September 14, 2016

To:

The Honorable Hal Rogers
Chairman
House Committee on Appropriations

The Honorable Nita Lowey
Ranking Member
House Committee on Appropriations

The Honorable Ken Calvert
Chairman
House Appropriations Subcommittee on
Interior, Environment and Related Agencies

The Honorable Betty McCollum
Ranking Member
House Appropriations Subcommittee on
Interior, Environment and Related Agencies

The Honorable Thad Cochran
Chairman
Senate Committee on Appropriations

The Honorable Barbara Mikulski
Ranking Member
Senate Committee on Appropriations

The Honorable Lisa Murkowski
Chairman
Senate Appropriations Subcommittee on
Interior, Environment and Related Agencies

The Honorable Tom Udall
Ranking Member
Senate Appropriations Subcommittee on
Interior, Environment and Related Agencies

Cc:

The Honorable Patty Murray
U.S. Senate

The Honorable Maria Cantwell
U.S. Senate

The Honorable Ron Wyden
U.S. Senate

The Honorable Jeff Merkley
U.S. Senate

Dear Chairmen Rogers, Calvert, Cochran and Murkowski and Ranking Members Lowey, McCollum, Mikulski, and Udall:

As authors of peer-reviewed science literature[1,2,3,4,5] on the atmospheric carbon impacts of combusting forest biomass for energy, we write to provide science context to assist you in your efforts to clarify federal policy on biomass energy.

We have reviewed legislative language included in the FY2017 Interior Appropriations bill reported out of the Senate Appropriations Committee relying on the use of USDA Forest Inventory & Analysis (FIA) data as a basis for determining the impact of biomass carbon emissions from a terrestrial carbon stocks perspective. FIA data are an essential element of the bill's language because these data provide the most credible option for assessing the impacts of harvesting, wildfires and other disturbances at the spatial and temporal scales needed to truly understand net emissions of forest carbon. Furthermore, FIA data are the only widely available source of data on forest carbon grounded in actual measurements of forest conditions.

The analysis of FIA data to determine the impact of biomass energy on forest carbon pools is a scientifically valid practice that undergoes continuing scrutiny and improvement. Both the Environmental Protection Agency (EPA) and the U.S. Department of Agriculture (USDA) routinely use FIA data to calculate net emissions of forest carbon. These calculations show that since well before 1990, U.S. forests have been removing more carbon from the atmosphere than is being lost from forests by harvesting and other disturbances. In fact, these net removals of atmospheric carbon by U.S. forests currently offset about 9% of total U.S. greenhouse gas emissions (11% of total CO_2 emissions).[6]

We understand there are concerns that the carbon accounting approach in the FY2017 Interior Appropriations bill could increase demand for biomass in a way that causes deforestation in the United States. A large body of research, however, stretching over many years and involving a range of academic and government experts, indicates that this concern is unwarranted. The research on land use and markets has demonstrated that strong markets for wood encourage U.S. forest owners to invest in forests and keep their land in forests[7]. This research has also made clear that real threats of

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[1] Miner, Reid, Robert Abt, Jim Bowyer, Marilyn Buford, Robert Malmsheimer, Jay O'Laughlin, Elaine Oneil, Roger Sedjo, and Kenneth Skog, 2014, Forest Carbon Accounting Considerations in U.S. Bioenergy Policy, Journal of Forestry, 112(6):591-606.

[2] Stewart WC, Nakamura G. 2012. Documenting the full climate benefits of harvested wood products in Northern California: Linking harvests to the U.S. Greenhouse Gas Inventory. Forest Products Journal 62: 340-353.

[3] Malmsheimer, Robert W., James L. Bowyer, Jeremy S. Fried, Edmund Gee, Robert L. Izlar, Reid A. Miner, Ian A. Munn, Elaine Oneil, and William C. Stewart, 2011, Managing Forests because Carbon Matters: Integrating Energy, Products, and Land Management Policy, Journal of Forestry (Supplement), Oct/Nov 2011, S7-S51.

[4] Lippke, B. R., Gustafson, R. Venditti, T. Volk, Oneil, E. Elaine, L. Johnson, M. Puettmann, and P. Steele. 2011. Sustainable Biofuel Contributions to Carbon Mitigation and Energy Independence. Forests 2:861-874.

