



University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE
CHESAPEAKE BIOLOGICAL LABORATORY

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CURRICULUM VITAE

I. Education

- B.S.** 1986 (with honors, Phi Beta Kappa), Earth Science, University of California, Santa Cruz.
Ph.D. 1997 Environmental and Ecological Economics, University of Maryland, College Park.

II. Professional Background

- 1996–1998 *Assistant Research Scientist/Project Manager*, University of Maryland, Institute for Ecological Economics, Center for Environmental Science
1998–2004 *Assistant Research Scientist*, University of Maryland, Ctr for Environmental Science
2004–2006 *Associate Research Scientist*, Univ. of Maryland, Ctr for Environmental Science
2006–2013 *Research Associate Professor*, Univ. of Maryland, Ctr for Environmental Science
2008–2013 *Economics Advisor*, US EPA, ORD, Ecosystem Services Research Program
2013–present *Research Professor*, University of Maryland, Center for Environmental Science

III. Research

A. Areas of Professional Expertise

- Integrated ecological and economic modeling and evaluation of policy/management options
- Ecosystem service trading, mitigation & offsets
- Decision support tools for maximizing net economic benefits of restoration
- Performance-based metrics for environmental restoration targeting
- Invasive species risk assessment
- GIS and spatial data statistical modeling

B. Peer-Review Publication

Papers & Book Chapters (2015–present)

- Wainger, L.A., Weber, M.A., Price, E.W., 2025. Modifying Social Vulnerability Indices to Complement Physical Exposure Risk Analyses. *Natural Hazards Review* 26, 04024048.
<https://doi.org/10.1061/NHREFO.NHENG-2237>. UMCES Publication #6398; CBL Reference #2025-010.
- Weber, M.A., Wainger, L.A., Testa, J.M., Waldbusser, G.G., Li, M., 2024. Climate resilience and profitability thresholds in Chesapeake Bay oyster aquaculture. *Journal of Environmental Management* 372, 123202. <https://doi.org/10.1016/j.jenvman.2024.123202>; UMCES Publication #6399; CBL Reference #2025-011.
- Mace, M.M., Wilberg, M.J., Jesse, J., North, E., Gawde, R., Scully, M.E., Wainger, L., 2024. Developing a fine-scale spatial operating model of eastern oyster population dynamics in Chesapeake Bay, Maryland, U.S.A. *Fisheries Research* 279, 107145.
<https://doi.org/10.1016/j.fishres.2024.107145>
- North, E.W., Wilberg, M., Blair, J., Wainger, L., Cornwell, J., Jones, R., Hayes, C.G., Gawde, R., Hood, R.R., Goelz, T., Hartley, T., Mace, M.M., Diriker, M., Fowler, N., Polkinghorn, B., 2024. Two applications of the Consensus Solutions process with collaborative modeling for

