

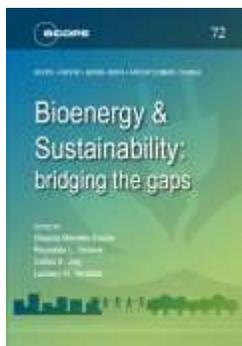
Bioenergy, Sustainability, and Land-Use Change Report Oak Ridge National Laboratory (ORNL) September 2015

Publications

- Pollesch, N and Dale, VH (2015) *Aspects of aggregation theory that apply to assessing bioenergy sustainability using multiple indicators*, Deliverable to BETO under WBS 4.2.2.40 Bioenergy Sustainability: How to define and measure it.
- Dale, VH and Kline, KL (2015) *Opportunities, Barriers, and Paths Forward for Sustainable Use of Bioenergy*. Deliverable to BETO under WBS 4.2.2.40 Bioenergy Sustainability: How to define and measure it.
- Baskaran, LB, Dale, VH, Tran, L and Wang, G (2015) *Aquatic macroinvertebrates as water quality indicators for switchgrass-based land-use changes: an evaluation across Tennessee*. Deliverable to BETO under WBS 4.2.2.40 Bioenergy Sustainability: How to define and measure it.
- Wang, G, Jager, HI, Baskaran, LM, Baker, TF and Brandt, CC (2015) *Projecting changes in water quality in the Tennessee River Basin associated with growing biofuels: I. SWAT model calibration and validation*. Deliverable to BETO under WBS 4.2.1.40, Q4 Milestone.

ORNL Presentations

Sept. 15 – Gangsheng Wang gave an oral presentation entitled *Hydrological Modeling of the Tennessee River Basin* (Authors: Gangsheng Wang, Yetta Jager, Latha Baskaran) at the Watershed Symposium hosted by the University of Tennessee (<http://isse.utk.edu/wrrc/>) Also, Natalie Griffiths presented a poster on the “Effects of short-rotation pine management for bioenergy on water quality in the southeastern U.S.”



Sept. 28 – Virginia Dale participated in the debate about the recent SCOPE report on “*Bioenergy and Sustainability: Bridging the Gaps*” at the World Bank in Washington, DC.

Sept. 29: Virginia Dale participated in the presentation on the recent SCOPE report on “*Bioenergy and Sustainability: Bridging the Gaps*” to BETO.

Sept. 29-Oct. 2: Rebecca Efroymson attended the 2015 Algae Biomass Summit in Washington, DC, and presented her talk on “*Environmental and socioeconomic indicators for sustainable production of algal biofuels.*”

Sept 30-Oct 2: Esther Parish presented her multi-metric sustainability case study assessment of the Vonore switchgrass-to-ethanol experiment at the Switchgrass III: Prairie and Native Grass International Conference in Knoxville.



CBES FORUM



Sept. 22: Overview of the pellet industry in the Southeastern US Virginia Dale, Keith Kline, Esther Parish and Emma Tobin spoke on the use of woody biomass for energy from forestry operations in the Southeastern United States (SE US), which has grown rapidly over the past decade. From 2012-2014, wood pellet exports to Europe more than doubled. We are identifying conditions to help assess and monitor aspects of environmental, social and economic sustainability associated with increased wood pellet production in the southeast US. They plan to apply a landscape design approach and contribute science-based analysis for more-informed decision making across the supply chain. This project is sponsored by DOE Bioenergy Technologies Office but is highly relevant to regional, national and international debates and stakeholders ranging from EPA and European regulators to NGOs and private industry.

Other CBES Activities

Sept 2: Keith Kline was appointed as a joint faculty member of the University of Tennessee, Bredesen Center for Interdisciplinary Research and Graduate Education.

