

Bioenergy, Sustainability, and Land-Use Change Report Oak Ridge National Laboratory (ORNL) February 2013

ORNL Publications:

- Papers in Special Feature of *Environmental Management* (February 2013) “Sustainability of Bioenergy Systems: Cradle to Grave.” Editor of special feature: Jie Zhuang, University of Tennessee, Knoxville, Tennessee, USA
 - Dale VH, KL Kline, D Perla, A Lucier. 2013. Communicating about bioenergy sustainability. *Environmental Management* 51(2): 279-290. DOI: 10.1007/s00267-012-0014-4
 - Efroymsen, RA, VH Dale, KL Kline, AC McBride, JM Bielicki, RL Smith, ES Parish, PE Schweizer, DM Shaw. 2013. Environmental indicators of biofuel sustainability: What about context? *Environmental Management* 51(2): 291-306 DOI: 10.1007/s00267-012-9983-6
 - Parish ES, KL Kline, VH Dale, RA Efroymsen, AC McBride, TL Johnson, MR Hilliard, JM Bielicki, 2013. A multi-scale comparison of environmental effects from gasoline and ethanol production. *Environmental Management* 51(2): 307-338. DOI: 10.1007/s00267-012-9983-6
 - Johnson TL, JM Bielicki, RS Dodder, MR Hilliard, PO Kaplan, CA Miller. 2013. Stakeholder decision making along the bioenergy supply chain: Sustainability considerations and research needs. *Environmental Management* 51(2): 339-353.
- Dale, V. H. and K. L. Kline. 2013. Modeling for integrating science and management. Pages 209-240 In D.G. Brown, D. T. Robinson, N. H. F. French, and B.C. Reed (editors), *Land Use and the Carbon Cycle: Advances in Integrated Science, Management, and Policy*, Cambridge University Press.
- Dale VH and KL Kline. 2013. Issues in using landscape indicators to assess land changes. *Ecological Indicators* 28:91-99.

ORNL Presentations:

Feb 1-4 - Yetta Jager presented “Thoughts on the role of species interactions in rivers” at the National Institute of Mathematical and Biological Synthesis Working Group on Species Interactions in Knoxville, TN.

Feb 7 – Yetta Jager presented, “Can math and computers help to protect fishes in rivers?” to the STEM (Science/Technology/Engineering/Mathematics) Academy, Farragut High School, Knoxville, TN.

February 13 - Virginia Dale, “From Disturbance to Sustainability” to the Department of Forestry, Wildlife and Fisheries at the University of Tennessee, Knoxville, TN.

ORNL Center for BioEnergy Sustainability (CBES) Forums:

Feb 14: Carlos Cerri of University of Sao Paulo presented “Measuring environmental sustainability indicators in land use change for sugarcane ethanol production in Brazil” This presentation can be accessed at the CBES website under forums: <http://www.ornl.gov/sci/ees/cbes/forums.shtml>

Feb 20 – Rachel Burton, Senior Associate at MARC-IV presented “Enzyme Catalysis for Biomass Based diesel Fuels”. This presentation can be accessed at the CBES website under forums:

<http://www.ornl.gov/sci/ees/cbes/forums.shtml>

Other ORNL Activities:

February 11-14 - Carlos Cerri of University of Sao Paulo visited ORNL, hosted by Keith Kline and Maggie Davis, to discuss soil carbon, nutrient cycling and bioenergy sustainability indicators and their measurement in Brazil. Cerri met with 11 CCSI and CBES scientists while at ORNL, toured the SPRUCE and EVEREST field sites with CCSI's Jeff Warren, and also toured the Center for Renewable Carbon, holding a forum and side meetings with UT researchers.

Feb 13-15- Laurence Eaton attended the Regional Biomass Feedstock Partnership meeting in Tunica, MS.

February 14 – Virginia Dale participated in a webinar with high school students from the Upper Adams School District in Pennsylvania so that they could learn more about science and research.

Feb 15 – Dale, Oladosu and Kline participated in a conference call with United Nations Food and Agriculture Organization team working on bioenergy and food security to discuss recent ONRL paper on sustainability indicators and potential areas of cooperation and collaboration.

