NAFO
National Alliance of Forest Owners

2025 M Street, NW
Suite 800
Washington, DC 20036

p: 202.367.1163
f: 202.367.2163
www.nafoalliance.org

Submitted via www.whitehouse.gov/ceq/initiatives/nepa
Executive Office of the President
Council on Environmental Quality
Washington, DC 20503

Re: Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions and Draft Guidance for NEPA Mitigation and Monitoring

To Whom It May Concern:

The National Alliance of Forest Owners ("NAFO") submits the following comments in response to the Council on Environmental Quality's ("CEQ's") draft guidance memoranda issued on February 18, 2010: (1) Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions ("Draft GHG Guidance") and (2) Draft Guidance for NEPA Mitigation and Monitoring ("Draft Mitigation Guidance"). We respectfully submit these comments for your consideration in finalizing the National Environmental Policy Act ("NEPA") guidance memoranda and approaching NEPA review relating to the greenhouse gas and climate change impacts of forests in the future.

NAFO is the voice of the nation's private forest owners. NAFO's mission is to protect and enhance the economic and environmental values of private forests through targeted policy advocacy at the national level. At the time of this submission, NAFO's members represent 75 million acres of private forests in 47 states. NAFO was incorporated in March 2008 and has been working aggressively since to sustain the ecological, economic, and social values of forests and to assure an abundance of healthy and productive forest resources for present and future generations.

Summary

These comments are divided into four main sections. First, NAFO provides background information on the role that private forests play in reducing the nation's carbon footprint. NAFO respectfully requests that CEQ remain cognizant of these principles in developing any NEPA approaches relating to forestry and greenhouse gas ("GHG") emissions. As described below, unlike most NEPA activities that result in GHG emissions, forest management and harvested wood products play a critical function by sequestering carbon, are an important source of low-carbon renewable fuel, and can provide other important carbon mitigation benefits. For example, the combustion of forest biomass, unlike conventional fuels, is carbon neutral. In finalizing the CEQ guidance, NAFO respectfully requests that CEQ consider these principles in distinguishing land and resource management decisions from other NEPA-triggering actions that have GHG emissions.

Second, NAFO supports CEQ's decision in the Draft GHG Guidance to exclude Federal land and resource management decisions from the guidance. As explained below, this conclusion is supported by the "rule of reason" inherent in any NEPA analysis, which limits the environmental review to analysis that would be meaningful to the public and the decisionmaker. While various existing methodologies can estimate the amount of direct GHG emissions associated with certain land and resource management decisions, there is generally insufficient information at the time of such a decision to fully capture the short- and long-term mitigation benefits associated with forests, sequestration in harvested wood products, and biogenic energy. In addition, any analysis regarding the indirect or cumulative impacts of GHG emissions or climate change impacts from a federal land or management action would be too speculative to be required under NEPA.

Third, NAFO offers recommendations in response to the specific questions that CEQ has posed about whether and how CEQ should provide guidance on the effects of GHG emissions and climate change associated with land and resource management decisions.

Finally, in finalizing both the Draft GHG Guidance and the Draft Mitigation Guidance, NAFO urges that CEQ not improperly read substantive requirements into NEPA, which is a procedural statute.

I. Private Forests Play An Important Role In Sequestering Carbon, Are A Renewable Energy Source, And Produce Biomass That Is Carbon-Neutral.

The purpose of CEQ's NEPA guidance is to provide a framework for how agencies should assess the greenhouse gas and climate change impacts of conventional industrial activities in NEPA reviews. As described below, forestry projects are fundamentally distinct from such activities as such projects, including those which lead to harvested wood products and the utilization of forest biomass for energy, typically lead to positive impacts on greenhouse gas emissions and climate change.

A. Forests Play a Critical Role in Sequestering Carbon

Forests reduce the overall GHG concentrations in the atmosphere through sequestration. The process of sequestration and storage is a natural by-product of tree growth. Through photosynthesis, trees remove, or sequester, carbon from the atmosphere, and store it wood. That carbon remains stored even if the tree is used to make much needed wood products, such as homes or furniture.

Through sequestration, forests in the United States, nearly 60 percent of which are privately owned,[1] serve as the most significant natural sink of greenhouse gases. U.S forests capturing about 10%-15% of annual U.S. greenhouse gas emissions through photosynthesis and storing it in the forest and in wood products.[2] EPA's most recent Inventory of U.S. Greenhouse Gas Emissions and Sinks, found that changes in carbon stocks in U.S. forests and harvested wood were estimated to account for net sequestration of 792 million metric tons of carbon dioxide equivalents in 2008. EPA 2010 Inventory at 7-13.

---

[1] *See* Society of American Foresters, *The State of America's Forests* at 9 (2007), *available at* http://www.sfpa.org/Environmental/StateOfAmericasForests.pdf.

[2] Carbon sequestration in forests, trees in urban areas, agricultural soils, and landfilled yard trimmings and food scraps, offset 14.9 percent of total emissions in 2007 and 13.5 percent of total emissions in 2008. *See* U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007 at ES-4 (Apr. 15, 2009) ("EPA 2009 Inventory"), *available at* http://www.epa.gov/climatechange/emissions/downloads09/GHG2007entire_report-508.pdf; EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008* at 7-13 (April 15, 2010) ("EPA 2010 Inventory"), *available at* http://www.epa.gov/climatechange/emissions/downloads10/US-GHG-Inventory-2010_Report.pdf.

EPA explained that "improved forest management practices, the regeneration of previously cleared forest areas, and timber harvesting and use have resulted in net uptake (i.e., net sequestration) of [carbon] each year from 1990 through 2008." *Id.* In addition, "[b]ecause most of the timber harvested from U.S. forests is used in wood products, and many discarded wood products are disposed of in [solid waste disposal sites] rather than by incineration, significant quantities of [carbon] in harvested wood are transferred to long-term storage pools rather than being released rapidly to the atmosphere." *Id.* EPA estimates and research on private forestlands have demonstrated the benefits of storing carbon in forest products. *See* NAFO, Carbon Mitigation Benefits of Working Forests, *available at* http://nafoalliance.org/mitigation-benefits-working-forests/. Work by the Consortium for Research on Renewable Industrial Materials has also documented how managed forests can produce sustained, overall net GHG emission reductions when carbon is stored in enduring harvested wood products and/or when harvested wood products are substituted for products with higher energy/carbon footprints. *See, e.g.,* Bruce Lipke et al., CORRIM: Life-Cycle Environmental Performance of Renewable Building Materials, 54 Forest Prod. J. 8 (2004). As explained below, EPA research and other studies have recognized that the use of cellulosic biofeuls can reduce overall GHG emissions.

Sequestration also comes from net forest growth. EPA found that "on average the volume of annual net growth nationwide is about 32 percent higher than the volume of annual removals." EPA 2010 Inventory at 7-13.