- management of a contentious oyster fishery. *Front. Mar. Sci.* 11.
<https://doi.org/10.3389/fmars.2024.1423534>
- Read, D.J., Blair, E., Wainger, L., 2024. Effective Engagement Techniques Across the Agricultural Conservation Practice Adoption Process. *Environmental Management*.
<https://doi.org/10.1007/s00267-024-02043-8>. UMCES Publication #6400; CBL Reference #2025-012
- Wainger, L.A., Murray, E.O., Theiling, C.H., McMurray, A.M., Cushing, J.A., Komlos, S.B., Cofrancesco, A.F., 2023. Broadening Benefits and Anticipating Tradeoffs with a Proposed Ecosystem Service Analysis Framework for the US Army Corps of Engineers. *Environmental Management*. <https://doi.org/10.1007/s00267-022-01777-7>
- Read, D.J., Wainger, L., 2023. Assessing intervention effectiveness at promoting voluntary conservation practice adoption in agrienvironments. *Conservation Biology* 37, e14009.
<https://doi.org/10.1111/cobi.14009>
- Hayes, C., Wainger, L., 2022. Comparing multi-criteria decision analysis to group negotiations in fisheries co-management. *Marine Policy* 138, 104997.
<https://doi.org/10.1016/j.marpol.2022.104997>
- Gray, M.W., Alexander, S.T., Beal, B.F., Bliss, T., Burge, C.A., Cram, J.A., Luca, M.D., Dumhart, J., Glibert, P.M., Gonsior, M., Heyes, A., Huebert, K.B., Lyubchich, V., McFarland, K., Parker, M., Plough, L.V., Schott, E.J., Wainger, L.A., Wikfors, G.H., Wilbur, A.E., 2022. Hatchery crashes among shellfish research hatcheries along the Atlantic coast of the United States: A case study at Horn Point Laboratory oyster research hatchery. *Aquaculture* 546, 737259.
<https://doi.org/10.1016/j.aquaculture.2021.737259>. UMCES Cont. No. 6042
- Read, D.J., Carroll, A., Wainger, L.A., 2021. Exploring private land conservation non-adopters' attendance at outreach events in the Chesapeake Bay watershed, USA. *PeerJ* 9, e11959.
<https://doi.org/10.7717/peerj.11959>. UMCES Cont. No. 6052
- Hood, R.R., Shenk, G.W., Dixon, R.L., Smith, S.M.C., Ball, W.P., Bash, J.O., Batiuk, R., Boomer, K., Brady, D.C., Cerco, C., Claggett, P., de Mutsert, K., Easton, Z.M., Elmore, A.J., Friedrichs, M.A.M., Harris, L.A., Ihde, T.F., Lacher, L., Li, L., Linker, L.C., Miller, A., Moriarty, J., Noe, G.B., Onyullo, G.E., Rose, K., Skalak, K., Tian, R., Veith, T.L., Wainger, L., Weller, D., Zhang, Y.J., 2021. The Chesapeake Bay program modeling system: Overview and recommendations for future development. *Ecological Modelling* 456, 109635. UMCES Cont. No. 6018
<https://doi.org/10.1016/j.ecolmodel.2021.109635>
- Weber, M.A., Wainger, L.A., Harms, N.E., Nessler, G.M., 2021. The economic value of research in managing invasive hydrilla in Florida public lakes. *Lake and Reservoir Management* 37, 63–76.
<https://doi.org/10.1080/10402381.2020.1824047>. UMCES Cont. No. 5942.
- Kleinman, P.J.A., Fanelli, R.M., Hirsch, R.M., Buda, A.R., Easton, Z.M., Wainger, L.A., Brosch, C., Lowenfish, M., Collick, A.S., Shirmohammadi, A., Boomer, K., Hubbard, J.A., Bryant, R.B., Shenk, G.W., 2019. Phosphorus and the Chesapeake Bay: Lingering Issues and Emerging Concerns for Agriculture. *Journal of Environmental Quality*. [UMCES #5771] CBL Ref # 2020-053
<https://doi.org/10.2134/jeq2019.03.0112>
- Lookingbill, T.R., Minor, E.S., Wainger, L.A., 2019. Chapter 6: The Ecosystem Service Impacts from Invasive Plants in Antietam National Battlefield, in: Lookingbill, T.R., Smallwood, P.D. (Eds.), *Collateral Values, Landscape Series*. Springer Nature, Switzerland. [UMCES # 5772] CBL Ref. # 2020-054
