

**Bioenergy, Sustainability, and Land-Use Change Report
Oak Ridge National Laboratory (ORNL) January-May 2018**

Dear readers,

We are reinitiating reports of the ORNL Center for BioEnergy Sustainability (CBES) and aim to issue quarterly updates in the future. Virginia Dale transitioned to the University of Tennessee where she continues research and publications on landscape ecology and system responses to disturbance. Please see the CBES website <https://cbes.ornl.gov/> for information on publications and presentations listed below. And let us know if you have comments or questions or would like a copy of any of the publications listed here. Thanks for your interest in more sustainable energy systems that incorporate biomass.

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Publications

- Baskaran L, Dale VH (in review) Framework to assess how wood pellet production affects species of concern: An example using gopher tortoise (*Gopherus polyphemus*). Biological Conservation.
- Davis, Alves, Karlen, Kline, Galdos, Abulebdeh (2018) Review of Soil Organic Carbon Measurement Protocols: A U.S. and Brazil Comparison and Recommendation. *Sustainability* 10(1)53; doi:10.3390/su10010053 <http://www.mdpi.com/2071-1050/10/1/53>
- Dale VH, Kline KL, Richard TL, Karlen DL, Belden WW. 2017 (in press) Bridging biofuel sustainability indicators and ecosystem services through stakeholder engagement. In a Special Issue on "Biofuels and Ecosystem Services" Biomass & Bioenergy <http://authors.elsevier.com/sd/article/S0961953417303100>
- Davis M, Alves BJR, Karlen D, Kline KL, Galdos M, Abulebdeh D. 2018 (in press). Review of Soil Organic Carbon Measurement Protocols: A U.S. and Brazil Comparison and Recommendation. *Sustainability* 10(1)53; doi:10.3390/su10010053 <http://www.mdpi.com/2071-1050/10/1/53>
- Griffiths, N.A., B.M. Rau, K.B. Vache, G. Starr, M.M. Bitew, D.P. Aubrey, J.A. Martin, E. Benton, and C.R. Jackson. Environmental effects of short-rotation woody crops for bioenergy: What is and isn't known. In Review at GCB Bioenergy.
- Inwood SE, López-Ridaura S, Kline KL, Gérard B, Monsalve AG, Govaerts B, Dale VH. (2018 in press) Assessing sustainability in agricultural landscapes: a review of approaches. *Environmental Reviews*. <http://dx.doi.org/10.1139/er-2017-0058>
- Jager and Efroymson. In press. *Can upstream biofuel production increase the flow of downstream ecosystem goods and services?* Biomass and Bioenergy, Special Issue on Ecosystem Services.
- Jager, Kreig, and Novello. Revision invited. *Beyond Sharing and Sparing: Designing Landscapes for Bioenergy and Wildlife*. Conservation Biology.
- Jager, Villnas, Novello, Dale, & Rose. (submitted) 'Unnatural hypoxic regimes'. *Ecosphere*.
- Kanter DR, Musumba M, Wood SLR, Palm C, Antle J, Balvanera P, Dale VH, Havlik P, Kline KL, Scholes RJ, Thornton P, Tiftonell P, Andelman S. 2018. Evaluating agricultural trade-offs in the age of sustainable development. *Agricultural Systems* Volume 163, June 2018, Pages 73-88. <https://doi.org/10.1016/j.agsy.2016.09.010>
- Mandal, S., Shurin, J., Efroymson, R., Mathews, T. (2018) Heterogeneity in nitrogen sources enhances productivity and nutrient use efficiency in algal polycultures. *Environmental Science & Technology* 52: 3769-3776. DOI: 10.1021/acs.est.7b05318
- Mandal, S., Shurin, J., Efroymson, R., Mathews, T. (accepted) Functional divergence in nitrogen uptake rates provides mechanistic basis for diversity-productivity relationship in microalgal communities. *Ecosphere* 9(5): 1-14 <http://dx.doi.org/10.1002/ecs2.2228>
- Oladosu G & Keith L. Kline (2018 in press) "Pity the poor biofuels policymaker: reconsidered." *Biofuels*, DOI: <https://doi.org/10.1080/17597269.2018.1476220>

Oladosu GA, Leiby PN, Bowman DC, Uria-Martinez R, Johnson MM. May 10, 2018. Oil Price Shocks and the U.S. Economy: An Updated Synthesis of Impact Estimates. Science Trends.