February 15 – Davis and Kline participated in Partnerships for International Research and Education (PIRE) conference call with team members from Argentina, Brazil, Mexico, and the US, to discuss project progress and plans including case study site selections.

February 15 – Davis and Kline participated in the NSF Partnership for International Research and Education (PIRE) conference call with team members from Argentina, Brazil, Mexico, and the US, to discuss progress and plans including case study site selections. In subsequent exchanges with teams identifying study sites and indicators, Kline provided recommendations on criteria and additional site options. ORNL also contributed to the PIRE Metrics subgroup conference call (21 Feb) charged with determining which indicators are recommended to assess sustainability across highly variable Pan American socio-ecological systems.

February 15 – Davis and conveners of ISO PC 248 – Sustainability Criteria for Bioenergy – Working Group 4 (Indirect effects) finalized the work plan for mandate to update the PC at the next Plenary (October 2013) on scientific research relevant to the issue of indirect effects.

February 19 – Esther Parish, Latha Baskaran and Virginia Dale met with John Swartz and Zachariah Seiden from the University of Tennessee to discuss their water quality monitoring of watersheds in East TN that are being used to calibrate the SWAT model and improve knowledge about the role of bioenergy crops in affecting water quality.

Feb 20 – Update #9 on contributions to ISO PC248 and report on January ISO plenary was distributed in fulfillment of Q2 Milestone. Plenary outcomes include Resolutions and a revised PC work plan that add a second stage of CD drafting, editing and review, plus the reformulation of criteria and indicators. These positive adjustments for developing a science-based Standard will require additional effort over the coming 12 months (see Update #9 for details).

February 25 – Kline, Kang, Nair, and Davis participated remotely in a Global Sustainable Bioenergy (GSB) and Latin America Caribbean and Africa (LACAf) projects conference call to discuss plans collaborative research on crop modeling/LUC and socially beneficial bioenergy (socioeconomic indicators).

Feb 27 – Kline and Singh (reviewed by Dale and Eaton) drafted initial comments for internal review of a LUC paper published by Wright and Wimberly in PNAS.

Upcoming ORNL Visits/Events:

March 8 - Esther Parish and Latha Baskaran completed a short course in Supercomputing designed to provide a brief introduction to the concepts of high performance computing (HPC), as well as introduce the tools and methods for using high performance computers to solve scientific problems. The course was offered by the [National Institute for Computational Sciences \(NICS\)](#) and the [Joint Institute for Computational Sciences \(JICS\)](#)

March 7-8 – Virginia Dale will serve as panelist on the National Science Foundation’s Exploratory and Research Collaborative Network Grants Panel in Arlington, VA.

March 17-24 – Virginia Dale will be a keynote speaker at the 4th meeting of the Ecological Society of Mexico to be held in Villahermosa, Tabasco.

April 2-4 – Virginia Dale will a guest plenary speaker at the 2013 Conference on Invasion Biology, Ecology and Management Conference in Lexington, KY.

May 7-8 – NREL/ORNL Bio-LUC model and LUC modeling review workshop at ORNL.

April 14-18 – Esther Parish will present at the annual symposium of the US chapter of the International Association of Landscape Ecologists in Austin, TX.

April 9-13 – Latha Baskaran will present at the Association of American Geographers (AAG) annual meeting in Los Angeles, CA.

May 27-31 – NSF PIRE and Collaborative Research Network biofuels workshops (back-to-back) hosted by Argentina (funded by NSF grant/MTU).

June 1-15 – Brazil biofuel sustainability research collaborations for land inventory, LUC, and socio-economic indicators (funded by counterparts in Brazil).

August 12-14 - Virginia Dale is invited to present at the 2nd International Conference on Biodiversity & Sustainable Energy Development in Raleigh, NC.

August 13-15 – Martin Schweitzer will be attending the International Energy Program Evaluation Conference in Chicago, IL.

October (dates to be determined) – ISO PC 248 Plenary to review second committee draft of ISO 13065, Sustainability Criteria for Bioenergy.