

## **Bioenergy Sustainability and Land-Use Change Report Oak Ridge National Laboratory (ORNL) September 2011**

### **ORNL Publications:**

Kline KL, GA Oladosu, VH Dale, AC McBride 2011. Scientific analysis is essential to assess biofuel policy effects: In response to the paper by Kim and Dale on “Indirect land-use change for biofuels: Testing predictions and improving analytical methodologies,” *Biomass and Bioenergy* 35 (2011), pp. 4488-4491. <http://dx.doi.org/10.1016/j.biombioe.2011.08.011>  
[first published on-line: September 10, 2011]

Schweizer, P. and H.I. Jager. 2011. Modeling fish diversity in the Arkansas-Red-White River Basin. *Transactions of the American Fisheries Society* 140(5): 1227-1239.  
<http://dx.doi.org/10.1080/00028487.2011.618354>

### **ORNL Presentations:**

September 9 – Keith Kline presented a review of opportunities and synergies between food security and reduced GHG emissions for the workshop on “The Role of Commodity Roundtables & Avoided Forest Conversion in Subnational REDD+” in San Diego, California.

September 15 – Keith Kline presented “The Standards Process and the Importance of Participation: A review of the work of WG4 and the Indirect Land Use Change Issue” and Maggie Stevens presented “Standards and Indirect Land Use Change: A brief review of the decomposition analysis paper by ‘Debo Oladosu and the importance to the bioenergy industry’” in a multi-sector forum hosted by the Instituto Argentino de Normalización y Certificación (IRAM) in Buenos Aires, Argentina.

September 16 - Allen McBride presented "Indicators to Support Environmental Sustainability of Bioenergy Systems" at the US-China Advanced Biofuels Forum at Idaho National Laboratory.

September 19-21 – ORNL scientists made four presentations at the International Energy Agency (IEA) Joint Task 38/40/43 Workshop on "Quantifying and managing land use impacts of bioenergy" in Campinas, Brazil.

- Keith Kline presented “Top Ten Steps to Improve Quantification of Land-Use Change Effects of Bioenergy Systems”
- Virginia Dale presented “Indicators to Support Environmental Sustainability of Bioenergy”
- Maggie Stevens presented a paper by Debo Oladosu and colleagues titled “Empirical Analysis of the Sources of Corn Used for Ethanol Production in the United States: 2001-2009”
- Keith Kline presented “Moving Forward: Policies to Improve Land Use & Address Social Concerns” and a plenary comment summarizing “Challenges to Certifying Sustainable Bioenergy Production”

Sept 21-22—Mike Hilliard and Paul Leiby presented “Integrating Biofuels Supply-Demand Chain Modeling at Local and National Levels for Strategic Analysis” at a workshop on Biofuel Supply Chain Modeling at NREL in Golden, CO.

September 26-27 – Esther Parish gave a talk at the China-US 2011 Joint Symposium on Global Sustainability Issues in Energy, Climate, Water and Environment at Purdue University on “Landscape Design for Bioenergy Cropping Systems” and made good contacts with other researchers interested in sustainability of bioenergy systems (e.g., Purdue Prof. Indrajeet Chaubey).

**ORNL CBES Forum:** September 15 - Randy Jackson, Associate Professor at the Grassland Ecology Department of Agronomy Co-chair Agroecology MS Program Nelson Institute for Environmental Studies Great Lakes Bioenergy Research Center University of Wisconsin-Madison and Meredith Luschen Business Operations Director presented “Ecosystem service tradeoffs in grassland plant communities grown for bioenergy feedstock.” This presentation can be accessed at the CBES website under forums: <http://www.ornl.gov/sci/ees/cbes/forums.shtml>

**Other ORNL Activities:**

Yetta Jager and Peter Schweizer met with Mike Meador of the U.S. Geological Survey (USGS) Reston, VA office. We discussed his research to identify indicator species known to be sensitive or tolerant to agricultural and urban water quality influences using data collected as part of the national-scale USGS National Water-Quality Assessment (AWQA) Program. We plan to build on his approach in our research to anticipate fish diversity responses to bioenergy crop production.

September 7-9 – Keith Kline participated in a workshop on the “Role of Commodity Roundtables & Avoided Forest Conversion in Subnational REDD+” focusing on agriculture, food security and GHG accounting organized by the National Wildlife Federation and the Roundtable on Sustainable Biofuels (RSB); San Diego, California.

September 12-15 – Keith Kline and Maggie Stevens contributed to the development of a draft report on how to handle indirect effects for a proposed International Organization for Standardization (ISO) standard on sustainability criteria for bioenergy, in Project Committee 248 Working Group 4 meeting hosted in Buenos Aires, Argentina.

September 22 – Virginia Dale and Keith Kline met at the Bioethanol Technology Center (CTBE, Campinas, Brazil) with Luis Cortez and a dozen researchers from four institutions involved in the development of the Latin America, Caribbean and African (LACAF) bioenergy project to discuss opportunities for collaboration and building linkages among OBP sustainability research, the Global Sustainable Bioenergy initiative, and LACAF.

September 28-30 – A workshop on “The Billion Ton Study: What can be Learned about Bioenergy Sustainability?” was held at Oak Ridge National Laboratory (ORNL). An all day field trip on the 28<sup>th</sup> featured demonstration of forest residue collection, the National Transportation Research Center, switchgrass fields, and the Genera Energy LLC Biomass Innovation Park. Sixty participants in total attended the workshop. Thirteen people attended the workshop session via live meeting. Presentations and other information about the workshop can be found at <http://www.ornl.gov/sci/ees/cbes/workshop.shtml>.