[\[https://sciencetrends.com/oil-price-shocks-and-the-u-s-economy-an-updated-synthesis-of-impact-estimates/\]](https://sciencetrends.com/oil-price-shocks-and-the-u-s-economy-an-updated-synthesis-of-impact-estimates/)

Singh, N., Kline, K. L., Efrogmson, R. A., Bhaduri, B., & O'Banion, B. (2017). Uncertainty in Estimates of Bioenergy-Induced Land Use Change. Chapter 10 in *Bioenergy and Land Use Change* (pp. 141–153). John Wiley & Sons, Inc. [\[https://doi.org/10.1002/9781119297376.ch10\]](https://doi.org/10.1002/9781119297376.ch10)

Wang, G., H.I. Jager, L. Baskaran, & C. Brandt. Hydrology and Water Quality Responses to Biomass Production in the Tennessee River Basin was submitted to the journal *Global Change Biology: Bioenergy* on 5/1/2018

Presentations

07-11 Jan 2018: Rocío Uría-Martínez and Paul Leiby presented a poster titled “Cost of Oil and Biomass Supply Shocks under Alternative Biofuel Supply Chain Configurations” at the Transportation Research Board 97th Annual Meeting. Washington, DC

07-11 Jan 2018: Paul Leiby and Jonathan Rubin presented a poster titled “Decentralized Incentives to Promote Sustainable Outcomes with Connected Autonomous Vehicles” at the Transportation Research Board 97th Annual Meeting in Washington, DC

05 Feb 2018: Keith Kline gave a presentation in Houston, Texas, about the new project to develop a *Protocol for Reference Scenarios involving Bio-based Product Systems* in conjunction with the annual meeting of ASTM International Committee E48 on Bioenergy and Industrial Chemicals from Biomass.

05 Feb 2018: Esther Parish presented “ORNL’s Research into the Sustainability of Southeastern United States’ Wood Pellet Production,” for BETO monthly A&S webinar. The presentation was coauthored by L. Baskaran, K. Kline, V. Dale, and colleagues from several external institutions.

16 Feb 2018: Erin Webb presented on bioenergy R&D to a group of students from Campbellsville High School who are planning to visit and tour the ORNL campus.

25-28 Feb 2018: Erin Webb attended the 2018 Genomic Sciences Program Annual Principal Investigator Meeting to present, “Technoeconomic Analysis of Biofuel Feedstock Supplies to Inform Plant Development R&D” Tysons, VA

27 Feb 2018: Kline prepared and presented “Bioeconomy Scenarios, Indicators, Economic Analysis & ORNL research related to framework for assessing effects of expanding US Bioeconomy” to identify potential collaborations, in the NREL Workshop on a “Framework to assess effects of expanding Bioeconomy.”

01 March 2018: Bhavna Sharma presented “Simulation modeling for reliable biomass supply chain design under operational disruptions” at the 4th Annual Women in STEM Research Symposium held at the University of Tennessee. March 1. 2018. Knoxville, TN

14 March 2018: “Assessment of Environmental Sustainability Indicators: ORNL Contributions to Landscape Design for Sustainable Bioenergy Systems, presented by Esther Parish (coauthors Kline, Dale, Baskaran and Efrogmson), Des Moines, Iowa for Landscape Design Project stage-gate Review.

14 March 2018: “Biodiversity modeling by the project ‘Visualizing Ecosystem Service Portfolios of Agricultural and Forested Biomass’, presented by Yetta Jager, Des Moines, Iowa for Landscape Design Project stage-gate Review.

20 March 2018, Washington, D.C: Energy and Land Use. Presented by Francis Johnson on behalf of Uwe Fritsche, Kline, Dale, et al., for World Bank Conference on Land & Poverty special session on “Leveraging Land Governance and Sustainability.”

[\[https://www.conftool.com/landandpoverty2018/index.php?page=browseSessions&form_session=574#paperID883\]](https://www.conftool.com/landandpoverty2018/index.php?page=browseSessions&form_session=574#paperID883)

23 March 2018, Chicago, IL: Invited presentation prepared by Kline and Oladosu, presented by Oladosu: Food AND fuel not food vs fuel, updated science perspectives. For the US Grains Council Meeting and Japanese Ethanol stakeholders.

26 March 2018, Golden CO: Keith presented and discussed recommended next steps with the NREL team on the “Input-Output Framework for Assessing Effects of US Bioeconomy.”

05 April 2018: Kline and Eaton provided an overview on BT16 Vol1 and Vol2 results to the consultant team working with the RSB on an Airbus collaboration to identify sustainable feedstock potentials in Alabama.