Sept 3: Keith Kline assisted the Steering Committee of the Research Coordination Network on Pan American Biofuels and Bioenergy Sustainability (<http://www.aiche.org/panamrcn>) and submitted a draft chapter on biofuels and biodiversity for the Research Roadmap Report. Prepared in collaboration with Audrey Meyer (Michigan Tech University), the chapter provides a synthesis of knowledge gaps and priorities for research based on “*Bioenergy and Biodiversity: Key Lessons from the Pan American Region*” (Kline et al. 2015; Env Mgmt) <http://link.springer.com/article/10.1007/s00267-015-0559-0>



A new International Standard, ISO 13065 Sustainability Criteria for Bioenergy, was published (9/2015). ORNL and a team of US experts contributed to components including GHG emission methods, energy efficiency, terminology, and direct versus indirect effects. Publication culminates five years of effort involving over 200 experts from 40+ nations. Overview: <https://www.youtube.com/watch?v=tvu12Lzqo4o> http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=52528 (ISO)



Sept. 10: CBES participated in the BETO live bioenergy Twitter chat. BETO collaborated with #SciStuChat to host a bioenergy-focused Twitter chat. #SciStuChat connects high school students with scientist, science educators, and other experts via Twitter.

Sept. 10: Esther Parish submitted an article to a special 2016 Southeastern Partnership on Integrated Biomass Supply Systems (IBSS) edition of “Auburn Speaks.” The article provides an overview of ORNL’s ongoing bioenergy sustainability research and recent collaboration with IBSS. Auburn Speaks is an award-winning, annual, publication from Auburn’s Office of the Vice President for Research and Economic Development showcasing research and creative scholarship. In the past, it has featured work by Auburn University faculty, students, staff and alumni. For this special issue, submissions have been requested from IBSS investigators at all of the partner organizations.



Sept 14, 18: ORNL participated in project kick-off calls with collaborators in the Antares Group, Inc. project on landscape design for sustainable bioenergy. This project was awarded in August by the Department of Energy to improve cellulosic bioenergy supply chains in Iowa and Kansas.

<http://www.energy.gov/eere/articles/energy-department-announces-9-million-improve-sustainability-cellulosic-bioenergy>

Sept. 9, 23, 30: Kline and Davis participated in webinars of the ASTM International Committee E-48 team developing a draft standard practice guide on sustainability assessment for bio-based energy products. A revised draft of the rationale and scope were developed and reviewed along with discussion of how this initiative is distinct from others such as ISO.

Sept. 14: Dale and Kline supported the National Technical Lead (USDA) for the International Energy Agency (IEA) Task 43 – Biomass Feedstocks – providing comments on the work plans for the next triennium period.

Sept 17: Yetta Jager’s joint faculty appointment with the Department of Ecology and Evolutionary Biology at the University of Tennessee was extended to support mentoring of post-doctoral fellows funded by the NSF National Institute for Mathematical and Biological Synthesis.

Sept. 20: Kline and Dale visited the old growth forest on the Oak Ridge Reservation with Bill Johnston. The old growth forest is a potential site visit for the FY16 BETO Southeastern US Bioenergy Study Tour scheduled for April of next year.



Sept. 20: Kline and Davis submitted ORNL Update Report #14 on BETO support to the development of ISO 13065. A preliminary analysis of the approved standard was also completed. The analysis considered 71 enumerated reporting requirements and identifies where up to 200 additional sub-requirements are incorporated under the indicators, mostly related to environmental aspects in the standard. The preliminary analysis reviews each requirement and indicator with regards to specific strengths and areas needing further improvement.

Sept.: CBES staff assisted Matt Langholtz and Tim Theiss in drafting sections for the “Moving Towards Commercialization” chapter of the BT16 Report. Kline led the section on the importance of trade and global markets while collaborating with INL (Lamers). Dale led section on implementing landscape designs to address sustainability issues.

Sept. 29-30: Tom Richard (Pennsylvania State University) visited ORNL and met with Keith Kline and Virginia Dale to discuss the new Antares project and plans to use a student from the university to help ORNL with the project and with Matt Langholtz, Adam Guss, and Laurence to discuss the Billion Ton update.