B. Forest Biomass Is an Important Renewable Fuel Source Leading to Lower GHG Lifecycle Emissions than Conventional Fuels

Wood from sustainably managed forests also provides a renewable, low-carbon energy source as an alternative to fossil fuels. According to U.S. Energy Information Administration ("EIA") data, biomass already supplies over 50% of the nation's renewable energy.[3] Forests can provide ample, sustainable, domestic supplies of biomass to produce liquid transportation fuels, electricity, thermal energy (heat and power for manufacturing and other industrial uses), and synthetic natural gas. *See* NAFO, Carbon Neutrality of Energy from Forest Biomass, *available at* http://nafoalliance.org/carbon-neutrality-of-energy-from-forest-biomass/. Newer "wood gasification" technologies heat wood in an oxygen-starved environment, collect gases

[3] *See* EIA, U. S. Energy Consumption by Energy Source (July 2009), *available at* http://www.eia.doe.gov/cneaf/alternate/page/renew_energy_consump/table1.html.

from the wood, and later mix the gases with air or pure oxygen for combustion. Wood and wood residuals can also be used to fire combined heat and power systems to provide steam that is efficiently used in sequence to produce both electricity and thermal energy for manufacturing processes.

In evaluating the GHG emissions associated with fuels, a lifecycle analysis incorporates all steps in a "product system" to evaluate broader environmental impacts of products and processes. Using forest biomass as a renewable fuel source has significant carbon benefits because it has a more favorable lifecycle analysis than petroleum and other fuels. The Department of Energy ("DOE") has estimated that "[c]ellulosic ethanol use could reduce GHGs by as much as 86%." *See* U.S. Department of Energy, Ethanol Benefits, *available at* http://www.afdc.energy.gov/afdc/ethanol/benefits.html (last visited on May 4, 2010). EPA, in its final rulemaking adopting changes to the Renewable Fuel Standard Program, also recognized the GHG emissions reductions of greater than 60% that would result from the use of cellulosic biofuels compared to petroleum. Using the "displacement index" approach, EPA determined that every BTU of gasoline replaced by cellulosic ethanol will produce lifecycle GHG emission reductions of 92.7 percent.[4]

Recent studies have also documented the GHG benefits of electricity produced from forest biomass. One study released by the Green Power Institute, which is the renewable energy program of the Pacific Institute, has found that biomass energy production in California over the last 30 years has provided two kinds of greenhouse gas benefits. *See* Gregory Morris, Ph.D. Bioenergy and Greenhouse Gasses (2008). First, it has avoided the GHG emissions associated with the production of fossil fuels. Second, biomass energy production has avoided the biogenic greenhouse gas emissions (mainly methane) of the various alternative disposal fates of biomass residues, replacing them with the lower potency greenhouse gas emissions of energy production. *Id.* at 4. The prevailing science thus acknowledges the significant carbon benefits of energy produced using renewable biomass from managed forests.

As such, forests can play an important role in reducing and managing greenhouse gas emissions. The EPA, in considering approaches toward addressing climate change, has recognized that responsibly managed forests are considered one of five key "groups of strategies that could substantially reduce emissions between now

[4] *See* EPA, EPA420-D-06-008, *Renewable Fuel Standard Program: Draft Regulatory Impact Analysis* at 191 (September 2006).

and 2030." *See* Regulating Greenhouse Gas Emissions Under the CAA, 73 Fed. Reg. 44,354, 44,405 (July 30, 2008). Similarly, the United Nation's Intergovernmental Panel on Climate Change ("IPCC") report on mitigation technologies highlights forest management as a primary tool to reduce GHG emissions. *Id.* at 44,405-06; *see also* NAFO, Carbon Mitigation Benefits of Working Forests (identifying trading platforms and registries that recognize forest management), *available at* http://nafoalliance.org/mitigation-benefits-working-forests/. President Obama also recently emphasized that renewable energy derived from feedstocks such as forest biomass hold the key to transitioning the nation to a "sustainable, low carbon energy future."[5]

C. The Combustion of Forest Biomass Is Carbon Neutral

The prevailing view in the science community is that carbon emissions from forest biomass are offset by the prior absorption of carbon through photosynthesis that created the biomass and, as such, will have a neutral effect on atmospheric carbon. In other words, the carbon that enters the atmosphere when forest biomass is combusted was previously absorbed from the atmosphere by the forest biomass and will be reabsorbed when new biomass is grown. NAFO attaches, and requests CEQ consider, a recent report that provides a helpful overview of carbon neutrality principles. *See* Exh. A, Reid Miner, National Council for Air and Stream Improvement, *Biomass Carbon Neutrality* (Apr. 15, 2010).

As the EPA has concluded, there is "[s]cientific consensus . . . that the CO_2 emitted from burning biomass will not increase total atmospheric CO_2 if this consumption is done on a sustainable basis."[6] Consistent with this conclusion, in its most recent Inventory, EPA did not include emissions from the combustion of wood biomass in its national emissions totals because it "assumed that the carbon . . . released during the consumption of biomass is recycled as U.S. forests and crops regenerate, causing no net addition of CO_2 to the atmosphere." EPA 2010 Inventory at

---

[5] Letter from President Barack Obama to Governors John Hoeven and Chet Culver (May 27, 2009), *available at* http://www.governorsbiofuelscoalition.org/assets/files/President%20Obama's%20Response5-27-09.pdf; *see also* President Barack Obama, *Memorandum for the Secretary of Agriculture, the Secretary of Energy, and the Administrator of the Environmental Protection Agency,* 74 Fed. Reg. 21531-32 (May 5, 2009).

[6] Environmental Protection Agency Combined Heat and Power Partnership, *Biomass Combined Heat and Power Catalog of Technologies*, 96 (Sept. 2007), *available at* www.epa.gov/chp/documents/biomass_chp_catalog.pdf.

3-10. In addition, EPA's Mandatory Greenhouse Gas Reporting Rule does not include biogenic CO_2, such as the carbon contained in wood and wood residues, in its reporting threshold. *See generally* 74 Fed. Reg. 56260 (Oct. 30, 2009). DOE's Voluntary Reporting of Greenhouse Gases Program, authorized by Section 1605(b) of the Energy Policy Act of 1992, also provides for exclusion of combustion of biomass fuels.[7] The international GHG accounting methods developed by the IPCC also recognize that biogenic carbon is part of the natural carbon balance and will not add to atmospheric concentrations of carbon dioxide. Finally, in issuing its Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, EPA announced that the treatment of biomass combustion warrants further study. NAFO is committed to working with EPA to develop a policy that acknowledges the carbon neutrality of the combustion of biomass energy and avoids unnecessary and counterproductive regulation.

Thus, a strong consensus exists that treating combustion of biomass as carbon neutral is scientifically sound.

II. CEQ's Proposed Guidance On The Effects Of Climate Change And GHGs Properly Excludes Federal Land And Resource Management Decisions.

In the Draft GHG Guidance, CEQ states that it "does not propose to make [its] guidance applicable to Federal land and resource management actions, but seeks public comment on the appropriate means of assessing the GHG emissions and sequestration that are affected by Federal land and resource management decisions." Draft GHG Guidance at 2.

