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Dept of Environmental Science, Policy, and Management
130 Mulford Hall #3114
Berkeley, CA 94720-3114
billstewart@berkeley.edu
(510) 643-3130

To: EPA Science Advisory Board (SAB) Panel on Biogenic Carbon Emissions

From: William Stewart, Co-Director Center for Forestry http://forestry.berkeley.edu/
Co-Director Center for Fire Research and Outreach http://firecenter.berkeley.edu/

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Subject: Ongoing SAB panel input to the US EPA's proposed biogenic carbon accounting systems and applicability to Western forests

We appreciate the SAB panel's insights into the importance of understanding the implications of using different types of baselines (especially counterfactual ones that can rarely be verified) and the fundamental importance of using a temporal scale of analysis that aligns with the physical impact of increased emissions on atmospheric, terrestrial and aquatic systems. While shorter time frames may seem to better match the interests of some stakeholders, a truncated time frame will provide biased insights given the varied sequestration and emission signatures of forests and forest products in use and in waste streams of varying efficiencies.

Of greater concern is how the proposed metrics and modeling systems would work for Western forests that do not fit the simple Douglas-fir or Southeast plantation models of relatively short rotations and minimal mortality losses. The average stand age for managed forest in 90 years in the West as compared to 47 years in for private forests in the East (Smith et al. 2010). These older stands typically experience greater losses to self-thinning and major disturbance events such as wildfires. The ongoing wildfires in the West are testament to the increasing importance of disturbances even if they do not fit into simple pollution control models.

In addition, forests under different type of management have very different carbon sequestration/emission signatures even though they will send harvested products to the same sawmills and energy plants. Estimating the full life-cycle carbon sequestration/emission impacts of different bioenergy scenarios solely from the view of energy plants that may source materials from very different forests would appear to be fraught with potential inaccuracies.

In the West where we have limited access to the growing European market for wood pellets, woody biomass is burned to meet renewable portfolio standards and to reduce mortality risks in our forests. Our analysis of the actual movement of forest fuels treatments, stand thinnings, and logging residues in across 17,000 acres of projects on private lands Northern California showed that the market prices in the 2000-2010 period often did not cover the marginal costs of collection and transport (Stewart and Nakamura 2012). Interviews with resource managers showed that they knew they lost money on most of the delivered tons of biomass but removed the biomass to reduce risk of loss related to high volumes of live and dead trees in dry forests. This scenario seems to have little in common with how the EPA report describes forest management. In essence, a rational forest management strategy of capturing incipient mortality and using the biomass for energy could fall in between the cracks of the EPA's GROW and AVOIDMIT attributes. The fact that the proposed methodology was only tested against two synthetic forests does not provide much evidence that the methodology is robust.

The following figure illustrates the large difference between private and federal timberlands in the percentage of gross growth that ends up in dead trees rather than larger live trees or harvested products.

