

Bioenergy, Sustainability, and Land-Use Change Report Oak Ridge National Laboratory (ORNL) September 2017

Publications

- Dale VH, Kline KL, Richard TL, Karlen DL, Belden WW (In press) Bridging biofuel sustainability indicators and ecosystem services through stakeholder engagement. Special issue of *Biomass and Bioenergy* on “Biofuels and Ecosystem Services.”
- David Gorelick, Yetta Jager (submitted) Siting bioenergy feedstock introductions through multi-objective spatial optimization, *Land Use Policy*.
- Fritsche, UR, G Berndes, AL Cowie, VH Dale, KL Kline, FX Johnson, H Langeveld, N Sharma, H Watson, J Woods (2017) Energy and land use. Working Paper for the UNCCD Global Land Outlook. Prepared for UNCCD and IRENA. https://global-land-outlook.squarespace.com/s/Energy-and-Land-Use_U_Fritsche-t9tw.pdf
- Jager HI, Efroymson RA (2017) Can Upstream Biofuel Production Increase the Flow of Downstream Ecosystem Goods and Services? Special issue of *Biomass and Bioenergy* on “Biofuels and Ecosystem Services.” <https://doi.org/10.1016/j.biombioe.2017.08.027>
- Parish ES, Dale VH, Kline KL (In press) Has pellet production affected SE US forests? *World Biomass*. DCM Productions, United Kingdom.
- Parish ES, Herzberger AJ, Phifer CC, Dale VH (In press) Telecoupled transatlantic wood pellet trade provides benefits in both the sending and receiving systems. Special issue of *Ecology and Society* on “Telecoupling: A New Frontier for Global Sustainability.”

Presentations

Sept. 6: Esther Parish presented a new poster entitled, “Using Future Climate Projections to Prioritize Knoxville’s Green Infrastructure Projects,” at the Cities Advisory Council meeting held at ORNL. The meeting was hosted by the ORNL Urban Dynamics Institute.

Sept. 12-15: Virginia Dale gave a presentation on “Assessing Progress toward Sustainability of Bioenergy Systems” at the International Association for Landscape Ecology (IALE) 2017 European Congress in Ghent, Belgium, in a symposium organized by Felix Keinast and Tom Edwards on “Integrating renewable and non-renewable energy development with landscape service trade-offs.”

Photo: Tom Edwards, Felix Keinast and Virginia Dale at the International Association for Landscape Ecology (IALE) 2017 European Congress in Ghent, Belgium.



Sept 12-15: Yetta Jager and Terry Matthews participated in the National Institute of Mathematical and Biological Sciences working group on Modeling Risk from ‘Molecules to Organisms and from ‘Organisms to Ecosystem Services.’

Sept. 18: At the invitation of Felix Keinast, Virginia Dale presented on “Sustainability Considerations for Energy Options” co-authored with Keith Kline, for the Landscape Ecology Group at the Swiss Federal Institute for Forest, Snow and Landscape Research.

Photo: Felix Keinast and Virginia Dale at the Swiss Federal Institute for Forest, Snow and Landscape Research.



Sept 18. Yetta Jager presented 'Risk and Resilience' to the ORNL Climate Change Science Institute 'Stretch Goal' brownbag including research on risk from hypoxia and wildfire and bioenergy solutions thereto.

Sept 18-20: Esther Parish attended the “Landscape Design for Sustainable Bioenergy Systems Project Team Meeting” hosted by Antares Group at the Farm Bureau in West Des Moines, Iowa and presented

ORNL's recommended framework for collecting and integrating indicators of sustainability. DOE BETO Sponsor Kristen Johnson also attended the team meeting and highlighted the fact that Virginia Dale and Keith Kline are communicating the project's progress to the International Energy Agency (IEA) Bioenergy Inter-task. Several important visitors dropped by the meeting including Iowa Farm Bureau President Craig Hill, Iowa Department of Agriculture Secretary Bill Northey (currently being considered by President Trump for a USDA under-secretary position), Iowa Office of Energy Independence Program Manager Shelly Peterson, and Iowa Department of Economic Development's Mark Lorenzo. On Sept 18, Esther toured the Iowa State University Bio-century Farm with Bill Belden and Kevin Comer of Antares, Doug Karlen of USDA, and several other meeting participants.

Photos: During the Landscape Design meeting, a USDA field agent presented the effect of tillage on soil properties via two demonstrations. Tilled soil falls apart when placed in water and absorbs very little rainfall. By contrast, healthy soil stays aggregated in water and is able to capture and retain the water that crops need.



Photos: Show tilled vs. no tilled soil (darker color = tilled soil). The group picture shows Bill Belden of Antares Group speaking to the ISU Bio-century Farm tour participants next to some water sampling equipment.

Sept. 22: Yetta Jager presented her white sturgeon and fall Chinook salmon population models, which may be used in support of an upcoming Environmental Impact Statement for the Columbia River hydropower system by Federal Agencies (USACE, BPA, and BOR).