At the outset, NAFO agrees with CEQ's conclusion in the Draft GHG Guidance that the guidance should not apply to land and resource management decisions. As the Supreme Court has made clear, "[i]nherent in NEPA and the CEQ implementing regulations is a "'rule of reason,' which ensures that agencies determine whether and to what extent to prepare an EIS based on the usefulness of any new potential information to the decision making process." Draft GHG Guidance at 4 (citing *DOT v. Public Citizen*, 541 U.S. 752, 767 (2004)). Agencies are "to conduct the NEPA process with a

[7] *See* DOE, *Technical Guidelines: Voluntary Reporting of Greenhouse Gases (1605(b)) Program* (January 2007) at 77 ("Reporters that operate vehicles using pure biofuels within their entity should not add the carbon dioxide emissions from those fuels to their inventory of mobile source emissions because such emissions are considered biogenic and the recycling of the carbon is not credited elsewhere.").

view to the purposes underlying NEPA." *City of Oxford v. FAA*, 428 F.3d 1346, 1354 (11th Cir. 2005) (citing *Public Citizen*, 541 U.S. at 767. NEPA serves two purposes:

> First, it ensures that the agency, in reaching its decision, will have available, and will carefully consider, detailed information concerning significant environmental impacts. Second, it guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision.

Id. at 768 (citations, quotation marks and alterations omitted). As such, when an analysis of certain potential effects would be so generalized or speculative as to yield no useful or detailed information, it is not required under NEPA. *See id.* at 767.

In general, CEQ's direction in the Draft GHG Guidance would be difficult if not impossible to apply in NEPA analyses for proposed forestry-related actions. To fully analyze the effects of GHG emissions from a particular land or resource management action, agencies must consider not only direct emissions and sequestration, but also other carbon benefits from the proposed action. The CEQ Guidance does not propose how to calculate such direct carbon benefits, and without such specific guidance the net impacts of a land or resource management project would be difficult to calculate with any precision and, in some instances, will be uncertain. For example, existing methodologies for assessing forest carbon changes rely on detailed forest inventories combined with specific growth and yield modeling. Such protocols apply to discrete actions. Applying the protocols more broadly would exceed their design capacity and introduce variability into the estimates that would no longer make them useful.

Potential indirect GHG emissions or cumulative impacts from such actions are even more difficult to quantify; such analysis would be overly burdensome and require great speculation and uncertainty, and thus should not be required in any NEPA analysis. For example, forest fuel treatments have a direct impact to forest carbon stocks as a result of the removal of fuel and the storage of carbon in any long term wood products. The same treatments might also provide biomass that could be used as a substitute for fossil fuel. Additionally, fuel treatments or other forest health treatments can reduce the risk of catastrophic wildfire. However, as described further below, quantifying these potential benefits would not only be costly and burdensome, it would require speculation that would be inappropriate in a NEPA analysis. NEPA requires that agencies "insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." 40 C.F.R. § 1502.24.

E.g., Wilderness Soc. v. Salazar, 603 F. Supp. 2d 52, 65 (D.D.C. 2009) ("Requiring defendants to provide analysis with respect to each individual water body without knowing where the activities would occur would be unreasonable and speculative and would be beyond NEPA's requirements.")

As the Draft GHG Guidance properly directs, agencies must "recognize the scientific limits of their ability to accurately predict climate change effects, especially of a short-term nature, and not devote effort to analyzing wholly speculative effects." Draft GHG Guidance at 2. NAFO believes it will generally be inappropriate to mandate any specific discussion of climate change effects for proposed land and resource management decisions because it is currently impossible to identify any specific climate impact related to such decisions as the direct, indirect, or cumulative effect of a particular source of GHG emissions. As CEQ recognizes, "'it is not currently useful for the NEPA analysis to attempt to link specific climatological changes, or the environmental impacts thereof, to the particular project or emissions, as such direct linkage is difficult to isolate and to understand." *Id.* at 3. For these reasons, any discussion of climate change in a NEPA review of a proposed land or resource management action would be wholly speculative and provide no useful information to the public or the decisionmaker. As such, it is not required by NEPA.

III. To The Extent CEQ Decides To Provide NEPA Guidance For Proposed Land And Resource Management Decisions, CEQ Should Ensure That It Not Direct Agencies To Consider Uncertain Or Speculative Effects.

In this section, NAFO provides its perspective on the specific questions posed by CEQ on whether and how it should propose guidance related to the consideration of the effects of GHG emissions and climate change associated with land and resource management decisions. The issues presented are complex; whether and how such discussion is appropriate under NEPA will depend on, among other things, the duration and scope of each proposed action and the ability of existing science to analyze the relevant beneficial and adverse effects. NAFO believes these complicated issues cannot be appropriately addressed in nationwide guidance. However, NAFO would welcome the opportunity to discuss these matters with CEQ to the extent it decides to address them in future draft guidance.

A. Whether and how NEPA documents regarding long-range energy and resource management programs should assess GHG emissions and climate change impacts?

NAFO believes that CEQ should not direct Federal agencies to assess GHG emissions and climate change impacts in their NEPA documents for long-range energy and resource management programs. Most long-range energy and resource management programs provide general parameters for future agency action, but fail to authorize specific activities. As such, there will generally be insufficient information available for an agency to make an informed and meaningful analysis of effects related to GHG emissions or climate change. Where a programmatic land management plan "does not include site-specific project proposals," an agency is not required "to quantify or detail the environmental impacts of on-the-ground . . . projects not yet proposed." *Sierra Nevada Forest Protection Campaign v. Rey*, 573 F. Supp. 2d 1316, 1346-47 (E.D.Cal. 2008). For example, in *Sierra Nevada Forest Protection Campaign*, the court upheld the Forest Service's NEPA analysis of the programmatic Sierra Nevada "Framework" management plan, even though it did not include a "quantified or detailed assessment" of impacts stemming from implementation of logging under the plan, as such projects were not yet proposed. *Id.* (*citing Ohio Forestry Ass'n, Inc. v. Sierra Club*, 523 U.S. 726, 729-33 (1988)); *see also Public Citizen*, 541 U.S. at 767-68; *e.g. City of Oxford*, 428 F.3d at 1353 ("An agency must consider the cumulative impacts of future actions only if doing so would further the informational purposes of NEPA.").

Quantifying the direct GHG emissions for a proposed long-range program is meaningless unless the program's related benefits (avoidance or reduction of GHG emissions) are also considered. Because the parameters of such an assessment will differ for every program, and is fraught with uncertainty, CEQ should not direct agencies to conduct it. As with all NEPA analysis, the "rule of reason" must prevail. Long-range impacts are highly speculative and directing agencies to include an analysis of impacts related to GHG emissions and climate change would be costly, controversial, and time consuming while leading, at best, to a speculative assessment. Such an outcome will do little to advance the agencies' overall understanding of the environmental consequences of its proposed action. As CEQ stated, any "[a]nalysis of emissions sources should take account of all phases and elements of the proposed action over its expected life, subject to reasonable limits based on feasibility and practicality." Draft GHG Guidance at 5. Therefore, quantifying the GHG emissions effects of long-range energy and resource management programs will often be infeasible and impractical.