- Wainger, L.A., Helcoski, R., Farge, K.W., Espinola, B.A., Green, G.T., 2018. Evidence of a Shared Value for Nature. *Ecological Economics* 154, 107–116. [UMCES # 5598]
<https://doi.org/10.1016/j.ecolecon.2018.07.025>
- Wainger, L. A., N. E. Harms, C. Magen, D. Liang, G. M. Nessler, A. M. McMurray, and A. F. Cofrancesco. 2018. Evidence-based economic analysis demonstrates that ecosystem service benefits of water hyacinth management greatly exceed research and control costs. e26617v1. [UMCES # 5556]. PeerJ Inc. doi:10.7287/peerj.preprints.26617v1.

- Olander, L.P., Johnston, R.J., Tallis, H., Kagan, J., Maguire, L.A., Polasky, S., Urban, D., Boyd, J., Wainger, L., Palmer, M., 2018. Benefit relevant indicators: Ecosystem services measures that link ecological and social outcomes. *Ecological Indicators* 85, 1262–1272. [UMCES # 5593]
<https://doi.org/10.1016/j.ecolind.2017.12.001>
- Wainger LA, Secor D, Gurbisz C, Kemp M, Glibert PM, Richkus J, Barber M. 2017. Resilience indicators support valuation of estuarine ecosystem restoration under climate change. *Ecosystem Health and Sustainability*. [UMCES # 5468]
<http://onlinelibrary.wiley.com/doi/10.1002/ehs2.1268/full>
- Wainger, L., A. McMurray, M. Paolisso, K. J. Johnson, and B. Needelman. 2017. Coastal Community Values for Marsh-Dependent Socioecological Services Revealed through a Systematic Qualitative Approach. *Agricultural and Resource Economics Review* 46: 1–27. [UMCES #5773] CBL Ref. # 2020-055
- Olander, L., S. Polasky, J. S. Kagan, R. J. Johnston, L. Wainger, D. Saah, L. Maguire, J. Boyd, D. Yoskowitz. 2017. So you want your research to be relevant? Building the bridge between ecosystem services research and practice. *Ecosystem Services* 26: 170–182. [UMCES # 5774] CBL Ref. No. 2020-056.
- Wainger L, Yu H, Gazenski K, Boynton W. 2016. The relative influence of local and regional environmental drivers of algal biomass (chlorophyll-a) varies by estuarine location. *Estuarine, Coastal and Shelf Science* 178:65–76. [UMCES # 5775] CBL Ref. # 2020-057.
- Nesslage GM, Wainger LA, Harms NE, Cofrancesco AF. 2016. Quantifying the population response of invasive water hyacinth, *Eichhornia crassipes*. *Biological Invasions* 18:2107–2115. [UMCES # 5184]
- O’Leary CA, Perry E, Bayard A, Wainger L, Boynton WR. 2016. Linking innovative measurement technologies (ConMon and Dataflow© systems) for high-resolution temporal and spatial dissolved oxygen criteria assessment. *Environmental Monitoring and Assessment* 188:543. [UMCES # 5776] CBL Ref. No. 2020-058.
- Richkus J, Wainger LA, Barber MC. 2016. Pathogen reduction co-benefits of nutrient best management practices. *PeerJ* 4:e2713. [UMCES # 5777] CBL Ref. No. 2020-059.
- Johnston, R. and L. Wainger. 2015. Benefit Transfer for Ecosystem Service Valuation: An Introduction to Theory and Methods. Chapter 12 In: *Handbook of Environmental Benefit Transfer* (R. Johnston, J. Rolfe, R. Rosenberger, and R. Brouwer, eds.). Springer. [UMCES # 5778] CBL Ref # 2020-060.
- Mazzotta, M., L. Wainger, S. Sifleet, J. T. Petty, and B. Rashleigh. 2015. Benefit transfer with limited data: An application to recreational fishing losses from surface mining. *Ecological Economics* 119:384–398. UMCES Technical Report # TS-728-15. [UMCES # 5779] CBL Ref. # 2020-061
- Munns, W. R., A. W. Rea, M. J. Mazzotta, L. A. Wainger, and K. Saterson. 2015. Toward a standard lexicon for ecosystem services. *Integrated Environmental Assessment and Management* 11:666–673. [UMCES # 5780] CBL Ref. # 2020-062
- Full publication list at <https://www.researchgate.net/profile/Lisa-Wainger/research>

