

## DR. ESTHER (SULLIVAN) PARISH

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### EDUCATION

Ph.D. Energy Science & Engineering, Bredesen Center for Interdisciplinary Research and Graduate Education, The University of Tennessee, Knoxville, Tennessee (December 2017)  
M.S. Geography, The University of Tennessee, Knoxville, Tennessee (May 2002)  
B.S. Geology & Geophysics, Yale University, New Haven, Connecticut (May 1994)

### PROFESSIONAL EXPERIENCE

2009—, **Researcher**. ORNL Environmental Sciences Division. As a geographer and landscape ecologist, Dr. Parish investigates the environmental and socioeconomic sustainability of bioenergy and hydropower systems, potential impacts of a changing climate, and the energy-water nexus. Dr. Parish leads multidisciplinary projects for the US Department of Energy BioEnergy Technologies Office (DOE BETO) and Water Power Technologies Office (DOE WPTO).  
2007-2009, **Post-Master's Research Associate**, Oak Ridge Associated Universities, ORNL. Conducted research for the Geographic Information Science and Technology (GIST) Group of the Computational Sciences and Engineering Division (CSED).  
2003-2008, **Geology and Geography Instructor**, Roane State Community College, Harriman, TN.  
2003-2007, **Senior Environmental Consultant**, XCEL Engineering, Inc., Oak Ridge, TN.  
2001-2003, **Geographer**, Tennessee Valley Authority (TVA) Public Power Institute (PPI), Norris, TN.  
1999-2000, **Environmental Analyst**, DPRA Incorporated, Oak Ridge, TN.  
1995-1999, **Environmental Scientist & Deputy Program Manager**, PAI Corporation, Oak Ridge, TN.  
1994-1995, **Field Engineer**, Schlumberger Oilfield Services, Wireline & Testing, Duncan/Enid, Oklahoma. Managed Enid's open hole logging truck, a team of three operators, and a variety of oilfield specialists and served as the Enid Depot Health, Safety, and Environment Engineer,

### PUBLICATIONS

Parish ES, Karlen DL, Kline KL, Comer KS, Belden WW (2023) Designing Iowa Agricultural Landscapes to Improve Environmental Co-Benefits of Bioenergy Production. *Sustainability* 15: 10051.  
Jager HI, Nair SS, Efrogmson RA, DeRolph CR, Parish ES, Wang G (2023) Ecosystem services from partially harvested riparian buffers can offset biomass production costs. *Science of the Total Environment* 889: 164199.  
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Parish ES, Kline KL (2022) Sustainability Evaluation of Landscape Design Alternatives. Case Study #7 in *Enabling Sustainable Landscape Design for Continual Improvement of Operating Bioenergy Supply Systems*. Final Report for DOE Project DE-EE0007088/0000 by Kevin Comer and Douglas Karlen. <https://doi.org/10.2172/1846013>. <https://www.osti.gov/servlets/purl/1846013>.  
Parish E, Pracheil B, McCoskey D, Harby A, Adeva-Bustos A, Hansen BT, Köhler B, Hedger R (2022) *Effective Environmental Decision Tools for Hydropower Development*. A DOE-Norway white paper developed under the Feb 2020 Annex to the MOU between DOE and Norway's Royal Ministry of Petroleum and Energy. <https://www.ornl.gov/project/environmental-decision-support-toolkit>