Sept. 30: Yetta Jager submitted an example of to the GBEP – IEA Bioenergy workshop on “Examples of Positive Bioenergy and Water Relationships” on behalf of the BETO-funded “Forecasting Water Quality and Biodiversity” project, which has demonstrated median reductions in nutrient, sediment and water yield for a large tributary river basin of the Mississippi River.

Upcoming ORNL Visits/Events:

Oct. 6-9: Virginia Dale and Keith Kline will participate in the AIChE Food-Energy-Water Nexus Workshop in Baltimore Maryland. This workshop will strive to unite experts in systems analysis and metrics to identify research needs and challenges to understanding the nexus along with the associated tradeoffs between food, energy, and water. The workshop will be designed to help to define the roles of professional societies and how they can foster collaborations between government, industry, and academia.

Oct. 15: GangSheng Wang will attend 2015 Soil and Water Assessment Tools (SWAT) conference. He will present a paper entitled: “Forecasting changes in water quality in the Tennessee River Basin with growing biofuels.” Authors: Gangsheng Wang, Yetta. Jager, Latha Baskaran, Tyler F. Baker, Craig C. Brandt. (<http://swat.tamu.edu/conferences/2015-purdue>)

Oct. 19-20: Virginia Dale will attend the NSF Food-Energy-Water (FEW) Nexus Workshop in Rapid City, South Dakota. This workshop will provide an opportunity for researchers, academics, industry, and governmental agencies to collectively discuss current and future challenges AND solutions within the Food-Water-Energy (FEW) sectors for the upper Great Plains region.

Oct. 21: ORNL will celebrate the 3rd Annual National Bioenergy Day by contributing several webinars to a week-long Bioenergy Week Web-a-thon being planned by the USDA-funded Southeastern Partnership for Integrated Biomass Supply Systems (IBSS). The webinars are planned to raise awareness of bioenergy and its potential benefits. All of the talks will be archived for future access. The planned ORNL speakers and the titles of their talks are:

- Maggie Davis will present “*Indirect Effects of Bioenergy: International Standards and Science*” with coauthors Ghatala F., Goldin D, and K. Kline.
- Esther Parish will present “*Environmental and socioeconomic sustainability analysis of switchgrass-to-ethanol production in Eastern Tennessee*” with coauthors V Dale, B English, S Jackson, and D Tyler.
- Natalie Griffiths will present “*Examining the effects of woody biomass production for bioenergy on water quality and hydrology in the southeastern United States*” with coauthors R Jackson, M Bitew, E Du, K Vaché, J. McDonnell, J Klaus, and B M. Rau
- Yetta Jager will present “*Future bioenergy production in two southern tributary basins of the Mississippi River Basin is projected to improve water quality*” with coauthors L Baskaran, G Wang, J Kreig, and C Brandt

Oct. 26-29: Virginia Dale and Keith Kline are invited to participate in the International Energy Agency (IEA) Bioenergy Conference 2015 in Berlin, Germany. Virginia will give a presentation titled “*Integrating biomass supply systems into sustainable landscape designs*” with coauthors Keith Kline and Esther Parish. Keith will give a poster on “*Understanding Indirect Effects: Evaluating and Improving Science-based Practices for ILUC assessment*” with coauthors Hans Langeveld, Virginia Dale and Rebecca

Efroymson.

Nov. 2-6: Keith Kline and Maggie Davis plan to attend the Society of American Foresters annual convention and present on “*Bioenergy Trade and Sustainability Assessment: Science, Truth and Consequences*” and “*Indirect Effects of Bioenergy: International Standards and Science*” in a special session on “Sustainability of International Trade in Bioenergy.” Virginia Dale will also attend and give a presentation on “*Using landscape design to assess sustainability of wood biomass production from southeast US forests.*”

Jan. 19-21: Virginia Dale, Donna Perla (EPA), and Doug Karlen (USDA) have organized two sessions on the bioeconomy at the Jan. 19-21 Conference in Washington, DC, of the National Council on Science and the Environment on the Food-Energy-Water Nexus: <http://www.ncseonline.org/2016-food-energy-water-nexus> . USDA, DOE, and EPA are all sponsors for this conference.