store, 2005–2006

Scholarship Recipient, ECU Department of Political Science Mitchell-Hunt Scholarship, Fall 2007, for excellence in research and writing

Scholarship Recipient, ECU Department of Political Science Colonel Louis A. and Trudy Gomes Scholarship, Fall 2008, for academic excellence

Scholarship Recipient, ECU Department of Political Science Outstanding Senior, Spring 2009, for excellent performance in the political science program throughout the undergraduate degree

Publications

Neenan, Bernard, Jason Kinnell, Matthew Bingham, and Sara Hickman. 2016. "Consumer Preferences for Electric Service Alternatives." *The Electricity Journal* 29:62–71.

Bingham, M.F., Z. Li, K.E. Mathews, C. Spagnardi, J. Whaley, S. Veale [Hickman], and J. Kinnell. 2011. "An Application of Behavioral Modeling to Characterize Urban Angling Decisions and Values." *North American Journal of Fisheries Management* 31:257–268.

Selected Reports

Electric Power Research Institute. 2019. *EPRI Program 182 Electricity Service Plan Market Size Model Software User Manual*. Principal Investigators: M.F. Bingham and J.S. Kinnell. Palo Alto, CA: Electric Power Research Institute.

Veritas Economic Consulting. 2018. *Benefits Valuation Study: Alcoa Warrick Power Plant*. Prepared for Alcoa Corporation. Cary, NC: Veritas Economic Consulting.

Veritas Economic Consulting. 2018. *Entrainment Reduction Benefits Study: Bayside Power Station*. Prepared for Tampa Electric Company. Cary, NC: Veritas Economic Consulting.

Veritas Economic Consulting. 2017. *§ 122.21(r)(11) Benefits Valuation Study, Kahe Generating Station*. Prepared for Hawaiian Electric Company (HECO). Cary, NC: Veritas Economic Consulting.

Veritas Economic Consulting. 2017. *§ 122.21(r)(11) Benefits Valuation Study, Waiau Generating Station*. Prepared for Hawaiian Electric Company (HECO). Cary, NC: Veritas Economic Consulting.

Veritas Economic Consulting. 2017. "Appendix D—Evaluation of Economic Effects from Alternative Ocoee River Release Schedules." In [2018] *Ocoee River Whitewater Rafting Agreement: Final Environmental Assessment Polk County, Tennessee*. Project Number 2016-30. Knoxville, TX: Tennessee Valley Authority.

Electric Power Research Institute. 2017. *Photovoltaic (PV) Adoption Influencers: Estimating the Drivers of Residential Solar Choice*. Product ID 3002011012. Principal Investigators: S.

Coley, N. Enbar, M.F. Bingham, J.S. Kinnell, S.G. Hickman, V.L. MacPherson, and Z. Li. Palo Alto, CA: Electric Power Research Institute.

Electric Power Research Institute. 2017. *Residential Solar Adoption Model Software User Manual*. Principal Investigators: M.F. Bingham, J.S. Kinnell, S.G. Hickman, and G.S. Crownfield. Palo Alto, CA: Electric Power Research Institute.

Neenan, Bernie, Richard Boisvert, Matt Bingham, Jason Kinnell, and Sara Hickman. 2015. "Modeling OG&E Variable Peak Pricing Impacts Using Electricity Demand Models." Prepared for Bryan Scott, Oklahoma Gas & Electric. Palo Alto, CA: Electric Power Research Institute.

Electric Power Research Institute. 2015. *Electricity Service Plan Preferences Estimator Tool (Final Version)*. Software User Manual for 3002006315, 3002006317, 3002006352, and 3002006380. Palo Alto, CA: Electric Power Research Institute. Principal Investigators: M.F. Bingham, J.S. Kinnell, S.G. Hickman, and G.S. Crownfield.

Electric Power Research Institute. 2015. *Program on Technology Innovation: Measuring Customer Preferences for Alternative Electricity Service Plans*. Product ID 3002005757. Principal Investigators: B. Neenan, J.S. Kinnell, M.F. Bingham, and S.G. Hickman. Palo Alto, CA: Electric Power Research Institute.

Kinnell, J.C., M.F. Bingham, G. Crownfield, D.M. Woodard, and S.G. Hickman. 2013. *Estimating Changes in Recreation Demand and Social Welfare Resulting from the Susitna-Watana Hydroelectric Project Interim Draft Report*. Appendix A in Alaska Energy Authority (AEA). 2014. *Social Conditions and Public Goods and Services Study Initial Study Report for the Susitna-Watana Hydroelectric Project FERC No. 14241*. Available at <http://www.susitna-watanahydro.org/type/documents>.

Bingham, M.F., J.S. Kinnell, D.A. Santoianni, D.M. Woodard, and S.G. Veale [Hickman]. 2011. "An Economic Assessment of Net Employment Impacts from Regulating Coal Combustion Residuals." Prepared for Utility Solid Waste Activities Group. Cary, NC: Veritas Economic Consulting.

Kinnell, J.C., M.F. Bingham, S.G. Veale [Hickman], and D.M. Woodard. 2011a. "Preliminary Benefit-Cost Comparison of Alternative Impingement Mortality Reduction Technologies: Eddystone Generating Station (Draft Report)." Prepared for Exelon Generation Company, LLC. Cary, NC: Veritas Economic Consulting, LLC.