For long-range management plans, it will generally be impossible to predict the specific environmental consequences of the site-specific projects that will be approved under that plan. As such, it would be unreasonable to direct agencies to quantify the effects (adverse and beneficial) of GHG emissions associated with the plan. For example, a management plan might envision future fuel management projects, but the specifics of such projects, including their location and scope, would not be know at the time of plan approval. In addition to direct emissions related to the harvest of timber, such projects would likely have numerous carbon mitigation benefits. If a project reduced the risk of catastrophic wildfire, it could be credited with avoiding the substantial GHG emissions that would have resulted from such a wildfire, and with maintaining an environment that allows carbon to be stored within the growing forest stands. However, quantification of the potential effect of natural disturbances, such as fire, are challenging to assess in general terms due to the fact that the amount of carbon released is highly variable based on the existing fuel and the level of combustion. Thus, the benefit to overall GHG emissions by avoiding a wildfire would be extremely difficult to assess.

At the plan level, it would also be difficult to assess whether and how the carbon from any wood harvested under a site-specific project might be sequestered. For example, as explained above, when wood is used to create products like furniture and building materials, those products will sequester carbon. In addition, if the excess woody biomass from a particular project is utilized as a substitute for fossil fuel, it would also avoid GHG emissions. Again, however, the precise benefit to overall GHG emissions under the plan would be nearly impossible to calculate, especially because the number and scope of site-specific projects would generally not be known at the time of plan approval. The result of this uncertainty is that any attempt to assess the GHG emissions from a long-term management plan would be pure speculation. As such, it should not be required under NEPA.

B. What should be included in specific NEPA guidance for projects applicable to the federal land management agencies?

As explained above, NAFO recommends against CEQ issuing guidance related to proposed land and resource management decisions at this time. However, should CEQ choose to do so, it is critical that CEQ keep in mind the challenges and uncertainties associated with evaluating effects of GHG emissions and climate change at the project-level.

To the extent that CEQ is inclined to provide direction to land management agencies about assessing GHG emissions and climate change impacts, NAFO urges that CEQ direct agencies to consider the positive impacts of sustainable forestry management practices, the forests' role in sequestering carbon, and the benefits of using forest-derived biomass as an energy source. *See supra* at Section I. As the IPCC recognized, forest management is a primary tool to reduce GHG emissions: "[i]n the long term, a sustainable forest management strategy aimed at maintaining or increasing forest stocks, while producing an annual sustained yield of timber, fiber or energy from the forest, will generate the greatest mitigation benefit."[8]

CEQ should also encourage agencies to assess the effects of GHG emissions using a timeframe and scale that is appropriate.[9] Because of the nature of the biomass carbon cycle, *see generally* Exh. A, any analysis of the emissions associated with a forestry practice should address more than just the direct emissions that may result at the time and place of the project's implementation. "The single-plot approach to assessing the biomass carbon cycle ignores the removal of carbon from the atmosphere by trees growing on other plots that will be harvested in future years." *See* Exh. A at 2. In addition, it may not account for the carbon sequestered in any resulting forest products. *See supra* at Section I.A. Therefore, in evaluating GHG emissions from a project that involves the combustion of forest-derived biomass, it is critical that Federal agencies not limit their quantification to the point of combustion. While it may be appropriate to measure emissions from fossil fuel at the point of combustion, under standard accounting protocols, "biogenic carbon emissions and sequestration are accounted for in the context of their impact on the biomass carbon cycle." Exh. A at 2.

It is also critical that CEQ remind Federal agencies that a quantitative assessment of climate change impacts would be inappropriate because existing science does not allow a connection to be made between specific climate impacts and any particular project. As such, even a qualitative analysis of climate change impacts would be speculative and should not be required under NEPA.

---

[8] Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, *Climate Change 2007 Mitigation* at p. 543 (B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds.), *available at* http://www.ipcc.ch/ipccreports/ar4-wg3.htm.

[9] CEQ observes that any type of cumulative effects analysis on GHG emissions would most appropriately focus on an assessment of annual and cumulative emissions. *See* Draft GHG Guidance at 5. Yet many projects of federal land management agencies are of much shorter duration.

C. What should be included in specific NEPA guidance for land management planning applicable to the federal land management agencies?

NAFO requests that its comments above, particularly in response to question A, be considered in connection to this question.

D. Should CEQ recommend any particular protocols for assessing land management practices and their effect on carbon release and sequestration?

Because the assessment of how forestry practices affect GHG emissions and sequestration is a developing area of science, NAFO recommends CEQ refrain from recommending any particular protocols. *Cf.* Draft GHG Guidance at 10 ("The science of climate change is rapidly developing."). There are many challenges and uncertainties associated with assessing the GHG emissions and sequestration that are affected by Federal land and resource management decisions. CEQ would not want its recommendation of certain protocols to discourage Federal agencies from utilizing other methodologies that may be better suited to certain types of forestry projects or from adopting new methodologies that may be an improvement over currently-available protocols.

In its Draft GHG Guidance, CEQ states that "Land management techniques, including changes in land use or land management strategies, lack any established Federal protocol for assessing their effect on atmospheric carbon release and sequestration at a landscape scale." *Id.* at 4. While NAFO disagrees with this assertion, it does agree that there are not existing inventories that would be useful and appropriate for predicting the climate impacts from GHG emissions associated with proposed forestry practices. While there are federal inventories that monitor forest growth and yield over time, they are not designed to fully account for all of the carbon flux in the forest environment. In addition, existing methodologies, even when used in combination, are insufficient to quantify all relevant GHG emission impacts associated with forestry practices.

DOE's General and Technical Section 1605(b) Guidelines for Voluntary Greenhouse Gas Reporting[10] provide a well-recognized methodology for estimating

[10] These Guidelines were developed in response to direction in Section 1605(b) of the Energy Policy Act of 1992, which required DOE's guidelines provide for the "accurate" and "voluntary" reporting of

GHG emissions and carbon sequestration from forestry. Another very promising methodology is the North American Forest Carbon Standard, developed by the Forest Carbon Standards Committee, a broad bi-national (American and Canadian) effort coordinated by the American Forest & Paper Association. However, this protocol is not yet fully developed and is only available in draft form at this time, *see* http://www.forestcarbonstandards.org/.

Other available methodologies available are the Voluntary Carbon Standard, *available at* http://www.v-c-s.org/docs/Guidance%20for%20AFOLU%20Projects.pdf, and IPCC's 2006 Guidelines for National Greenhouse Gas Inventories and Good Practice Guidance for Land Use, Land-Use Change and Forestry, *available at* http://www.ipcc-nggip.iges.or.jp/. Unfortunately, these standards generally do not address active forest management practices; in addition, as international standards, they are not always appropriately applied to forestry projects in North America. The Climate Action Reserve's Forest Project Protocol, Version 3.1, *see* http://www.climateactionreserve.org/how/protocols/adopted/forest/current/, is another methodology. However, because the methodology was developed based on California's regulatory structure, it is not always directly applicable to other parts of the United States.