Peer-Reviewed Technical Reports

- NOAA SAB & ESMWG, 2022. Developing Resilience in the Face of Rapidly Changing Marine Environments. NOAA Science Advisory Board and Ecosystem Science and Management Working Group, Silver Spring, MD. (Lead writer/editor for Chapter 2. Promoting resilience by incorporating people in forecasting, risk assessment, and policy to respond to rapid change).
- Wainger, L.A., Johnston, R.J., Rose, K.A., Castellini, M., McCammon, M., Newton, J., 2021. Decision Making under Deep Uncertainty: What is it and how might NOAA use it? Ecosystem Science and Management Working Group (ESMWG) to the NOAA SAB, Silver Spring, MD.
- Murray, E.O., Theiling, C.H., Wainger, L.A., (in press). Developing an Ecosystem Goods and Services Assessment Framework: Products and Resources (No. ERDC TN-EMRRP-??-x), EMRRP.

- Wainger, L.A., Filoso, S., Murray, E.O., Weber, M.A., Price, E.W., Flemming, T.H., Hychka, K., (in press). Assessing relative wetland flood risk reduction benefits using COPE: An exploration of Capacity, Opportunity, Payoff and Equity. US Army Corps of Engineers, Engineer Research and Development Center, Vicksburg, MS.
- Wainger, LA, McMurray A, Griscom HR, Murray EO, Cushing JA, Theiling CH, Komlos S. 2020. A Proposed Ecosystem Services Analysis Framework for the U.S. Army Corps of Engineers. ERCS/EL SR-20-2. US Army Corps of Engineers, Engineer Research and Development Center. Available from <http://dx.doi.org/10.21079/11681/37741>.
- Shenk, G.W., Wainger, L.A., Wu, C., Capel, P., Friedrichs, M., Hubbart, J.A., Iho, A., Kleinman, P.J.A., Sellner, K., Stephenson, K., 2020. Assessing the Environment in Outcome Units (AEIOU): Using Eutrophying Units for Management (No. STAC Publication 20-003; TS-751-20; UMCES-CBL # 2020-065). Edgewater, MD.
- Wainger, L.A., McMurray, A., Griscom, H.R., Murray, E.O., Cushing, J.A., Theiling, C.H., Komlos, S., 2020. A Proposed Ecosystem Services Analysis Framework for the U.S. Army Corps of Engineers (No. ERDC/EL SR-20-2). US Army Corps of Engineers, Engineer Research and Development Center.
- Wainger, L.A. and M.A. Weber, 2019. Nutrient Credit Trading Could Expand Maryland Oyster Aquaculture. Maryland Sea Grant Fact Sheet. FS-1103.
<https://extension.umd.edu/learn/publications/nutrient-credit-trading-could-expand-maryland-oyster-aquaculture>
- Hood, R.R., Shenk, G.W., Dixon, R., Ball, W.P., Bash, J., Cerco, C.F., Claggett, P., Harris, L., Ihde, T., Linker, L.C., Sherwood, C., Wainger, L.A., 2019. *Chesapeake Bay Program Modeling in 2025 and Beyond*. STAC Publication 19-001, Edgewater, MD.
- McGee, B., M. Bryer, J. Davis-Martin, L. Wainger, R. Batiuk, J. Greiner, S. Newbold, K. Saunders, S. Phillips, R. Dixon. 2017. *Quantifying Ecosystem Services and Co-Benefits of Nutrient and Sediment Pollutant Reducing BMPs*. STAC Publication Number 17-008, Edgewater, MD. 37 p.
- Wainger, L., and D. Ervin. 2017. *Synthesis Chapter-The Valuation of Ecosystem Services from Farms and Forests: Informing a Systematic Approach to Quantifying Benefits of Conservation Programs*. The Council on Food, Agriculture & Resource Economics and USDA Office of Ecosystem Markets. <http://www.cfare.org/UserFiles/file/SynthesisChapter-TheValuationofEcosystemServicesfromFarmsandForests.pdf>.
- Wainger, L., Loomis, J., Johnston, R.J., Hansen, L., Carlisle, D., Lawrence, D., Gollehon, N., Duriancik, L., Schwarz, G., Ribaud, M., Gala, C., 2017. *Chapter 2: Ecosystem Service Benefits Generated by Improved Water Quality from Conservation Practices*. The Council on Food, Agriculture & Resource Economics and USDA OEM, Washington, DC. Available online.
- Davis-Martin, J., Devereux, O., Batiuk, R., Hobbs, B., Wainger, L., Dixon, R., 2017. Cracking the WIP: Designing an Optimization Engine to Guide Efficient Bay Implementation. STAC Publication Number 17-004. STAC, Edgewater, MD.
- Wainger, L., and D. Ervin. 2017. *Synthesis Chapter-The Valuation of Ecosystem Services from Farms and Forests: Informing a Systematic Approach to Quantifying Benefits of Conservation Programs*. The Council on Food, Agriculture & Resource Economics and USDA Office of Ecosystem Markets. <http://www.cfare.org/UserFiles/file/SynthesisChapter-TheValuationofEcosystemServicesfromFarmsandForests.pdf>.
- Wainger, L., J. Loomis, R.J. Johnston, L. Hansen, D. Carlisle, D. Lawrence, N. Gollehon, et al. 2017. *Chapter 2: Ecosystem Service Benefits Generated by Improved Water Quality from Conservation Practices*. Washington, DC: The Council on Food, Agriculture & Resource Economics and USDA Office of Ecosystem Markets. <http://www.cfare.org/UserFiles/file/Chapter2-EcosystemServiceBenefitsGeneratedbyImprovedWaterQualityfromConservationPractices.pdf>.
- Olander, Lydia, Robert J. Johnston, Heather Tallis, Jimmy Kagan, Lynn Maguire, Steve Polasky, Dean Urban, James Boyd, Lisa Wainger, and Margaret Palmer. 2015. *Best Practices for Integrating Ecosystem Services into Federal Decision Making*. Durham: National Ecosystem Services Partnership, Duke University. doi:10.13016/M2CH07.

Wainger, L. A., and C. Magen. 2015. *EnviroAtlas Use Case*: Opportunities for improving water quality and related ecosystem services from cost-effective targeting of manure transportation subsidies. For US EPA Office of Research and Development. <http://www.epa.gov/enviroatlas/enviroatlas-use-cases>.

