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Regulation of Fuels and Fuel Additives:
Changes to Renewable Fuel Standard Program
Docket EPA-HQ-OAR-2005-0161

To Whom It May Concern:

The National Alliance of Forest Owners ("NAFO") welcomes this opportunity to submit the following comments in response to the United States Environmental Protection Agency's ("EPA's") Proposed Rule on the Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program ("RFS2"), 74 Fed. Reg. 24903 (May 26, 2009). As described below, NAFO and its members fully embrace the nation's renewable energy goals. NAFO's members look forward to serving an instrumental role in realizing the congressionally established renewable fuel mandates by providing forest derived renewable biomass. Fuel from forest-derived biomass will realize significant greenhouse gas ("GHG") reductions compared to conventional fuels while achieving other environmental benefits at the same time. In turn, we respectfully request EPA collaborate with NAFO in achieving these goals by crafting a final rule that provides the fullest opportunities for forest derived biomass.

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.

In recent years, both domestically and abroad, there has been an increased focus on the role forests can play to address climate change. As described below, responsibly managed forests provide significant prospects for reducing atmospheric CO_2—and contributing to our nation's energy security goals—by providing biomass for renewable energy, such as transportation fuels, that have lower lifecycle CO_2 emissions than fossil fuels.

Both Congress in the Energy Independence and Security Act of 2007 ("EISA") and EPA in the proposed RFS2 explicitly have recognized the opportunities for forests to provide a key source of renewable biomass and, in turn, realize our nation's lower carbon potential. While NAFO supports this objective, the potential for forest derived biomass to help realize the goals of the EISA far exceeds that envisioned in the EISA and in the proposed rule. For the reasons expressed below, NAFO urges EPA to further expand the eligibility of biomass derived from forests in order to fully realize the benefits of this critical feedstock in achieving the climate change and energy security goals set forth in the EISA.

Summary

Our recommendations for improving the RFS program are focused on five general areas. First, we provide background information on how forest biomass can be used to achieve carbon benefits. The three main energy uses of forest biomass are to produce low-carbon fuels, low-carbon sourced electricity, and ultra-low carbon synthetic natural gas. Second, we urge EPA to promote a renewable biomass definition that provides the greatest opportunity for the use of wood as a renewable fuel feedstock. Third, in order to promote opportunity for forest derived biomass, we recommend improvements to the construction of certain key terms in the proposed rule: (1) planted trees, (2) tree plantation, (3) actively managed, and (4) forestland. Fourth, we urge that EPA identify forest derived biomass as a qualifying cellulosic and advanced biofuel in the final RFS2. As explained below, studies indicate a highly favorable lifecycle analysis for forest derived biofuels. Finally, we recommend that the final rule adopt a self-certification program that allows renewable fuel producers to choose between a variety of verification tools to implement the land restrictions on renewable biomass under RFS2.

I. The Role of Forests in Achieving the Goal of Low Carbon Energy

Forests can provide ample, sustainable, domestic supplies of biomass to produce low-carbon liquid transportation fuels, low-carbon sourced electricity, and ultra-low carbon synthetic natural gas that can be substituted for higher carbon sources of electricity and fuels. Wood and wood residues are a dependable, domestic renewable energy resource for energy production through processes like biomass generation, wood gasification, and conversion to cellulosic biofuels. Newer "wood gasification" technologies heat wood in an oxygen-starved environment, collect gases 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.

Using forest biomass to produce fuels, electricity, and thermal energy has significant carbon benefits. In evaluating the GHG emissions associated with fuels, a lifecycle analysis ("LCA") incorporates all steps in a "product system" to evaluate broader environmental impacts of products and processes. Work by the Consortium for Research on Renewable Industrial Materials ("CORRIM"), for example, has documented[1] 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. Similarly, the EPA, in its April 2007 Regulatory Impact Analysis for the Renewable Fuels Standard Program (EPA 420-R-07-004), recognized the G emissions reductions that would result from the use of cellulosic biofuels. Indeed, using the "displacement index" approach, EPA has determined that every BTU of gasoline replaced by cellulosic ethanol will produce lifecycle GHG emission reductions of 92.7 percent.

With respect to electricity from biomass, recent studies have documented the GHG benefits resulting from the California biomass energy industry over the past 30 years—benefits that can be further expanded in the future. One study[2] released by the Green Power Institute, the Renewable Energy Program of the Pacific Institute, has found that biomass energy production in California has provided two kinds of

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[1] *See* Bruce Lipke et al., CORRIM: Life-Cycle Environmental Performance of Renewable Building Materials, 54 Forest Prod. J. 8 (2004).