- Levine A, Pracheil B, Curtis T, Smith L, Cruce J, Aldrovandi A, Brelsford C, Buchanan H, Fekete E, Parish E, Uria-Martinez R, Johnson M, Singh D (2021) *An Examination of the Hydropower Licensing and Federal Authorization Process*. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-79242. <https://www.nrel.gov/docs/fy22osti/79242.pdf>.
- Kreig J, Parish E, Jager HI (2021) Growing grasses in unprofitable areas of US Midwest croplands could increase species richness. *Biological Conservation* 261: 109289.
- Parish E, Dale V, Davis M, Efroymsen R, Hilliard M, Kline K, Jager H, Xie F (2021) An Indicator-based Approach to Sustainable Management of Natural Resources. Chapter 12 of *Data Science Applied to Sustainability Analysis*. Elsevier. 310 pages. Co-edited by Jennifer Dunn and Prasanna Balaprakash.
- Efroymsen R, Jager H, Mandal S, Parish E, Mathews T (2021) Better management practices for environmentally sustainable production of microalgae and algal biofuels. *Journal of Cleaner Production* 289: 125150.
- Aldrovandi MSP, Parish ES, Pracheil BM (2021) Understanding the Environmental Study Life Cycle in the United States Hydropower Licensing and Federal Authorization Process. *Energies* 14(12): 3435.
- Omitaomu OA, Kotikot SM, Parish ES (2021) Planning green infrastructure placement based on projected precipitation data, *Journal of Environmental Management* 279: 111718.
- Dale VH, Baskaran L, Parish E (2021) Assessing Effects on Biodiversity from Wood Pellet Production in the Southeastern United States. *World Biomass 2020/2021 Edition*, Pages 58-63. DCM Productions, United Kingdom.
- Langholtz M, Busch I, Kasturi A, Hilliard M, McFarlane J, Tsouris C, Mukherjee S, Omitaomu O, Kotikot S, Allen M, DeRolph C, Davis M, Parish E (2020) The economic accessibility of CO<sub>2</sub> sequestration through bioenergy with carbon capture and sequestration (BECCS) in the US. *Land*. *Land* 9: 299. Special issue on “Bioenergy and Land.”
- Ha M, Wu M, Tomer M, Gassman P, Isenhardt T, Arnold J, White M, Parish E, Comer K, Belden B (2020) Biomass production with conservation practices for two Iowa watersheds. *Journal of the American Water Resources Association* 1–15. <https://doi.org/10.1111/1752-1688.12880>.
- Parish E, Baskaran L, Dale V. (2020) Framework for assessing land-management effects on at-risk species: Example of SE USA wood pellet production and gopher tortoise (*Gopherus Polyphemus*). *WIREs Energy and Environment* 10(1):e385.
- Englund O, Dale VH, Kline KL, McGrath, J, McDonnell K, Mola-Yudego B, Murphy F, English B, Negri M, Parish E, et al. (2020) Multifunctional perennial production systems for bioenergy: performance and progress. *WIREs Energy and Environment* <https://doi.org/10.1002/wene.375>
- McManamay R, Parish E, DeRolph C (2020) A dataset of eco-evidence tools to inform early-stage environmental impact assessments of hydropower development. *Data in Brief* 30: 105629.
- McManamay R, Parish E, DeRolph C, Witt A, Graf W, Burtner A (2020) Evidence-based indicator approach to guide preliminary environmental impact assessments of hydropower development. *Journal of Environmental Management* 265: 110489.
- Jager H, Parish E, Langholtz M, King A (2020) Perennials in flood-prone areas of agricultural landscapes: A climate adaptation strategy. *BioScience* 70(4): 278–280.
- Dale VH, Kline KL, Parish ES, Eichler SE (2019) Engaging stakeholders to assess landscape sustainability. *Landscape Ecology* 34(6):1199-1218.
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- Parish ES, Pracheil BM, McManamay RA, Curd SL, DeRolph C, Smith B (2019) Review of environmental metrics used across multiple sectors and geographies to evaluate the effects of hydropower development. *Applied Energy* 238:101-118.
- Sylvester L, Omitaomu OA, Parish ES, Bhaduri BL (2019) Evaluating the Implications of Climate Projections on Heat Hardiness Zones for Green Infrastructure Planning. *Current Environmental Engineering* 6:55-73.