Other Reports, Discussion Papers, Online Products, and Draft Manuscripts

- Delta Independent Science Board 2024. Understanding Decision-Making under Deep Uncertainty: Seminar Synthesis. Report to the Delta Stewardship Council. Sacramento, California. <https://deltacouncil.ca.gov/pdf/isb/products/2024-10-02-isb-dmdu-seminar-synthesis.pdf>
- Delta Independent Science Board. 2024. Advancing Scientific Understanding and Management of the Delta Through a Food Web Perspective. Report to the Delta Stewardship Council. Sacramento, California. <https://deltacouncil.ca.gov/pdf/isb/products/2024-10-02-isb-food-webs-review.pdf>
- Delta Independent Science Board. 2022. Review of Water Supply Reliability Estimation Related to the Sacramento-San Joaquin Delta. Report to the Delta Stewardship Council. Sacramento, California. <https://deltacouncil.ca.gov/pdf/isb/products/2022-06-16-isb-water-supply-reliability-review.pdf>
- Wainger, L.A., Read, D., Blair, E., 2022. Enhancing Chesapeake Bay Partnership Activities by Integrating Social Science Draft Final Report. UMCES-CBL for Chesapeake Bay Trust.
- Wainger, L.A., Price, E.W., 2022. A crediting system providing incentives for co-benefit creation in the Maryland Department of the Environment stormwater program (Technical Report No. TS-789-22 and [UMCES] CBL 2023-018). UMCES-CBL, Solomons, MD.
- West, A.O., Wainger, L.A., Rose, K.A., Roman, M.R., Miller, T.J., Moser, F.C., Dennison, W.C., Martinez, F.A., 2021. Ecosystem-Based Management: An analysis of national needs and opportunities. NOAA technical memorandum NOS NCCOS ; 288. <https://doi.org/10.25923/ta8k-y562>. TS-779-22 and Ref. No. [UMCES] CBL 2022-036
- Price, E., Hollady, T., Wainger, L., 2021. Cost Analysis of Stormwater and Agricultural Practices for Reducing Nitrogen and Phosphorus Runoff in Maryland (No. UMCES Technical Report # TS-772-21). DOI: 10.13140/RG.2.2.28896.74246/1. <https://bit.ly/3yFWpwD>
- Flemming, T.H., Wainger, L.A., Bhaskaran, H., O'Neil, J., 2020. Game Module of Environmental Economics: You've Got Kale: A Game Teaching Farm Economics & Environmental Stewardship in a Changing Climate [WWW Document]. URL https://teachoceanscience.org/teaching_resources/education_modules/environmental_economics/
- Wainger LA, Testa JM, Brady DC, Harman CJ, Ortiz-Bobea A, Basenback N, Chang S, Collick AS, Ball WP. in prep. Integrated ecological economic modeling reveals sensitivity of aquatic habitat to phenological change.
- Wainger, L, Woodland, R, Hollady, T. 2019. Evaluating Costs and Benefits of the Department of Defense Legacy Resource Management Program. UMCES Technical Report # TS-747-19 and Ref. No. [UMCES]CBL 2020-030.
- Weber, M.A., Wainger, L.A., Parker, M., Hollady, T., 2018. The potential for nutrient credit trading or economic incentives to expand Maryland oyster aquaculture. Report to Maryland Sea Grant, Award#NA14OAR4170090. UMCES Technical Report # TS-718-19, University of Maryland Center for Environmental Science, Solomons, MD. <https://repository-library-noaa-gov.proxy-um.researchport.umd.edu/view/noaa/37930>
- Hychka, K., Wainger, L.A., Murray, E.O., Filoso, S., 2018. Nontidal Wetlands and Flood Attenuation USACE Technical Report (Draft submitted). ERDC-EL, Vicksburg, MS.
- Wainger LA, Gazenski K, Waldrop A, Basenback N, Filoso S, Siskey M. 2017. A systematic review of reviews to support the Biodiversity Metric Advancement Workgroup (BMAW). UMCES Tech Report. DOI: 10.13140/RG.2.2.20262.73284. UMCES Technical Report # TS-701-17.
- US EPA Chesapeake Bay Program. Environmental Finance Symposium Report Action Team. 2017. *The Path Forward: Chesapeake Bay Program Response to Chesapeake Bay Environmental Finance Symposium Recommendations and Final Report*. https://www.chesapeakebay.net/who/group/environmental_finance_symposium_report_action_team

- Kennedy, C. and L.A. Wainger 2016. Evaluation of Ecosystem Services of SAV in the Chesapeake Bay. Chapter 11 in Technical Synthesis III. Maryland DNR and US EPA Chesapeake Bay Program Office.
- Needelman B, Paolisso M, Land S, Leisnham P, Baldwin A, Johnson K, Wainger L, McMurray A, Dindinger J. 2015. Integrating Socio -Ecological Research and Collaborative Learning to Promote Marsh and Community Resilience A Final Report Submitted to the National Estuarine Research Reserve System Science Collaborative. Available from <http://www.nerra.org/projects/enhancing-resilience-on-marylands-deal-island/>.

C. Contracts and Grants

Awarded (Recent)

- “Baltimore BLUE-CORE: BLUEspace Collaborative REsearch for Urban Coastal Access and Climate Resilience in South Baltimore,” NOAA and Maryland Sea Grant. Morgan State University PEARL and UMCES-CBL; February 1, 2024 – January 31, 2028.
- “Benefits of controlling harmful algal blooms in freshwater lakes and reservoirs: A multi-method valuation approach,” US Army Corps of Engineers ERDC. Chesapeake Biological Laboratory, UMCES; 1 October 2023 – 30 September 2026.
- “Refining Co-Benefit Measures of Environmental Restoration Investments,” MD Dept of Environment, Chesapeake Biological Laboratory, UMCES.
- “MDE Tier II Implementation Team-Evaluating the Economic Benefits Analysis of the Superconducting Magnetic Levitation (SCMAGLEV) Train,” MD Dept of Environment, U00P3600388 with the Chesapeake Biological Laboratory, UMCES; 1 November 2022 – 30 June 2025.
- “Thriving Agricultural Systems in Urbanized Landscapes,” U.S. Dept of Agriculture, S000182-USDA 2019-68012-29904 with the Chesapeake Biological Laboratory, UMCES; 1 September 2019 – 30 June 2025.
- “Economic Studies of Harbor Dredging, Operations and Future Development,” UMCES #4324620. MD Port Administration, 518830; 1 July 2023 – 31 October 2025. [Full project 1 July 2023 - 30 June 2028]
- “Standardized Economic Benefits Evaluation Procedure,” AWD-100230 GR100359. MDE. 12/18/2024-9/30/2025.
- “NSF Convergence Accelerator Track E: Convergence Towards Nationwide Smart Precision Aquaculture Networks for Sustainable Shellfish Farming,” National Science Foundation, 104050-Z3820201 with the Horn Point Laboratory, UMCES; 1 October 2022 – 30 September 2023.