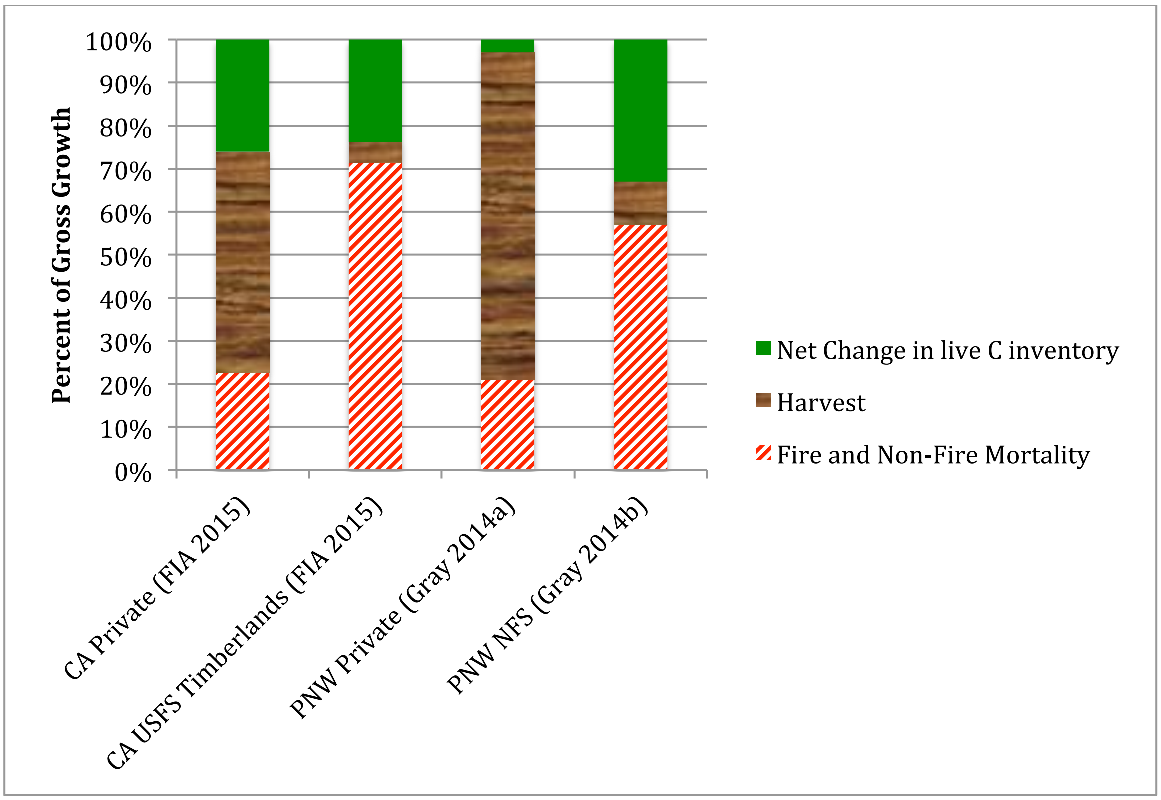

Figure 1: Allocation of forest growth to larger trees, harvest products and mortality based on remeasured Forest Inventory and Analysis (FIA) plots

The West's relatively large difference in the percentage of gross forest growth that ends up in new mortality between private and federal ownerships is not that unusual. Malmsheimer et al. (2011) analyzed the data in from the Smith et al. (2009) and noted mortality rates as being double on federal ownerships as compared to private ownerships for most regions of the US. Clearly, the risks to live tree carbon are considerably greater on the generally older and more heavily stocked lands. However, the EPA proposal to do an environmental analysis around an energy plant would be dependent on the assumptions made on how two different potential feedstock flow chains would be modeled. A BAF score based on a historic or synthetic estimate of past feedstocks may or may not have policy value as the US looks forward towards a world where carbon emissions matters.

While the SAB pointed out that the EPA showed little interest in discussing its choice of a forest growth model, it is apparent to many analysts that the FASOM model would probably not correctly capture either the actual volume biomass for energy removals or the risk reduction rationale. With climate change, many predict that these risk factors of forest mortality will increase, but it is unclear how these would be integrated into FASOM based calculations that EPA is proposing.

Here in California, we are experiencing the opposite scenario that the EPA is trying to model of whether an increased demand for bioenergy would create serious negative environmental impacts. Substantial declines in the wholesale electricity rate offered to biomass plants have led to many being shuttered – and a substantial decline in fuels reduction projects and other non-commercial entries designed to reduce mortality risks in managed forests. The wood that used to go to bioenergy plants is now simply left in the woods to slowly decompose or quickly burn. It is unclear how the fairly complex and presumably expensive reporting system proposed by EPA staff would provide input into the implications of less bioenergy production and the related drop in investment in risk-reducing activities in managed forests.

In conclusion we hope that as the EPA moves forward in assessing the potential role of energy from sustainably produced biomass feedstocks, the modeling tools and methods are tested and verified against real world situations before being promulgated.

References

Christensen, G., Waddell, K., Stanton, S. and Kuegler, O. In Press California's Forest Resources: Forest Inventory and Analysis, 2001-2010. U.S. Forest Service, Pacific Northwest Research Station, Portland, OR.

Gray, A.N. and Whittier, T.R. 2014 Carbon stocks and changes on Pacific Northwest national forests and the role of disturbance, management, and growth. *Forest Ecology and Management*, **328**, 167-178.

Gray, A.N., Whittier, T.R. and Azuma, D.L. 2014 Estimation of Aboveground Forest Carbon Flux in Oregon: Adding Components of Change to Stock-Difference Assessments. *Forest Science*, **60**, 317-326.

Malmsheimer, R., Bowyer, J., Fried, J., Gee, E., Izlar, R. and Miner, R. 2011 Managing forests because carbon matters: integrating energy, products, and land management policy. *J Forest*, **109**, S7 - 48.

Smith, W.B., tech. coord; Miles, Patrick D., data coord.; Perry Charles H., map coord,; Pugh, Scott A. Data CD coor. 2009 Forest Resources of the United States, 2007. GTR-WO-78. U.S. Department of Agriculture, Forest Service, Washington Office, , Washington, DC, p. 336.

Stewart, W.C. and 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.