- Kline KL, Parish ES and Dale VH (2018) The importance of reference conditions in assessing effects of bioenergy wood pellets produced in the southeastern United States. *World Biomass* 2018/2019 Edition, Pages 82-86. DCM Productions, United Kingdom.
- Dimitriou I, Berndes G, Englund O, Brown M, Busch G, Dale V, Devlin G, English B, Goss K, Jackson S, Kline KL, McDonnell K, McGrath J, Mola-Yudego B, Murphy F, Negri MC, Parish ES, Segane H, Tyler D (2018) *Lignocellulosic Crops in Agricultural Landscapes: Production systems for biomass and other environmental benefits – examples, incentives, and barriers*. IEA Bioenergy Task 43 Report TR2018-05. 33 pp.
- Parish ES, Herzberger A, Phifer C, Dale VH (2018) Telecoupled transatlantic wood pellet trade provides benefits in both the sending and receiving systems. *Ecology and Society* 23 (1):28.
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- Parish ES, Dale VH, Kline KL (2017) Has pellet production affected Southeastern US forests? *World Biomass: The International Review of the Biomass Industry*, DCM Productions, United Kingdom. 2017/2018 Edition, Pages 38-42.
- Parish, Esther Sullivan (2017) *Investigating the Sustainability of Southeastern United States' Wood Pellet Production for Use in European Biopower Facilities*. PhD Dissertation, University of Tennessee, Dec. 2017.
- Parish ES, Dale VH, Kline KL, Abt RC (2017) Reference scenarios for evaluating wood pellet production in the Southeastern United States. *Wiley Interdisciplinary Reviews*, e259. doi:10.1002/wene.259
- Parish ES, Dale VH, Tobin E, Kline KL (2017) Dataset of timberland variables used to assess forest conditions in two Southeastern United States' fuelsheds. Elsevier's *Data in Brief* 13: 278-290.
- Dale VH, Parish ES, Kline KL, Tobin E (2017) How is wood-based pellet production affecting forest conditions in the southeastern United States? *Forest Ecology and Management* 396: 143-149. doi.org/10.1016/j.foreco.2017.03.022
- Dale VH, Keith L Kline, Esther S. Parish, Annette L. Cowie, Robert Emory, Robert W. Malmshemer, Raphael Slade, C.T. (Tat) Smith, T. Bently Wigley, Niclas Scott Bentsen, Göran Berndes, Pierre Bernier, Miguel Brandão, Helena Chum, Rocio Diaz-Chavez, Gustaf Egnell, Leif Gustavsson, Jörg Schweinle, Inge Stupak, Paul Trianosky, Arnaldo Walter, Carly Whittaker, Mark Brown, George Chescheir, Ioannis Dimitriou, Caspar Donnison, Alison Goss Eng, Kevin P. Hoyt, Jennifer C. Jenkins, Kristen Johnson, Charles A. Levesque, Victoria Lockhart, M. Cristina Negri, Jami E. Nettles, and Maria Wellisch (2017) Status and prospects for renewable energy using wood pellets from the southeastern United States. *GCB Bioenergy* 9(8):1296-1305. doi: 10.1111/gcbb.12445
- Nugent PJ, Omitaomu OA, Parish ES, Mei R, Ernst K, Absar M, Sylvester L (2017) A Web Based Geographic Information Platform to Support Urban Adaptation to Climate Change. *Advances in Geocomputation*, Springer.
- Dale VH, Parish ES, Kline KL. (2016) Lessons from the Forest. *World Biomass*. <http://www.dcm-productions.co.uk/flippages/flipbook/index.html?page=20>
- Parish ES (2016) In Search of Bioenergy Sustainability. In *Auburn Speaks: On Biofuels in the Southeast*. Edited by Steve Taylor. Published by Auburn University. 226 p.
- Parish ES, Dale VH, English BC, Jackson SW, Tyler DD (2016) Assessing multimetric aspects of sustainability: Application to a bioenergy crop production system in East Tennessee. *Ecosphere* 7(2):e01206. 10.1002/ecs2.1206
- Sylvester LM, Omitaomu OA, Parish ES (2016) Analyzing the Implications of Climate Data on the Rainfall Frequency Spectrum: Case Study of Knoxville, Tennessee and Surrounding Region. ORNL/TM-2016/485
- Sylvester LM, Omitaomu OA, Parish ES, Allen M (2016) Processing and Monthly Summaries of Downscaled Climate Data for Knoxville, Tennessee and Surrounding Region. ORNL/TM-2016/486