Kinnell, J.C., M.F. Bingham, S.G. Veale [Hickman], and D.M. Woodard. 2011b. "Preliminary Benefit-Cost Comparison of Alternative Impingement Mortality Reduction Technologies: Handley Generating Station (Draft Report)." Prepared for Exelon Generation Company, LLC. Cary, NC: Veritas Economic Consulting, LLC.

Kinnell, J.C., M.F. Bingham, S.G. Veale [Hickman], and D.M. Woodard. 2011c. "Socioeconomic Analysis of Alternative Development Scenarios for Doe Mountain—Preliminary Evaluation." Prepared for Golder Associates and The Nature Conservancy. Cary, NC: Veritas Economic Consulting, LLC.

Bingham, M.F., G. Crownfield, J.C. Kinnell, K.E. Mathews, Z. Li, C.M. Spagnardi, S.G. Veale [Hickman], and D.M. Woodard. 2009a. *Confidential Benefits Valuation Study at Great Lakes Generating Facility 1*. Cary, NC: Veritas Economic Consulting, LLC.

Bingham, M.F., G. Crownfield, J.C. Kinnell, K.E. Mathews, Z. Li, C.M. Spagnardi, S.G. Veale [Hickman], and D.M. Woodard. 2009b. *Confidential Benefits Valuation Study at Great Lakes Generating Facility 2*. Cary, NC: Veritas Economic Consulting, LLC.

Bingham, M.F., G. Crownfield, J.C. Kinnell, K.E. Mathews, Z. Li, C.M. Spagnardi, S.G. Veale [Hickman], and D.M. Woodard. 2009c. *Confidential Benefits Valuation Study at Great Lakes Generating Facility 3*. Cary, NC: Veritas Economic Consulting, LLC.

Bingham, M.F., J.C. Kinnell, K.E. Mathews, and D.M. Woodard. 2008. *Assessing the Economic and Community Impacts Associated with a Theoretical Closure of Buckeye Technology's Foley Plant: Preliminary Results*. Cary, NC: Veritas Economic Consulting, LLC.

Bingham, M.F., J.S. Kinnell, D.A. Santoianni, D.M. Woodard, and S.G. Veale [Hickman]. 2011. "An Economic Assessment of Net Employment Impacts from Regulating Coal Combustion Residuals." Prepared for Utility Solid Waste Activities Group. Cary, NC: Veritas Economic Consulting.

Bingham, M.F., S.G. Veale [Hickman], Z. Li, G.S. Crownfield, D.M. Woodard, and J.C. Kinnell. 2014. "Integrating Revealed and Stated Preference Data to Improve the Estimation of Baseline Risk Fish Ingestion." Working Paper No. 2014-03. Available at <http://www.veritaseconomics.com/Working%20Papers/Bingham.et.al.2014.Integrating.RP.and.SP.Data.to.Improve.Estimation.of.Baseline.Risk.Fish.Ingestion.pdf>

Electric Power Research Institute. 2011a. "Southern Company Electric Vehicle Survey: Consumer Expectations for Electric Vehicles." 1022728. Palo Alto, CA: Electric Power Research Institute. Principal Investigators: B. Neenan, J.C. Kinnell, and M.F. Bingham.

Electric Power Research Institute. 2011b. "TVA Electric Vehicle Survey: Consumer Expectations for Electric Vehicles." 1022729. Palo Alto, CA: Electric Power Research Institute. Principal Investigators: B. Neenan, J.C. Kinnell, and M.F. Bingham.

Veritas Economic Consulting and Environmental Consulting and Technology, Inc. 2011. "Impact of Fluctuations in Water Levels on the Water Users within the Upper Great Lakes." Prepared for the Ministry of Foreign Affairs of the Government of Canada. Cary, NC: Veritas Economic Consulting, LLC.

Kinnell, J.C., M.F. Bingham, C.M. Spagnardi, S.G. Veale [Hickman], D.M. Woodard, and G.S. Crownfield. 2009. *Estimation and Comparison of the Benefits and Costs of Alternative IM&E Reduction Options: Manchester Street Generating Station*. Cary, NC: Veritas Economic Consulting.

Selected Presentations

Bingham, M.F., J.C. Kinnell, S. Becker, and S. Hickman. 2019. "Data Uncertainty in Entrainment Reduction Benefits Estimates." Presented at Great Lakes Interest Group 316(b) Annual Meeting, La Crosse, Wisconsin, October 10.

Bingham, M.F., J.C. Kinnell, D.M. Woodard, S.G. Hickman, G.S. Crownfield, D.M. Clark, and V.L. MacPherson. 2017. "Case Study of Social Costs on Oahu." Presented to Clean Water Act §316(b) Technical Challenges for Power Plants Drawing Water from Estuaries, Briarcliff Manor, New York, May 16.

Kinnell, J.C., M.F. Bingham, and S.G. Hickman. 2015. "Developing Estimates of Baseline Risk Fish Ingestion: An Application from the Lower Passaic River Study Area." Presented at the Eighth International Conference on Remediation and Management of Contaminated Sediments, New Orleans, Louisiana, January 13.