D. Invited Seminars and Presentations

- December 6, 2024. Moderator. Interstate Commission on the Potomac River Basin (ICPRB) Land Use Webinar - Integrating Climate and Resilience with Equity, webinar
- July 24, 2024. What works to increase conservation practice adoption? Thriving Agriculture in Urbanizing Systems Workshop. Annapolis, MD.
- June 18, 2024. Developing & Applying a US Army Corps of Engineers Ecosystem Services Analysis Framework: Applications to Chesapeake Bay. NOAA Chesapeake Bay Office Ecological Science monthly webinar series.
- June 11, 2024. Plenary Panel: Advances in Coupled Natural and Human Systems Research: Understanding and Applications. Chesapeake Community Research Symposium, Annapolis, MD
- June 11, 2024. Co-developing future scenarios to explore resilience of agro-ecological systems under uncertainty. Chesapeake Community Research Symposium, Annapolis, MD.

April 18, 2024. Developing & Testing a US Army Corps of Engineers Ecosystem Services Analysis Framework. [with Elizabeth Murray] National Conference on Ecosystem Restoration, Albuquerque, NM.

November 16, 2023. *What works to increase conservation practice adoption?* Presentation to Chesapeake Bay Program Agricultural Working Group, webinar.

September 7, 2023. *What works to increase conservation practice adoption?* Choose Clean Water (community group), webinar

June 27 2023. *What have we learned about using economic incentives to address non-point source reductions?* Chesapeake Environmental Protection Association, (community group), webinar.

March 16, 2023. *Incentives for ecosystem services (co-benefits) in stormwater projects using Capacity, Opportunity, Payoff & Equity (COPE) criteria.* STAC Ecosystem Services Workshop. Kent Island, Maryland.

February 15, 2023. *Integrating Social Science for Adaptive Management in CBP.* CRC Roundtable.

December 15, 2022. *Rethinking Equity Indices.* ACES: A Community on Ecosystem Services. Crystal Gateway Marriott, Arlington, VA

December 15, 2022. *Broadening Benefits and Anticipating Tradeoffs by Using an Ecosystem Services Framework in USACE Planning.* ACES: A Community on Ecosystem Services. Crystal Gateway Marriott, Arlington, VA

December 8, 2022. *Integrating Social Science for Adaptive Management in CBP.* Chesapeake Bay Partnership Management Board meeting. (with Dan Read)

December 7, 2022. *Integrating Social Science for Adaptive Management in CBP.* Chesapeake Bay Program Citizens Advisory Committee. (with Dan Read)

November 30, 2022. *Shallow water enhancement in the Hudson Raritan Estuary: Challenges and Opportunities.* Panelist discussing economic incentives.

October 26, 2022. *Incentives for co-benefits in stormwater projects using Capacity, Opportunity, Payoff & Equity (COPE) criteria.* Maryland Department of the Environment Lunchtime Seminar.

September, 22, 2022. *Integrating Social Science for Adaptive Management in CBP.* Chesapeake Bay Program Scientific, Technical Assessment and Reporting workgroup.

September 21 2022. *Decision Making under Deep Uncertainty: What is it and how might NOAA use it?* NOAA Fisheries Management Strategy Evaluation working group.

July 27, 2022. *Economic decision support tools for oyster growers.* Smart Precision Aquaculture Network. National Science Foundation Convergence Accelerator Network. Expo Phase I.

April 28, 2022. *Decision Making under Deep Uncertainty: What is it and how might NOAA use it?* NOAA Science Advisory Board. Silver Spring, MD and National Academy of Sciences Ocean Studies Board, Fisheries Subcommittee, Washington DC.

April 13, 2022. *Coupled ecological and economic models to project climate-induced changes in estuarine habitat and oyster aquaculture profitability.* US Climate Variability and Predictability (US CLIVAR), [Workshop on Daily to Decadal Ecological Forecasting along North American Coastlines](#), Woods Hole, MA, USA.

March 10, 2022. *Social Science Roadmap Project (GIT 5): Questionnaire results.* Chesapeake Bay Partnership, Management Board.

January 20, 2022. *Creating financial incentives for blue carbon & multi-benefit projects.* Maryland Department of the Environment. Blue Carbon Financing webinar.

January 19, 2022. *Using Data to inform Social Science Integration into Chesapeake Bay Restoration Goals.* CRC Roundtable webinar.

December 6, 2021. *Advancing ecosystem service valuation: Overcoming knowledge gaps, revealing tradeoffs, and informing incentives.* USDA Economic Research Service. Ecosystem Service Valuation Workgroup.

August 17, 2021. *Review of Research into Ecosystem Goods and Services in USACE Decision-making.* US Army Corps of Engineers. EMRRP Webinar.

August 2, 2021. *Findings from Integrated Social-Ecological Modeling: Climate, Farming and Water Quality.* Agricultural and Applied Economics Association Annual Meeting. Austin, TX.