### **Upcoming ORNL Visits/Events:**

Virginia Dale shared guidance regarding the National Research Council Report on biofuels to be released October 4, noting that it is difficult to reach conclusions when data are inadequate, some models are applied at inappropriate scales, and key processes are not included in model theories. Her recommendations were to (a) read details with attention to the assumptions, scales, and caveats of analyses; (b) be aware that the report focuses on model projections rather than data, and the models did not reflect place-based details; and (c) recognize that the report was not based on current information (e.g., it did not consider the Billion Ton Update, and rather was based on earlier projections of biomass production, and does not include current information from bioenergy technology industries due to restrictions of proprietary data). She concludes that the answer to the question of what are the economic and environmental effects of biofuels is that 'it always depends' on a broad set of preexisting conditions, trends and available options, with no one solution being the best for all situations.

Rebecca Efroymsen will be leading the development of an issue paper on the identification and use of ecological endpoints for a biofuel feedstock ecological risk assessment. The work will be done for Versar, Inc. and, along with Environmental Protection Agency (EPA's) conceptual models for assessing ecological risk from biofuel feedstock production, will form the basis of an upcoming EPA workshop.

Oct 3-4 – Matt Langholtz and Virginia Dale will participate in the Council on Sustainable Biomass Production (CSBP) meeting in Knoxville, TN. The meeting focused on continued development of biomass certification standards and processes for producers and consumers, targeting roll-out in July of 2012.

Oct 4-7 - Debo Oladosu and Keith Kline collaborated with research colleagues in Brazil to review and comment on the revised Global Trade Analysis Project (GTAP) model simulations for indirect land-use change that were presented to the California Air Resource Board (CARB) and released to the public on 15 Sept 2011.

October 9-12 - Debo Oladosu will give a presentation at the 30th U.S. Association for Energy Economics/International Association for Energy Economic (USAEE/IAEE) North American Conference from October 9-12, 2011 at the Capital Hilton Hotel, Washington, DC. The presentation examines the global indirect energy use and associated emission implications of biofuels policy in the USA.

October 10 – Rocio Uria-Martinez will give a presentation at the 30th USAEE/IAEE North American Conference from October 9-12, 2011 at the Capital Hilton Hotel, Washington, DC. The presentation is on “Modeling Energy Security and Economic Sustainability Issues of the U.S. Biofuel Industry” Co-authors are Paul Leiby and ‘Debo Oladosu of ORNL.

October 11 – Paul Leiby will give a presentation at the 30th USAEE/IAEE North American Conference from October 9-12, 2011 at the Capital Hilton Hotel, Washington, DC. The presentation is on “National Low Carbon Fuel Standard: Tradable Credits System Design and Cost Savings” Co-author is Prof. Jonathan Rubin, U. Maine. This paper considers the role of low-carbon biofuels under a hypothetical national standard for average motor fuel carbon intensity, such as that being implemented in California, with a focus on flexible credit markets.

October 18-19 – Keith Kline will speak at The Coordinating Research Council (CRC) Lifecycle Analysis Workshop in the "Land Use Change and GHG Emissions" session at Argonne National Laboratory.

October 25 - Virginia Dale will give a presentation on environmental stewardship in bioenergy crop production during the Biomass Production Field Day in Vonore, TN. This event is sponsored by the University of Tennessee, the US Dept. of Energy, Genera Energy, Ceres Inc., and DuPont Danisco Cellulosic Ethanol. A detailed preliminary agenda, along with other field day information, can be found at <http://www.biomassfieldday.com>.

October 25-26 – Laurence Eaton has been invited to attend a DOE/OBP sponsored US-EU Life Cycle Analysis (LCA) workshop at the University of Illinois. The workshop will focus on the sustainability of Biomass production for bioenergy with discussion on the critical needs for making economic and environmental LCAs more effective and realistic, focusing on biofuels.

November 10-11 – Virginia Dale will visit Michigan Technological University as a Distinguished Ecologist lecturer in the School of Forest Resources and Environmental Science.

November 13-16 – Mike Hilliard will give a presentation at the Annual Meeting of the Institute for Management Science and Operations Research (INFORMS) in Charlotte, NC, on the Biomass Location for Optimal Sustainability Model (BLOSM) --Balancing Profit and Water Quality in a Watershed. His presentation will use data from the watershed surrounding a cellulosic ethanol refinery in Tennessee; an optimization model paired with results from a water quality model demonstrates that planting switchgrass in the right locations can improve nitrogen, phosphorus and sediment levels with a moderate impact on revenue. A web-based interface communicates the results.

<https://informaticsmeetingsonline.com/emeetings/formbuilder/clustersessiondtl.asp?csnno=15781&mmnno=206&ppnno=57555>

November 17-18 – Virginia Dale will give a plenary talk on infrastructure sustainability and resilience at the National Science Foundation Emerging Frontiers in Research Innovation, Resilient and Sustainable Infrastructures Program (NSF-EFRI RESIN) Workshop in Champaign, IL. <http://ict.illinois.edu/conferences/RESINworkshop2011/>

February 22-24, 2012 – Virginia Dale will speak on “Environmental and socioeconomic indicators for bioenergy sustainability as applied to Eucalyptus” at symposium on “Assessment and Management of Environmental Issues Related to Eucalyptus Culture in the Southern United States”. The symposium is being organized by the USDA Forest Service and the National Council for Air and Stream Improvement, Inc. (NCASI) in Charleston, SC. Matt Langholtz is assisting in the preparation of this paper.

April 16-20, 2012 - Keith Kline and Maggie Stevens will participate in the second plenary meeting of the ISO Project Committee (PC248) developing a standard on “Sustainability Criteria for Bioenergy” hosted by the U.S. Technical Advisory Group at Argonne National Lab.