Certain aspects of the biomass carbon cycle are not easily quantified. For example, as described above, carbon is often sequestered in wood products. There are established procedures for estimating the amount of carbon stored in wood products, such as DOE's Section 1605(b) Guidelines. However, these estimates vary by species and regional uses of wood, and they are currently not fully developed for application in all parts of the United States. In addition, it would be a complex, costly, and burdensome task to track all wood products in order to properly account for the carbon that remained sequestered. As such, even the 1605(b) Guidelines do not require a wood product offset be reported. Therefore, even where methodologies are available for analyzing certain aspects of the biomass carbon cycle, it may be unreasonable to require such quantification under NEPA because of the high burden associated with

---

information on: (1) greenhouse gas emission levels for a baseline period (1987-1990) and thereafter, annually; (2) greenhouse gas emission reductions and carbon sequestration, regardless of the specific method used to achieve them; (3) greenhouse gas emission reductions achieved because of voluntary efforts, plant closings, or state or federal requirements; and (4) the aggregate calculation of greenhouse gas emissions by each reporting entity. 42 U.S.C. §§ 13385(b)(1)(A)-(D).

such an assessment and the low likelihood that it would result in useful information for the decsionmaker.

E. How should uncertainties associated with climate change projections and species and ecosystem responses be addressed in protocols for assessing land management practices?

As described above, it is NAFO's belief that because the uncertainties associated with potential climate change impacts are so great and the sciences is constantly developing, it would be inappropriate for CEQ to direct agencies to consider these speculative effects in their NEPA analyses. NAFO also notes that in the context of forestry, sustainable management practices are the best contingency for uncertainty.

F. How should NEPA analyses be tailored to address the beneficial effects on GHG emissions of Federal land and resource management actions?

Any evaluation of the effects of GHG emissions of land and resource management actions would be incomplete and unreasonable without consideration of the beneficial effects on GHG emissions from the same actions. Section I of this letter describes some of the benefits of sustainable forestry practices, including the sequestering of carbon in the forest and forest products and the carbon neutrality of combusting forest-derived biomass. Other benefits come from the ability of certain forest practices to avoid other activities (e.g. use of fossil fuels) or events (e.g. wildfire) that would have even greater GHG emissions. Notably, if a proposed action does not change the status quo, it can not trigger NEPA's requirement for an environmental impact statement.[11]

[11] *See, e.g., Burbank Anti-Noise Group v. Goldschmidt*, 623 F.2d 115, 116 (9th Cir. 1980) ("An EIS is not required . . . when the proposed federal action will effect no change in the status quo."); *Committee for Auto Responsibility v. Solomon*, 603 F.2d 992, 1002-03 (D.C. Cir. 1979) ("To compel [an agency] to formulate an EIS under these circumstances [where there is no change to the status quo] would trivialize NEPA's EIS requirement and diminish its utility in providing useful environmental analysis for major federal actions that truly affect the environment.").

G. Should CEQ provide guidance to agencies on determining whether GHG emissions are "significant" for NEPA purposes? At what level should GHG emissions be considered to have significant cumulative effects?

NAFO recommends against CEQ providing direction on when GHG emissions are "significant" under NEPA. Agencies should be provided the flexibility to analyze proposed actions within their particular areas of jurisdiction and expertise and determine whether they are significant. Announcing any particular amount of direct GHG emissions as a trigger for finding a proposed action is significant would also likely overlook the benefits that the same project might have on GHG emissions.

IV. In Finalizing The NEPA Guidance Memorandums, CEQ Should Clarify That It Is Neither Requiring Agencies Mitigate Environmental Impacts Nor Announcing Any Other Substantive Mandates.

NAFO recommends that CEQ revise any statements in its draft guidance documents that could be misconstrued as requiring agencies include mitigation or monitoring measures in their decisions.

NEPA does not mandate any particular outcome or that an agency select the alternative with the fewest environmental consequences. *See, e.g., National Audubon Society v. Department of Navy*, 422 F.3d 174, 184 (4th Cir. 2005) (*citing Public Citizen*, 541 U.S. at 756, *and Strycker's Bay Neighborhood Council, Inc. v. Karlen*, 444 U.S. 223, 227-28 (1980)). It only requires that agencies make an informed decision based on a "hard look" at the potential environmental impacts of major Federal actions. *Id.*; *see Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349-51 (1989) ("NEPA itself does not mandate particular results, but simply prescribes the necessary process . . . . Other statutes may impose substantive environmental obligations on federal agencies, but NEPA merely prohibits uninformed rather than unwise agency action."); *Vermont Yankee Nuclear Power Corp. v. Natural Res. Def. Council*, 435 U.S. 519, 558 (1978) (NEPA's "mandate to the agencies is essentially procedural").

Certain statements in the draft guidance memorandum inappropriately suggest that agencies are required to include mitigation or monitoring requirements in their decisions under NEPA. For example, in the Draft GHG Guidance, CEQ states that Federal agencies should consider opportunities to reduce GHG emissions caused by their proposed actions and, where GHG emissions are quantified, should consider

mitigation measures and alternatives to reduce GHG emissions.[12] The Draft Mitigation Guidance similarly recommends mitigation be considered and states that if an agency decides to employ mitigation measures, they should be identified as binding commitments to the extent consistent with agency authority. Draft Mitigation Guidance at 2. CEQ also suggests that the public be provided access to mitigation monitoring reports and documents. *Id.*

NAFO is concerned that such statements could be interpreted as placing substantive requirements on agencies conducting NEPA reviews. "There is a fundamental distinction . . . between a requirement that mitigation be discussed in sufficient detail to ensure that environmental consequences have been fairly evaluated, on the one hand, and a substantive requirement that a complete mitigation plan be actually formulated and adopted, on the other." *Robertson,* 490 U.S. at 352. NEPA imposes only procedural requirements. *Public Citizen*, 541 U.S. at 756; *Winter v. Natural Resources Defense Council, Inc.*, 129 S.Ct. 365, 376 (2008). "Because NEPA imposes no substantive requirement that mitigation measures actually be taken, it should not be read to require agencies to obtain an assurance that third parties will implement particular measures." *Robertson,* 490 U.S. at 352 n.16. CEQ should make clear that its guidance does not direct agencies to require controls on or mitigation of GHG emissions. We therefore request that CEQ reinforce in its final guidance documents that NEPA does not require agencies adopt any substantive requirements as part of their decisions.

[12] CEQ proposes that "if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2-equivalent GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public." *Id.* CEQ proposes that for these actions, the Federal agencies also "consider mitigation measures and reasonable alternatives to reduce action-related GHG emissions." *Id.* at 5.

V. Conclusion

NAFO appreciates the opportunity to provide its views on this important guidance memorandum and hopes that its comments will assist CEQ in finalizing them.