June 29, 2021. *Identifying & incentivizing multi-benefit stormwater practices*. US EPA workshop on The Cost of Doing Nothing.

June 24, 2021. *Social Science Assessment for Advancing Chesapeake Bay Program Partnership Goals*. Chesapeake Bay Program STAR Committee meeting.

April 27, 2021. *Changing Weather, Changing Farms: Opportunities to Reduce Chesapeake Harm*. Citizen Science at Chesapeake Biological Lab.

March 17, 2021. *Decision Making under Deep Uncertainty: What is it and how might NOAA use it?* Report to the Science Advisory Board for NOAA.

January 12, 2021. *Applying Ecosystem Services: Real World Examples*. Ecosystem Services Framework training. NOAA Office for Coastal Management

December 16, 2020. *Adapting stormwater programs to change*, Envision the Choptank Stormwater Conference.

September 28, 2020. *Assessing the Environment In Outcome Units (AEIOU) STAC workshop report*. Water Quality Goal Implementation Team Meeting.

May 20, 2020. *Assessing the Environment In Outcome Units (AEIOU) STAC workshop report*. CBP Modeling Workgroup.

April 8, 2020. *Anticipating and Adapting to Phenologic Changes in the Chesapeake Water System*. CBP Modeling Workgroup Quarterly Review

November 14, 2019. Keynote speaker. *Nutrient Credit Trading Opportunities in Maryland*. Agricultural and Environmental Law Conference. UM Agriculture Law Education Initiative. Annapolis, MD.

November 12, 2019. *Evaluating the efficiency of water body restoration: Evidence from the Chesapeake Bay*. Penn State University, Water Insights Seminar Series.

November 12, 2019. *Costs and Cost-Effectiveness of Stormwater and Agricultural BMPs in Maryland*. Webinar presentation to the Chesapeake Bay Program Water Quality Goal Implementation Team.

September 10, 2019. *What have we learned about using economic incentives to address the NPS problem?* Presentation to the Chesapeake Bay Program Scientific and Technical Advisory Committee.

July 22, 2019. *Social science integration in Chesapeake Bay restoration*. UC Davis and Delta Social Science Working Group workshop on Human Dimensions Research in Delta Environments. Sacramento, CA.

June 11, 2019. *Recommendations to the Chesapeake Bay Partnership from the Scientific and Technical Advisory Board* (US EPA Chesapeake Bay Program). Meeting with Governor Hogan, Annapolis, MD.

June 3, 2019. *Costs and Cost-Effectiveness of Stormwater and Agricultural BMPs in Maryland*. Maryland Department of the Environment. Baltimore, MD.

May 20, 2019. *Evaluating the efficiency of Chesapeake Bay restoration*. Center for Natural Resource Economics & Policy, 6th National Forum on Socioeconomic Research in Coastal Systems. New Orleans, LA.

April 24, 2019. *Oyster Aquaculture Profitability & Potential Economic Tipping Points with Ocean Acidification*. Maryland Department of the Environment. Baltimore, MD.

December 4, 2018. *Evaluating the ecosystem service benefits & social efficiency of Chesapeake Bay restoration*. Meeting of ACES: A Community on Ecosystem Services. Arlington, VA.

December 3, 2018. *Measuring Benefit Relevant Indicators (BRIs) Using Ecological & Social Context*. Part of short course taught at ACES. Arlington, VA.

November 15, 2018. *Evaluating the efficiency of Chesapeake Bay restoration*. Clark University Seminar Series. Worcester, MA.

November 30, 2018. *Enhancing Incentives for Creating Sustainable Healthy Urban Waterfronts*. UMCES Environmental Summit. Baltimore, MD.

October 31, 2018. *Economic Assessment of Benefits Associated with Invasive Plant Management*. USACE ERDC. Aquatic Plant Control Research Program Review. Vicksburg, MS.

August 14, 2018. *Closing the innovation-practice gap to sustain social welfare under a changing climate*. Research Agenda for Ecological Economics. University of VT. Burlington, VT.