[2] Gregory Morris, Ph.D. *Bioenergy and Greenhouse Gasses* (2008).

greenhouse gas benefits. In addition to avoiding the GHG emissions associated with the production of fossil fuels, biomass energy production also avoids the biogenic greenhouse gas emissions (mainly methane) of the various alternative disposal fates for the residue and waste biomass, replacing them with the lower potency greenhouse gas emissions of energy production. As the study observes:

> The modern California biomass power industry has operated for almost 30 years. The figure below shows the cumulative greenhouse-gas benefits that have already been provided by the California biomass power industry since its inception through 2006. The chart does not show 2007 or later operations of the industry, which are additive to the curves in the figure. Atmospheric greenhouse-gas levels in 2006 were lower by 70 million tons of CO_2 equiv. of fossil greenhouse gases and by 62.5 million tons of CO_2 equiv. of biogenic greenhouse gases as a result of solid-fuel biomass power production in California during 1980-2006. The greenhouse-gas reductions already in the books will continue to provide benefits well into the future."[3]

One of the tremendous benefits offered by renewable biomass from managed forests results from the "carbon neutrality" of wood and wood residues. The international greenhouse gas accounting methods developed by the Intergovernmental Panel on Climate Change ("IPCC") and the domestic greenhouse gas reporting program administered by the Energy Information Administration recognize that "biogenic" carbon

[3] *Id.* at 4.

such as the carbon contained in wood and wood residues, is part of the natural carbon balance and will not add to atmospheric concentrations of carbon dioxide.[4] Wood gases can be cooled, filtered, and purified to remove pollutants to be used as fuel for internal combustion engines, micro-turbines, and gas turbines. More recently, research has enabled low energy-intensive methods of converting wood into sugar and sugar into cellulosic biofuel. In short, wood and wood residuals have come to play an increasingly important part in renewable fuel and energy generation, particularly as new technologies expand the potential use of this dependable resource.

II. EPA should promote a renewable biomass definition that provides the fullest opportunity for the use of wood as a renewable fuel feedstock.

A. EPA has the discretion and flexibility to broadly interpret the EISA.

To fully realize the potential of wood and wood products in playing a key renewable energy role, statutes and regulations must appropriately encourage the use of forest biomass feedstock. While Congress in the EISA correctly recognized a role for forest derived biomass by including such feedstock within the definition of "renewable biomass," Congress provided a definition that has the potential to be construed narrowly. An overly narrow interpretation could frustrate the renewable energy, low carbon, and energy security goals promoted by Congress. The definition of "renewable biomass" contained in the Renewable Fuels Standard of the EISA could be read too narrowly and unnecessarily exclude some present and potential future supplies of wood and wood residues from eligibility to contribute to the RFS. We urge EPA in the final rule to avoid constraining its interpretation of the EISA in an overly narrow way as it pertains to forest derived biomass.

The EISA defines renewable biomass from private lands to include:

> [1] **Planted trees** and tree residue from [2] **actively managed** [3] **tree plantations** on non-federal land cleared at any time prior to enactment of [December 19, 2007]. . . .

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[4] Guidelines for Voluntary Greenhouse Gas Reporting, 10 CFR Part 300 (2006). EPA's Biomass Combined Heat and Power Catalog also states that there is a "'scientific consensus'. . . that the carbon dioxide emitted from burning biomass will not increase total atmospheric carbon dioxide if this consumption is done on a sustainable basis." 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.

The EISA definition thus contains three qualifiers on the potential use of forest derived biomass. EPA, however, has full discretion and authority to interpret each of these key terms in the EISA definition of renewable biomass, as well as the EISA generally, to encompass the broadest possible opportunities for wood as a renewable fuel.