Respectfully Submitted,

David P. Tenny
President and CEO
National Alliance of Forest Owners

Exhibit A

Biomass Carbon Neutrality

Reid Miner, National Council for Air and Stream Improvement (NCASI)
April 15, 2010

Summary: The term "carbon neutrality" has come to mean many different things. In the context of biomass-derived fuels, it is best understood as an attribute of biomass carbon that reflects the fact that this carbon was only recently removed from the atmosphere and is part of a natural cycle. When this cycle is in balance, it has a net zero impact on atmospheric carbon; i.e. it is "neutral." This is an important distinction between biomass carbon and the carbon in fossil fuels.

The balance of the biomass carbon cycle can be assessed at different scales. Assessing the biomass carbon cycle at the individual plot level, however, yields a misleading picture. The single-plot approach to assessing the biomass carbon cycle ignores the removal of carbon from the atmosphere by trees growing on other plots that will be harvested in future years. If wood-producing land is being regrown to pre-harvest carbon stocks before it is harvested again, then year-after-year, the atmosphere sees a net zero carbon "emission" across the wood-producing region because the "emissions" from plots harvested this year are offset by the uptake occurring in new growth on other plots that will be harvested in the future.

The biomass carbon cycle is never exactly in balance. At the global level, loss of forests, primarily in the tropics, is a significant contributor to emissions of CO_2 to the atmosphere. In many other places on earth, however, there are large net removals of CO_2 from the atmosphere by forests. In the U.S., the data indicate that forested land area is stable or increasing and forest carbon stocks are growing. This means that U.S. forests in total are removing carbon from the atmosphere faster than they are losing carbon as a result of harvesting and other phenomena, such as decay and wildfires. The data also indicate that those forests supplying wood to the industry have stable or increasing carbon stocks.

The benefits of biomass-derived fuels depend not only on their impacts on the biomass carbon cycle; they also depend on how efficiently they displace fossil fuel on a life cycle basis. Research indicates that life cycle emissions of greenhouse gases are significantly lower for biomass fuels derived from sustainably managed forests than for the fossil fuels they displace. The precise benefits vary depending on processing and utilization efficiencies, and impacts, if any, on long-term average forest carbon stocks.

Introduction:

The term "carbon neutrality" has come to mean many things. It is sometimes used to describe activities, such as a conference or rock and roll tour, whose greenhouse gas emissions have been offset by carbon credits. In the context of forest carbon, however, the meaning is different. In this white paper, the concepts behind the carbon neutrality of forest biomass are explained and explored.

The biomass carbon cycle:

Photosynthesis is a process of converting radiant energy from the sun and CO_2 from the air into the chemical energy of plant tissue (Hall, 1999). Through photosynthesis, carbon in atmospheric CO_2 becomes carbon in plant tissue, also called biomass. When biomass is burned, decays or is otherwise oxidized, the chemical energy is released and the CO_2 is placed back into the atmosphere, completing a natural carbon cycle. As long as this cycle is in balance, it has a net zero impact on the carbon in the atmosphere, which is why biomass carbon is often called "carbon neutral."

The biomass carbon cycle and carbon neutrality differentiate the carbon in biomass from the carbon in fossil fuels. Fossil fuels contain carbon that has been out of the atmosphere for millions of years. When fossil fuels are burned, therefore, they put carbon in the atmosphere that is in addition to what has been cycling between the atmosphere and the earth, causing the amounts of CO_2 in the atmosphere to increase. Indeed, the primary source of increased CO_2 in the atmosphere since pre-industrial times is fossil fuel combustion (Denman, 2007).

Standard accounting protocols measure emissions from fossil fuel at the point of combustion while biogenic carbon emissions and sequestration are accounted for in the context of their impact on the biomass carbon cycle (e.g. IPCC, 2006).

The impacts of biomass carbon on atmospheric CO_2:

As long as the biomass carbon cycle is in balance, it neither adds carbon to, nor subtracts carbon from, the atmosphere. The cycle, however, is never in exact balance. If plants are removing carbon from the atmosphere faster than it is being returned to the atmosphere, the cycle is accomplishing net removals of carbon from the atmosphere, and stocks of stored carbon (primarily in forests) are increasing. On the other hand, if biomass carbon is being returned to the atmosphere faster than it is being removed by plants, the cycle is adding carbon to the atmosphere and stocks of stored carbon are decreasing.

The balance of the biomass carbon cycle can be assessed at different scales. Assessing the biomass carbon cycle at the individual plot level, however, yields a misleading picture. Plot-level assessment shows a large "pulse of emissions" occurring at the time of harvest with slow removal of these "emissions" from the atmosphere over time. This single-plot approach to assessing the biomass carbon cycle ignores the removal of carbon from the atmosphere by trees growing on other plots that will be harvested in future years. If wood-producing land is being regrown to pre-harvest carbon stocks before it is harvested again, then year-after-year the atmosphere sees a net carbon "emission" of zero across the wood-producing region because the "emissions" from plots harvested this year are offset by the uptake occurring in new growth on other plots that will be harvested in the future. The wood supply area represents the facility's or industry's supply chain and the gains or losses in carbon over a period of time should be assessed over the entire area, not just a single plot.

At the global level, the status of the biomass carbon cycle is uncertain. It is well established that because of deforestation, largely in the tropics, there have been large transfers of biomass carbon to the atmosphere, amounting to an estimated 0.5 to 2.7 billion tonnes per year in 1990s. During this period, land use change, largely due to deforestation, was responsible for between 7% and 31% of all human-caused CO_2 emissions (derived from data in Denman, 2007).

At the same time, however, attempts to develop global carbon budgets have found a large unexplained removal of carbon from the atmosphere that is attributed to processes occurring on land. This "residual land sink" is not well understood but a number of explanations have been proposed including a continuing accumulation of carbon in undisturbed tropical forests and forest regrowth on other areas such as abandoned agricultural lands and managed forests. The residual land sink was estimated to be removing 0.9 to 4.3 billion tonnes of carbon from the atmosphere per year in the 1990s (Denman, 2007). Therefore, although it is well established that deforestation in the tropics is a significant contributor to man-made CO_2 emissions, the balance in the overall biomass carbon cycle at the global level is uncertain.

In the United States, as in most of the developed world, the situation is better understood. In the U.S., forest carbon stocks continue to grow (USEPA, 2009) indicating that the biomass carbon cycle in the U.S. is continuing to accomplish net removals of CO_2 from the atmosphere. In the U.S., forested area is stable or slowly growing (USEPA, 2009). Even on industry-owned timberland, carbon stocks are stable, reflecting the effects of regeneration and regrowth that occurs under sustainable forest management practices (Heath, 2010). The data clearly indicate, therefore, that in the United States, the biomass carbon cycle is accomplishing net removals of carbon from the atmosphere. In other words, the U.S. forest biomass carbon cycle is in surplus and roughly in balance on industry–owned timberlands.