- June 12, 2018. *Overcoming behavioral biases in climate change planning*. SESYNC Boundary Spanning Symposium 2018. Annapolis, MD.
- May 28, 2018. *Integrated Models to Support Decision Makers: Towards a modeling sandbox for biophysical & social scientists*. ChesRMS 2018. Annapolis, MD.
- May 22, 2018. *Applying economic principles to promote community well-being*. State of the Coasts. Cambridge, MD.
- April 19, 2018. *Valuation of ecosystem services available from farms and forests: Reliable measurement and developing incentives for private action*. World Resources Institute Brown Bag Seminar Series. Washington, DC.
- February 1, 2018. *Spatial economic information needs of decision makers*. University of Copenhagen, Dept of Food and Resource Economics.
- January 5, 2018. *Promoting joint ecological and economic modeling*. Preparatory talk for STAC workshop Modeling Beyond 2025. <https://youtu.be/AufCZImff-Y>
- November 6, 2017. Resilience indicators support valuation of estuarine ecosystem restoration under climate change. Coastal and Estuarine Research Foundation, Newport, RI.
- June 29, 2017. *Valuation of ecosystem services available from farms and forests: Developing reliable approaches for federal agencies*. National Ecosystem Service Partnership webinar (national audience).
- March 28, 2017. *Setting the Context: Ecosystem Service Analysis*. Ecosystem Services Valuation workshop (STAC).
- March 23, 2017. Valuation of ecosystem services available from farms and forests: A valuation framework based on the best available science. Council on Food, Agriculture and Resource Economics webinar.
- March 20, 2017. Effective Use of Economic Valuation. Capitol Hill briefing sponsored by the Agricultural & Applied Economics Association.
- Feb 23, 2017. *Valuation of ecosystem services available from farms and forests: Developing reliable approaches for federal agencies*. W3133 Economics workshop Benefits and Costs of Natural Resources Policies Affecting Ecosystem Services on Public and Private Lands. Carlsbad, CA.

E. Symposia Organized/Chaired for Professional Meetings

- December 2022. *Effective incentives for ecosystem service benefits from urbanizing agricultural landscapes*. A Community on Ecosystem Services. Crystal City, VA.
- June 2021. *What makes economic analysis useful for large water body restoration? A comparison of the Chesapeake Bay and Baltic Sea contexts*. European Association of Environmental and Resource Economists. Berlin, Germany.
- May 2020. Workshop organizer (as NOAA ESMWG member). *Exploring Decision Support Tools that are Robust to Deep Uncertainty for Potential Use by NOAA in Fisheries and Coastal Management Applications*. Boulder, CO.
- May 2019. *Policy-relevant economic valuation of research & restoration in large water bodies*. Center for Natural Resource Economics & Policy bi-annual meeting. New Orleans, LA.
- March 2019. Co-Leader with Gary Shenk. AEIOU – *Assessing Environmental Impacts in Outcome Units*. Chesapeake Bay Scientific and Technical Advisory Committee (STAC) workshop. Annapolis, MD
- January 2019. Steering Committee Member. *Use of Dredged Material to Protect Low-Lying Areas of the Chesapeake Bay*. UMCES & Maryland Port Administration hosting. Annapolis, MD.
- December 2018. Session Organizer. *Freshwater Wetland Restoration Effects on Flood Risk: What Do We Know?* ACES: A Community on Ecosystem Services. Arlington, VA.
- August 2018. Session Organizer. *Using restorability and resilience concepts in evaluating and valuing ecosystem service benefits of restoration*. National Conference on Ecosystem Restoration. New Orleans, LA.
- January 2018. Steering Committee Member. *Chesapeake Bay Program Modeling in 2025 and Beyond: A Proactive Visioning Workshop*. Chesapeake Bay STAC Workshop.

F. Outreach to Federal/State/Local Government and Non-Governmental Organizations

Office of Management and Budget and Office of Information and Regulatory Affairs. One of 10 national peer reviewers of draft *Guidance for Assessing Changes in Environmental and Ecosystem Services in Benefit-Cost Analysis*. November 2023.

California Delta Independent Science Board (2020-present; Chair as of 10/2022)

Ecosystem Sciences and Management Working Group (ESMWG) of the NOAA Scientific Advisory Board. 2018-present. Co-Chair 2020-2022.

Bay Journal Science Advisory Board (2020-present)

Hughes Center for AgroEcology Research Advisory Board. (2022-present)

NY Sea Grant. Proposal reviewer (2022)

The Foundation for Food and Agriculture Research, Proposal reviewer (2023)

US EPA ORD Technical Qualifications Board (2020) promotion review board

Advancing Agricultural Assistance. Steering Committee member at the request of Christine Conn, MD DNR, 2020

Chesapeake Bay Program Scientific and Technical Advisory Committee (STAC), 2007-2019

Chair September 2015-2017

Social Sciences Subcommittee

National Academies of Sciences. Invited speaker/participant.

Decision Making under Deep Uncertainty. Ocean Studies Board. April 28, 2022.

Rising to Coastal Challenges: Social Science Perspectives on Research Needs for Responding to Rising Seas. December 6, 2017.

Workshop on landscape approaches and multi-resource analysis for sustainable natural resource management. June 2, 2015.

Council on Food, Agricultural and Resource Economics (C-FARE), 2015-2017

Invited Co-Lead Editor of multi-investigator program that produced a report on the topic of:

Valuation of prioritized ecosystem services that are enhanced by USDA programs.

BayStat Program Scientific Advisory Panel, 2015-2017.

National Ecosystem Services Partnership – FRMES, 2012-2016. Co-organizer of economics section, in collaboration with faculty from Duke Nicholas School of the Environment. Developed technical guidance for federal agencies to use in decision-making related to ecosystem services.

White House Council on Environmental Quality.

Ecosystem Services in NEPA. Invited Presenter. May 12, 2016