[5]Daigneault, A. B. Sohngen and R. Sedjo. 2012. Economic approach to assess the forest carbon implications of biomass energy. Environmental Science and Technology (46), 5664−5671.

[6] Based on data in "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014", Report EPA 430-R-16-002, April 2016, U.S. EPA, Washington DC. Calculations available on request.

[7] Among many studies, see, for instance,

- Hardie, I., P. Parks, P. Gottleib, and D. Wear. 2000. Responsiveness of rural and urban land uses to land rent determinants in the US South. *Land Econ*. 76:659–673.

deforestation in the U.S. stem from pressures to convert forests to more profitable non-forest uses, such as agriculture and development. Complex and costly forest carbon accounting requirements would tend to discourage forest owners from participating in bioenergy markets, reducing the profitability of owning forestland. The research on this topic, examples of which are identified above, indicates that this would increase the likelihood that forests will be converted to other uses, resulting in losses of forest and increased emissions of forest carbon to the atmosphere. The comparatively simple approach to addressing forest carbon emissions contained in the FY2017 Interior Appropriations bill reduces the likelihood of this unintended outcome.

Opposition to forest-derived bioenergy from wood, even wood harvested to reduce wildfire risks, as well as from harvesting and manufacturing residuals, is based in part on concerns that these sources of bioenergy may increase emissions of greenhouse gases in the near term compared to the use of fossil fuels. Although the research on this question has yielded variable results, especially regarding the timing of emissions impacts[8], one robust finding warrants highlighting. The Intergovernmental Panel on Climate Change (IPCC) and others have determined that the most robust finding regarding the effect of CO_2 emissions on global temperature is the effect on eventual peak global temperature. The modeling on this question has made it clear that expected peak global temperature is related to long-term cumulative emissions of CO_2 and is insensitive to near-term trends in CO_2 emissions as long as cumulative emissions are limited.[9] This means that even where a forest bioenergy system is predicted to result in near-term increases in CO_2 emissions compared to fossil fuels, as long as it results in lower emissions in the long term, the effect on peak global temperature is beneficial. Put differently, policies that focus only on near-term emissions without considering longer term impacts may result in higher peak global temperatures.

Understanding the relationship between long-term cumulative CO_2 emissions and peak global temperatures is critical to correctly assessing forest bioenergy systems. The long-term emissions reductions associated with forest bioenergy are well established in science literature. Indeed, a central finding of the Fourth Assessment Report of the IPCC is that, "In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fiber or energy from the forest, will generate the largest sustained mitigation benefit."[10]

- Lubowski, R.N., A.J. Plantinga, and R.N. Stavins. 2008. What drives land-use change in the United States? A national analysis of landowner decisions. *Land Econ.* 84:529 –550.
- USDA Forest Service. 2012. Future of America's forest and rangelands: Forest Service 2010 Resources Planning Act assessment. USDA For. Serv., Gen. Tech. Rep. WO-87, Washington, DC.
- Wear, D.N., and J.G. Greis. 2012. The Southern Forest Futures Project: Summary report. USDA For. Serv., Gen. Tech. Rep. SRS-GTR- 168, Southern Research Station, Asheville, NC.
- Abt, K., R. Abt and C. Galik. 2012. Effect of bioenergy demands and supply response on markets, carbon and land use. *Forest Science* 58 (5).

[8] See, for instance, Lamars, P. and M. Junginger. 2013. The debt is in the detail: a synthesis of recent temporal forest carbon analyses on woody biomass for energy. *Biofuels, Bioproducts, and Biorefining* 7(4): 373-385 (2013).

[9] Intergovernmental Panel on Climate Change (IPCC). 2013. *Climate change 2013: The physical science basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, UK and New York.

[10] Intergovernmental Panel on Climate Change (IPCC). 2007. *Forestry. Chapter 9 in Climate change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, UK and New York.

We support efforts to develop biomass policy consistent with established science and mindful of the impacts of market forces. We are happy to make ourselves available to answer your questions and those of your colleagues as you continue your work.

Respectfully,

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