Where Congress' direction is ambiguous, EPA may exercise discretion in interpreting statutory terms. *Chevron USA Inc. v. NRDC*, 467 U.S. 837, 843-44 (1984); *e.g. id.* at 843 ("The power of an administrative agency to administer a congressionally created . . . program necessarily requires the formulation of policy and the making of rules to fill any gap left, implicitly or explicitly, by Congress."); *Nat'l Cable & Telecomm. Ass'n v. Brand X Internet Servs.,* 545 U.S. 967, 980 (2005) ("ambiguities in statutes within an agency's jurisdiction to administer are delegations of authority to the agency to fill the statutory gap in reasonable fashion"). In particular, EPA has broad discretion in implementing a statute to achieve the policy choices articulated by Congress. *See, e.g., Pauley v. BethEnergy Mines, Inc.*, 501 U.S. 680, 696 (1991) ("When Congress, through express delegation or the introduction of an interpretive gap in the statutory structure, has delegated policy-making authority to an administrative agency, the extent of judicial review of the agency's policy determinations is limited.").

As described below, EPA in interpreting the key terms in the EISA definition should properly apply this discretion broadly to effectuate the policy goals sought by Congress and EPA in transitioning toward low carbon energy by promoting the fullest opportunities for forest derived biomass.

B. EPA should interpret the EISA definition to promote the low carbon policies sought by Congress and the President.

In enacting the EISA, Congress and the President recognized that promoting biofuels is critical to addressing energy security and reducing greenhouse gas emissions. The EISA itself states that its purposes are:

> [T]o move the United States toward greater energy independence and security, to increase the production of clean renewable fuels, to protect consumers, to increase the efficiency of products, buildings, and vehicles, to promote research on and deploy greenhouse gas capture and storage options, and to improve the energy performance of the Federal Government.

See EISA, PL 110-140, 121 Stat 1492, 1492 (Dec. 19, 2007). Subsequent congressional actions reinforce promoting a broad definition of renewable biomass that appropriately includes renewable forest biomass as an energy source. In 2008,

Congress enacted a more expansive renewable biomass definition as part of the Food, Conservation and Energy Act of 2008 ("Farm Bill" (7 U.S.C. § 8101(12)). Most recently, the House of Representatives adopted H.R. 2454, the American Clean Energy and Security Act of 2009, which includes this broader Farm Bill renewable biomass definition. This definition of renewable biomass reinforces the opportunity for forests to make a significant contribution to producing clean, domestic renewable energy and providing environmentally sound, cost effective offsets to greenhouse gas emissions.

President Obama recently emphasized that advanced biofuels derived from feedstocks such as forest biomass hold the key to transitioning the nation to a "sustainable, low carbon energy future," and that it is necessary to remove "artificial barriers to market expansion" for advanced biofuels. Letter from President Barack Obama to Governors John Hoeven and Chet Culver (May 27, 2009). As stated by the President:

> In the Nation's ongoing efforts to achieve energy independence, biomass and biofuels promise to play a key role by providing the Nation with homegrown sustainable energy options and energizing our economy with new industries and jobs.

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).

Once finalized, EPA's interpretation of key RFS2 definitions will significantly impact the use of forest derived biomass in transportation fuels. Finalizing a narrow scope of eligibility would create disincentives to maintain or increase the availability of wood biomass feedstock. Such an overly narrow interpretation will diminish the ability of forests to fully contribute to GHG reduction and fossil fuels displacement goals. The emerging renewable energy industries that use or aspire to use forest wood and wood residues to produce power, liquid fuels, or synthetic natural gas face other pragmatic challenges besides identifying qualifying feedstocks. New renewable energy projects, many of which are proposing to employ "first-of-a-kind" technologies, are currently trying to secure financing, negotiate off-take agreements, arrange feedstock supply, hedge commodity price fluctuations, and anticipate policy shifts in what is already a highly constrained credit environment. Given the potential of these emerging green industries to deliver lasting economic and environmental benefits, every effort should be made to remove barriers to their establishment.

C. Promoting forest derived biomass will lead to environmental benefits beyond reduced carbon and other GHG emissions.

Beyond GHG mitigation benefits, providing the fullest opportunity for the use of forest derived biomass will result in a number of environmental benefits. Through existing state and local oversight and sustainable forestry practices, private forestry operations are achieving environmental goals and protecting our nation's ecosystems. Working forests provide significant environmental benefits, including watershed protection, wildlife habitat, and carbon dioxide absorption. Moreover, the removal of additional biomass could be beneficial to air quality to the extent that it reduces the need for prescribed burns, lowers the risk of unwanted wildfire, or displaces fossil fuel as an energy source.