06 April 2018: Kline prepared summary slides for two projects that comprise part of the new “Landscape Ecology and Regional Analysis” research team, led by Matt Langholtz, in Environmental Sciences Division of ORNL.

11 April 2018: Kline K, Chordia M, Brandao M, Cowie A, Dale V, Langeveld J: Examining Evidence for Drivers of Indirect Land-use Change Associated with Biofuel Policies. Oral presentation for the International Association for Landscape Ecology – US Annual Meeting.

17 April 2018: Kline, Langeveld, Dale and Efrogmson: Understanding Indirect Effects of Bioenergy: Science-based ILUC Assessment. For the IEA Bioenergy Workshop on sustainability governance in Copenhagen. An Abstract was also submitted and published in proceedings.

18 April 2018: Dale, Kline, Parish, Hodges – IEA Bioenergy Workshop on sustainability governance in Copenhagen; “Governance and issues related to wood pellet production in the Southeast United States”

19 April 2018: Kline K, Dale V, Richard T, Karlen D, Belden W, (2017) Stakeholder perceptions on bioenergy development in midwestern U.S. state of Iowa. Abstract published in workshop proceedings and Book of Abstracts for IEA Bioenergy, “Governing sustainability of bioenergy, biomaterial and bioproduct supply chains from forest and agricultural landscapes” April 2018.

07 May 2018: Maggie Davis presented the Special Topic, “Sustainability Standards Landing Page” (Kline coauthor) for the BETO- A&S Monthly Lab Call.

15 May 2018: Laurence Eaton presented “Market-specific analysis energy crops potential” to the DOE BETO sponsor and sister labs on a webinar

16 May 2018: Stupak, Smith, Kline, et al. Governing Sustainability of Biomass Producing Landscapes and Biomass-Based Supply Chains: Key messages from a conference on state of the art and future prospects (PPT prepared for the EU Bioenergy Conference and Exposition (EUBCE), Copenhagen).

Other announcements

Natalie Griffiths received the Stanley I. Auerbach Award for innovative biogeochemical research leading to a better understanding of the impacts of human activities on aquatic and terrestrial ecosystems.

Tim Theiss, Phil Britt, Adam Rondinone, and Abhijeet Borole attended the Electrons to Molecules Workshop to discuss opportunities and challenges of using renewable electricity and waste gases (CO₂ primarily) to generate viable biofuels and bioproducts. The workshop was hosted by National Renewable Energy Laboratory (NREL) and Bioenergy Technologies Office (BETO).

Keith Kline, Maggie Davis and Missy Miller are coordinating an international drafting team to develop a protocol for characterizing the reference scenario when conducting impact assessments for bio-based products. Contact Millermm@ornl.gov for more information or to contribute.

Esther Parish, Yetta Jager, Keith Kline, Rebecca Efrogmson, and Latha Baskaran are discussion potential collaborative research with the USDA Forest Service Southern Research Station.

Maggie Davis has been appointed to a 3-year term on the Society of American Foresters Committee on Forest Policy and is working on a policy statement on use of biomass for energy. davismr@ornl.gov

Upcoming Events

11-13 June 2018: Yetta Jager and Rebecca Efroymson will travel to the 8th International Conference on Algal Biomass, Biofuels & Bioproducts in Seattle, WA.

11-13 June 2018: H. Jager, R. Efroymson, A. Coleman, M. Wigmosta, and L. Baskaran. Poster. Water scarcity and sustainable freshwater algae production in the United States. The 8th International Conference on Algal Biomass, Biofuels and Bioproducts. Seattle, WA June 11-13, 2018.

14-15 June 2018: Invited presentation for 13th Annual Energy Conference on Bioenergy & Natural Systems, New York Institute of Technology: Food Security Challenges for Bioenergy (K.Kline)
https://www.nyit.edu/events/energy_conference

19-23 August 2018: H. Jager and R. Novello. Invited presentation and book chapter. Bayesian network models explore how forest treatments can reduce wildfire risk and increase connected habitat for ESA-listed salmonids. Symposium: Advances in Understanding Landscape Influences on Freshwater Habitats and Biological Assemblages. American Fisheries Society meeting, Atlantic City.

19-23 August 2018: H. Jager and A. Todd. Organized symposium Bad Acid: Past and future risk of acidification to aquatic ecosystems that support fisheries and aquaculture. American Fisheries Society meeting. August 19-23, Atlantic City.

5-10 August 2018: Kreig J et al. A modeling framework for predicting species richness as a measure of biodiversity in changing bioenergy landscapes. Ecological Society of America. New Orleans.

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