- Sylvester LM, Omitaomu OA, Parish ES (2016) Analyzing the Implications of Climate Data on Plant Hardiness Zones for Green Infrastructure Planning: Case Study of Knoxville, Tennessee and Surrounding Region. ORNL/TM-2016/322
- Dale VH, Parish ES, Kline KL (2015) Mapping risks to global biodiversity: Comparing biofuel to fossil fuel production. *Biofuels, Bioproducts & Biorefining* 9(2):177-189.
- Nugent PJ, Omitaomu O, Parish ES, Mei R, Ernst KM, Absar M (2015) A Web Based Geographic Information Platform to Support Urban Adaptation to Climate Change. *Proceedings of Geocomputation 2015*, May 20-23.
- Preston BL, King AW, Ernst KM, Absar SM, Nair SS, Parish ES (2015) Scale and representation of human agency in the modeling of agroecosystems. *Current Opinion in Environmental Sustainability* 14: 239-249.
- Smith, CT, E Atkin, I Dimitriou, KL Kline, and G Berndes, et al. (2015) Mobilizing Sustainable Bioenergy Supply Chain, Lignocellulosic Crops Supply Chain, Inter-Task Project Synthesis Report, IEA Bioenergy. Available online at <http://www.ieabioenergy.com/wp-content/uploads/2015/11/IEA-Bioenergy-inter-task-project-synthesis-report-mobilizing-sustainable-bioenergy-supply-chains-28ot2015.pdf>
- Parish E, Kline K, Dale V, Efroymsen R, McBride A, Johnson T, Hilliard M, Bielicki J (2013) Comparing Scales of Environmental Effects from Gasoline and Ethanol Production. *Environmental Management* 51(2): 307-338.
- Efroymsen RA, Dale VH, Kline KL, McBride AC, Bielicki JM, Smith RL, Parish ES, Schweizer PE, Shaw D (2013) Environmental indicators of biofuel sustainability: What about context? *Environmental Management* 51(2):291-306.
- Preston BL, Parish ES, Dale VH, Editors (2012) *Sustaining Tennessee in the Face of Climate Change: Grand Challenges and Opportunities*. A report developed by ORNL in conjunction with researchers from several universities across Tennessee.
- Parish ES, Hilliard M, Baskaran LM, Dale VH, Griffiths NA, Mulholland PJ, Sorokine A, Thomas NA, Downing ME, Middleton R (2012) Multimetric Spatial Optimization of Switchgrass Plantings Across a Watershed. *Biofuels, Bioproducts & Biorefining* 6(1):58-72.
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- Parish, Esther Sullivan (2002) *Linking Channel Instability to urbanization in the Upper Beaver Creek Watershed, Knox County, Tennessee*. Master's Thesis, University of Tennessee, May 2002.
- Sullivan, Esther Marie (1994) *Low temperature pressure-solution deformation, volume strain and cleavage formation in a Neogene subduction zone*. Senior paper series. Yale University, Dept. of Geology and Geophysics; 1994; no. 4. <http://search.library.yale.edu/catalog/3658570>

## AWARDS

- Stanley I. Auerbach Award for Distinguished Achievement presented to Esther Parish by the ORNL Environmental Sciences Division “For creative scientific analyses and spatially explicit tools to help renewable energy stakeholders and the nation meet sustainability goals” (October 2022)
- Clean Energy Education & Empowerment (C3E) Finalist in the category of “Social, Economic, & Policy Innovation” (August 2021)
- UT-Battelle 2017 Award for “Science Communicator” (October 2017)
- Best Poster Award, Smoky Mountains Computational Sciences & Engineering Conference for “Science-Practice Collaboration to Increase Urban Resilience to Climate Change” (September 2016)

- Industrial and Systems Engineering Research Conference (ISERC) Best Track Paper for Modeling and Simulation: “A Decision Analysis Tool for Climate Impacts, Adaptations, and Vulnerabilities” (May 2016)
- ORNL Supplemental Performance Award for organizing a joint ORNL/UT webinar series to highlight recent research in celebration of National Bioenergy Day (February 2016)
- ORNL Supplemental Performance Award for significant contributions to a proposal (April 2014)
- CODiE Award for “Best Science or Health Curriculum” from the Software and Information Industry Association for the JASON curriculum, “Operation: Tectonic Fury” (May 2011)
- ORNL Significant Event Award for Novel Computational Analysis (October 2010)
- ORNL Significant Event Award for Climate War Gaming Support (March 2009)
- My Community, Our Earth (MyCOE) Top Ten Project, as selected by UNEP, World Bank, National Geographic Society and Association of American Geographers (September 2002)
- Professional Accomplishment Award, University of Tennessee Geography Department (April 2002)
- National DOE Pollution Prevention (P2) Award for Information Sharing (April 1999)
- PAI Technical Performer of the Year (December 1998)
- East Tennessee Technology Park (ETTP) P2 Award for Programmatic Support (June 1998)
- PAI President's Award (May 1998)
- Letters of Appreciation from ETTP Waste Management (February 1998, August 1997)
- PAI Manager's Award (December 1997)
- Letters of Appreciation from the ETTP P2 Program Coordinator (August 1997, March 1997)
- DOE Oak Ridge Operations Pollution Prevention (P2) Award for Innovative P2 Training (June 1996)
- Best Engineers of Schlumberger Technologies (BEST) Award (1995)
- Schlumberger Client Service Award (April 1995)
- Yale University Department of Geology & Geophysics Hammer Award (May 1994)
- National Merit Scholar (1990)
- University of Chicago Prize for Commitment to School and Community (1990)
- Bausch & Lomb Science Award (1990)
- Outstanding Illinois State Science Fair Project in the Category of Conservation (1988)
- Illinois Clean Water Award (1988)
- U.S. Meteorological Society Award for Creativity (1987)