Sept. 25: Esther Parish successfully defended her PhD dissertation on "Investigating the Sustainability of Southeastern United States' Wood Pellet Production for Use in European Biopower Facilities" for the Bredesen Center for Interdisciplinary Research and Graduate Education at the University of Tennessee.



Photo: Adam Taylor, Nicholas Nagle, Esther Parish, Keith Kline and Virginia Dale are pleased that Esther did so well at her dissertation defense.

Sept 23-27: Yetta Jager participated in a symposium on September 27, 2017, highlighting authors in an upcoming Renewable Energy and Wildlife book to be published by Johns Hopkins Press in conjunction with The Wildlife Society. The Symposium is sponsored by the Renewable Energy Working Group of The Wildlife Society and will be held at the annual meeting in Albuquerque, NM.

Sept. 28: Virginia Dale was the speaker for the Jason Live Science virtual Q&A session targeted to middle school students: <http://www.jason.org/virginia-dale>

Other ORNL Activities

Paul Leiby conferred with sponsors at EPA/OTAQ on research related to ORNL's contributions to Regulatory Impact Assessments in connection with EPANHTSA GHG/Fuel-Economy regulations (calculation of energy security impacts, in support of the Midterm Evaluation)

Paul Leiby completed arrangements with the US Assoc. For Energy Economics for developing and filling-

out a Concurrent Session at the association's meeting Nov 2017 (Houston), on "Energy Security and Emergency Oil Stockpiling." Speakers/papers include those from ORNL, DOE, and Duke University/Resources for the Future.

Sept. 6: Sarah Eichler-Inwood successfully completed her comprehensive exam for her PhD under the Bredesen Center. Her major professor was Virginia Dale, and Keith Kline also served on her committee. Her dissertation was titled "Improving sustainability of agricultural landscapes through assessment and adaptive management."

Sept. 7: Energy Analysis Team (Paul Leiby, D. Oladosu, R. Uria-Martinez, D. Bowman, and M. Johnson) held the first planning call for their new project on Benefits of Emergency Oil Stockpiling, with DOE/FE/SPR sponsor and International Energy Agency sponsor (Head, Energy Policy and Security Division).

Sept. 14: Amy Wolfe met with Federal Energy Management Program (FEMP, within DOE-EERE) sponsor, Nic Baker, in DC to discuss plans for using FEMP Institutional Change (IC) approaches to enhance FEMP effectiveness and identify appropriate metrics for FEMP's impact. She and Christopher Payne (LBNL IC collaborator) also had a lengthy conference call with Nic Baker and Elena Meehan (contractor) on September 12 to discuss steps the IC team will take in the next few weeks and the remainder of the calendar year to analyze Energy Exchange 2017 feedback and metrics to assist in Energy Exchange 2018 planning.

Sept. 14: Obadebo Oladosu and Paul Leiby held a conference call with EPSA personnel on identifying detailed flow data for validating or calibrating the ORNL-developed TRIM (Transportation, Refining and Infrastructure Model).

Sept. 14-15: Amy Wolfe, in her 2nd term as a member of the AAAS Committee for Scientific Freedom and Responsibility (CSFR), participated in a biannual CSFR meeting in Washington, DC. CSFR has been working on a project that includes an updated AAAS Statement on Scientific Freedom and Responsibility and associated materials for the past few years.

Upcoming ORNL Visits/Events

Oct. 18: ORNL will participate in the Fifth Annual National Bioenergy Day (led by Esther Parish).

Oct. 18-20: Keith Kline is invited to give a keynote presentation on the interactions among bioenergy and food security for the "Ethanol Summit of the Americas," Houston, Texas.



Oct. 24-26: Keith Kline will participate in the CRC Life-Cycle Assessment of Transportation Fuels Workshop to be held at Argonne National Laboratory, IL.

Oct. 31-Nov. 3: Yetta Jager is invited to participate in a review of the Department of Interior's Northeast Climate Change Science Center, which will include a visit to USGS Conte Lab.

Nov. 7-8: Virginia Dale and Keith Kline are invited to attend the workshop at the University of Florida-UF in Gainesville, Florida, on "Ethanol in the Americas"

<http://bioenfapesp.org/gsb/lacaf/index.php/workshop-ethanol-in-the-americas>

Nov. 15-17: Latha Baskaran will give a presentation at the annual Society of American Foresters National Convention in Albuquerque, NM. The presentation is on "Framework to Identify Effects of Forest Management for Wood-based Pellets on Biodiversity."

Dec. 6-8: Virginia Dale and Keith Kline will participate in the first workshop of the US-China Food-Energy-Water Systems Transdisciplinary Environmental Research Network in Nashville, TN. Virginia will give a plenary lecture on "Environmental Challenges and Opportunities in the Food-Energy-Water Nexus."

Dec. 11-15: At the invitation of Tom Richard, Virginia Dale submitted an abstract to the session on "Carbon-negative Bioenergy" at the 2017 AGU Fall Meeting Session.

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