<u>The carbon benefits of biomass fuels:</u>

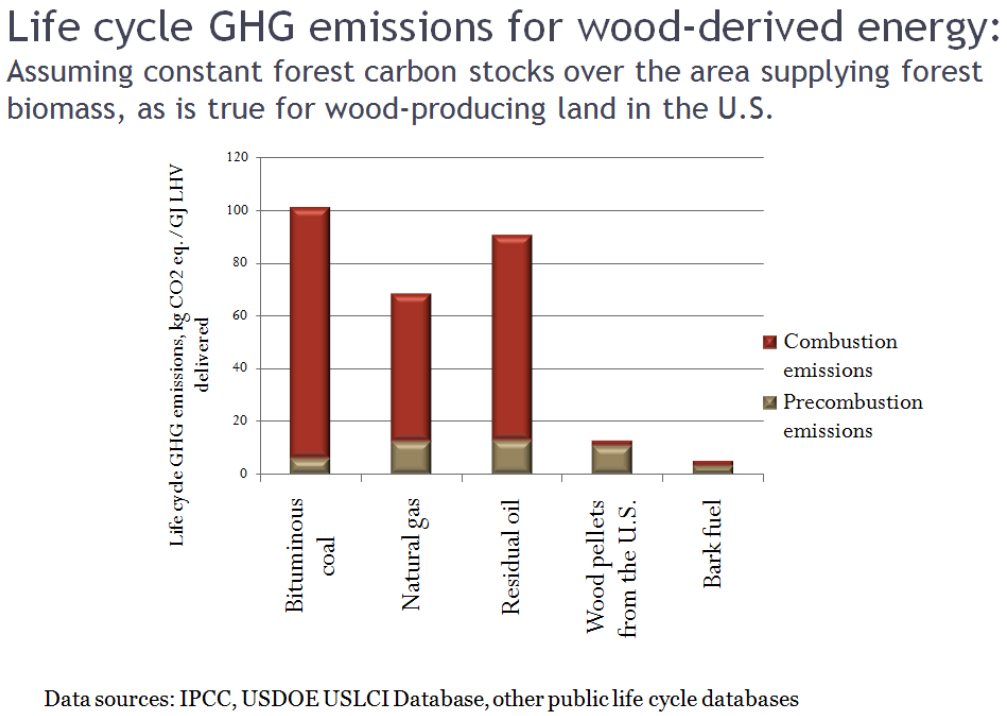
By inserting an energy recovery step into the biomass carbon cycle, we can produce energy without adding combustion-related fossil fuel carbon to the atmosphere. The amount of benefit we get from this, however, depends primarily on two things. First, it depends on whether the biomass carbon cycle is being thrown out-of-balance by our use of biomass. Second, it depends on how much lower the greenhouse gas emissions are for our biomass-derived fuel compared to the fossil fuel we would have otherwise burned.

Regarding the biomass carbon cycle: it was noted above that the biomass carbon cycle in the US is currently in surplus. Whether this continues will depend on whether the markets and policies that affect land use continue to value forests and the fuels and other products they produce so that the supply of forest-derived biomass will remain adequate to meet the increasing demand.

Regarding the relative greenhouse gas emissions of different fuels: When comparing greenhouse gases emissions for different fuels, one must look beyond combustion-related emissions to also include emissions that occur in raw material extraction and production, fuel processing, and transport. Looking at all of the emissions together, on a "life cycle" or "cradle-to-grave" basis, provides the most accurate picture of the relative benefits of using one fuel compared to another.

When the biomass cycle is in balance (i.e. forest carbon transfers to the atmosphere are matched by carbon uptake via new growth, so forest carbon stocks are stable), fuels derived from forest biomass have very low life cycle greenhouse gas emissions compared to fossil fuels. This is illustrated in the following figure. If the use of wood-derived energy was causing the biomass carbon cycle to be out of balance, the wood-based fuel values in the figure would include additional emissions. If the use of wood was causing carbon stocks on wood-producing land to decline (over the area supplying the industry or facility), these "emissions" would be greater than zero,

but if the stocks of carbon on wood-producing land were increasing, the “emissions” would be less than zero (i.e. net sequestration).



Accounting for carbon in forest biomass:

Many countries already have biomass carbon accounting systems in place that account for changes in forest carbon stocks. In the United States, for example, the U.S. Forest Service develops an annual estimate of the changes in forested area and forest carbon stocks. The estimate is based on an extensive forest monitoring network and modeling. The results of the analysis are used in the report submitted annually by the United States in fulfillment of its obligations under the United Nations Framework Convention on Climate Change (e.g. USEPA, 2009). As noted above, the Forest Service assessments show that forest carbon stocks continue to grow (USEPA, 2009) indicating that the biomass carbon cycle in the U.S. is continuing to accomplish net removals of CO_2 from the atmosphere.

Of course, there is no guarantee that this will continue indefinitely. Fortunately, an “early warning” system is already in place to detect worrisome changes in the trends. The Forest and Rangeland Renewable Resources Planning Act (RPA) requires the Secretary of Agriculture to prepare a renewable resource assessment every 10 years (although these reports are usually updated more frequently). The last full RPA Assessment Report was released in 2000 and was updated in 2007. The 2010 report is currently being prepared (U.S. Forest Service, 2008). In addition, the U.S. Forest Service prepares RPA Assessment reports focused specifically on current and projected timber supply, the most recent of which was released in 2007 (Haynes, 2007). In these RPA

Assessment reports, the Forest Service examines trends in forest carbon stocks and, especially in the timber assessments, considers scenarios that could alter current trends.

The general accounting and analytical framework used by the Forest Service provides an excellent starting point for examining the potential impacts of using forest biomass on U.S. forest carbon stocks. Whether it is used as is, or is adapted to work over different scales of area or time, such a conceptual framework can be used to ensure that all forest carbon is accounted for.

Carbon neutrality in national greenhouse gas accounting:

The United States and many other countries include estimates of forest carbon stocks in their national inventories of greenhouse gas emissions and sinks. Changes in forest carbon stocks are treated as equivalent to CO_2 emissions or removals. CO_2 emissions associated with combustion of forest biomass are included in estimates of changes in forest carbon stocks. To avoid double counting, a CO_2 emission factor of zero is assigned to biomass fuels at the point of combustion. This convention is often equated with biomass carbon neutrality in context of national GHG accounting.

Use of a zero emission factor for biomass combustion in national GHG accounting does not mean that carbon emissions from biomass are being ignored or that biomass energy is assumed to be "neutral" in terms of its effects on the biomass carbon cycle. The zero emission factor merely reflects the fact that the impacts on the biomass carbon cycle are being tracked by following changes in forest carbon stocks rather than emissions of biomass-derived CO_2.

An alternative approach to tracking biomass carbon has been suggested that would require emissions of biomass-derived CO_2 to be considered equivalent to CO_2 from fossil fuels (see, for instance, Searchinger, 2009). While such an approach would be easy to implement, it suffers from several drawbacks. First, it tells you little about forest carbon stocks because the carbon in biomass fuels represents only a fraction of the biomass that is lost from forests due to all natural and anthropogenic causes (Gower, 2003) (Natural Resources Canada, 2007). Second, it could cause many current users of biomass fuels to switch to fossil fuels, causing permanent transfers of fossil fuel carbon to the atmosphere. This switching would take place because forest biomass-derived fuels often burn less efficiently than fossil fuels due to their water content, resulting in less usable energy per unit of carbon emissions (Bergman, 2008). Third, because it would (unnecessarily) increase the carbon liability for burning biomass fuels, it would devalue forest-derived biomass and the forested lands where it is produced. This would result in less biomass being produced (at a time when more is needed) and could cause forest owners to convert forested land to other more profitable uses. Devaluing forest biomass could also reduce the economic incentives for maintaining forest health, potentially leading to increased risks of catastrophic carbon loss due to fire (Oneil, 2007).

Ultimately, the concerns about overreliance on forest biomass are concerns about depleting forest carbon stocks and encouraging conversion of forested lands to non-forest uses. It makes sense, therefore, to rely on an accounting framework that is based on monitoring forests and associated carbon stocks, especially when such a program is (a) already largely in place and (b) avoids the many pitfalls of frameworks that focus on emissions of biomass-derived CO_2. A framework based on monitoring forest carbon stocks at the national or regional scale

may not be suitable for all purposes, but, in the U.S., it is well suited to a variety of programs aimed at monitoring and potentially regulating greenhouse emissions to the atmosphere.

The challenge of accounting for forest carbon impacts in other countries:

Perhaps the most difficult question facing those attempting to develop comprehensive biomass carbon accounting methods is how to do the accounting on biomass that is imported from other countries. Fortunately, most developed countries are in the same position as the United States in that they have data on forest carbon stocks and the data show that carbon stocks are stable or increasing, especially when averaged over multi-year periods (MCPFE, 2007) (USCCSP, 2007). On the other hand, in the developing world, the data are much less reliable and large losses of forest carbon due to deforestation are still common.

The amount of forest biomass imported by the United States is relatively small. In 2008, for instance, imports of lumber and paper/paperboard were 6 and 15% of U.S. production, respectively while the imports wood chips and particles (including wood pellets) were 0.04% of US industrial roundwood production (FAO, 2010). Of the amounts for forest-derived materials imported, very little comes from developing countries. Instead, most comes from Canada and Europe. In 2005, for instance, 85% of lumber and log imports to the U.S. were from Canada (Howard, 2007) and in 2006, 84% of the imports of pulp, paper and paperboard were from Canada and Europe (AF&PA, 2007). Given these statistics, imports of forest-derived material by the U.S. are not expected to have significant connections to concerns about deforestation in developing countries.

The concerns about impacts on forests in the developing world, however, are not primarily related to the demand for forest-derived biomass. Instead, the primary concern is that forests in the developing countries will be cleared to create land for producing agriculture-based biofuels. The question of how to account for the impacts of forest clearing when characterizing the benefits of agriculture-based fuels from other countries is an important one, but it need not dictate the forest carbon accounting rules used in the U.S. or be applied to domestic forests

Concluding observations

Ultimately, the concerns about the over use of forest biomass are related to potential loss of forest area and forest carbon. It makes sense, therefore, to use an accounting framework that focuses on impacts in the forest. In the U.S. and elsewhere where the data are reliable, the impacts of using biomass fuels can be characterized within an accounting framework that (a) relies on large-scale forest carbon accounting to account for biogenic CO_2 emissions in the context of the forest carbon cycle and (b) separately accounts for other lifecycle greenhouse gas emissions. For fuels from countries without adequate data, or where forest carbon stocks are declining, it may be necessary to use other accounting frameworks, but this need not be required of all biomass-derived fuels. In the case of biomass-derived fuels produced in the US, the impacts on national carbon stocks are already being monitored and the monitoring shows that the use of biomass for all purposes, including biomass-derived fuels, is not causing forest carbon stocks to decline.

References:

AF&PA. (2007). *Statistics of Paper, Paperboard and Wood Pulp: 2007.* Washington, DC: American Forest and Paper Association.

Bergman, R. a. (2008, January). Primer on wood biomass for energy. USDA Forest Service, Forest Products Laboratory, Madison, WI.

Bowyer, J. D.-G. (2006). *Life cycle environmental performance of renewab le materials in teh context of residential building construction: Phase 1 research report.* Seattle: CORRIM, University of Washington.

Denman, K. G. (2007). *Couplings Between Changes in the Climate System and Biogeochemistry. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

FAO. (2010). *FAOStat*. Retrieved February 10, 2010, from http://faostat.fao.org

Gower, S. (2003). Patterns and Mechanisms of the Forest Carbon Cycle. *Annu. Rev. Environ. Resour. Vol. 28* , 169-204.

Hall, D. a. (1999). *Photosynthesis, Sixth Ed.* Cambridge University PRess.

Haynes, R. W. (2007). *The 2005 RPA timber assessment update; Gen. Tech. Rep. PNW-GTR-699.* USDA Forest Service, Pacific Northwest Research Station.

Heath, L. S. (2010). Greenhouse Gas and Carbon Profile of the U.S. Forest Products Industry Value Chain. *Environmental Science and Technology* .

Howard, J. (2007). *U.S. timber production, trade, consumption, and price statistics 1965 to 2005; Research Paper FPL-RP-637.* Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory.

IPCC. (2006). *2006 IPCC Guidelines for National Greenhouse Gas Inventories.* Hayama, Kanagawa, Japan: IPCC, c/o Institute for Global Environmental Strategies.

MCPFE. (2007). *State of Europe's forests 2007.* Warsaw: Ministerial Conference on the Protection of Forests in Europe.

Natural Resources Canada. (2007, October). Is Canada's forest a carbon sink or source? *Canadian Forest Service Science - Policy Notes* .

Oneil, E. B. (2007). Discussion Paper DP8: Eastside Climate Change, Forest Health, Fire and Carbon Accounting. In *Future of Washington's Forest and Forest Industries Study.* College of Forest Resources, University of Washington.

Searchinger, T. e. (2009, October 23). Fixing a critical climate accounting error. *Science Vol 326* , pp. 527-528.

Skog, K. e. (2008). *The greenhouse gas and carbon profile of the U.S. forest products sector; NCASI Special Report 08-05.* Durham, NC: National Council for Air and Stream Improvement.

U.S. Forest Service. (2008, August 12). *The RPA Assessment and Supporting Publications*. Retrieved February 3, 2010, from US Forest Service: http://www.fs.fed.us/research/rpa/assessment-pub.shtml

USCCSP. (2007). *The first state of the carbon cycle report: the North American Carbon Budget and Implications for the Global Carbon Cycle.* Washington, DC: U.S. Climate Change Science Program.

USEPA. (2009). *Inventory of greenhouse gas emissions and sinks: 1990-2007.* Washington, DC: United States Environmental Protection Agency.