Private forestry operations are managed under a well-established set of statutes, regulations, and non-regulatory and voluntary programs at the federal, state, and local level. The resulting framework has been effective in improving the environmental performance of forestry operations, and will continue to do so in the future. *See* Attachment 1, NAFO *The Environmental Regulation of Private Forests in the United States.* Several federal laws apply to private forest operations, including the Clean Water Act, Clean Air Act, Endangered Species Act, Insecticide Fungicide and Rodenticide Act, and the Coastal Zone Management Act. *Id.* at 1-6. In addition, forestry operations are regulated by State forest management regimes, local land use requirements, zoning, and other stipulations. *Id.* at 6-7. Third party sustainable forestry programs and a variety of voluntary agreements are also used to achieve desired environmental goals. *Id.* at 7-8.

Efforts to control "non point source" pollution from forestry operations have been very successful. *Id.* at 2. Of particular note, most states have adopted Best Management Practices ("BMPs") for forestry, producing significant environmental benefits. BMPs vary by jurisdiction as they are often designed based on local conditions and circumstances, including regional climate, soils, topography, biota, legal, technical, and socioeconomic factors. Notwithstanding their variations, BMPs share a general set of objectives: "avoid, minimize, and mitigate." *Id.* at 3. To achieve these objectives, BMPs will seek to, for example: 1) minimize soil compaction and the extent of bare soils; 2) separate exposed soils from surface waters; 3) separate fertilizer and herbicide applications from surface waters; 4) inhibit hydraulic connections between bare ground and surface waters; 5) provide forested buffers around watercourses; and 6) promote stable roads and watercourse crossings. *Id.* (citing Olszewski, R. and C.R. Jackson. 2006. Best management practices and water quality. *In* A primer on the top

ten forest environmental and sustainability issues in the southern United States. National Council for Air and Stream Improvement, Inc. (NCASI) Special Report No. 06-06. (Research Triangle Park, NC: NCASI)). In short, BMPs are a widely-used and successful method for protecting our nation's water quality. *Id.* at 3-4; *see also* NCASI Technical Bulletin, *Compendium of Forestry Best Management Practices for Controlling Nonpoint Source Pollution in North America*, In Press (Research Triangle Park, NC: NCASI).

NAFO thus urges EPA to finalize a RFS2 rule that allows for the full use of forest derived biomass as a renewable fuel to achieve both significant GHG reductions and to promote strong environmental management practices in the production of liquid transportation fuels.

III. EPA in the final RFS2 should broaden its interpretation of key terms.

A definition of renewable biomass that provides broad opportunities for forest biomass is critical to EPA's overall ability to meet the EISA mandates. The definition should encompass a full range of trees and other plants, forest residuals, and wood byproducts, including sawdust, bark, wood chips, and dissolved wood.

Under EPA's proposed rule, renewable biomass would encompass planted trees and slash from a tree plantation that is actively managed. As described above, EPA has inherent flexibility to more broadly interpret the EISA definition of renewable biomass consistent with common definitions used in the forestry profession and thereby expand opportunities for wood as a renewable fuel. NAFO urges EPA to do so and recommends the following analysis of and suggested improvements to several key terms in the RFS2 proposed rule: (1) planted trees, (2) tree plantation, (3) actively managed, and (4) forestland.

A. Key Terms

As described above, the EISA defines renewable biomass from private lands to include:

> [1] **Planted trees** and tree residue from [2] **actively managed** [3] **tree plantations** on non-federal land cleared at any time prior to enactment of [December 19, 2007]. . . .

In the final rule, NAFO urges EPA to interpret each of these three key terms broader than in the proposed rule and more consistently with the way they are construed in the forestry profession. NAFO also recommends that EPA amend its proposed definition of

"forestland" to include tree plantations consistent with the use of the term among forestry professionals.

1. Planted Trees

The proposed rule defines the term "planted trees" as "trees planted by humans from nursery stock or by seed either through direct application to the ground or by intentional natural seeding by mature trees left undisturbed for that purpose." *See* 74 Fed. Reg. at 25114 (proposed 40 C.F.R. § 80.1401).

NAFO supports EPA's approach of including in the definition not only trees that were established by human planting, but also trees established from seeding by mature trees. However, we respectfully request EPA broaden the proposed definition of planted trees to include a full suite of intentionally applied methods of direct and natural regeneration resulting from active management. This may include methods that are not covered by the proposed rule's definition, such as coppice, root suckers, and other common forms of natural regeneration. Specifically, we suggest that EPA's proposed definition of "planted trees" be amended to also include trees regenerated "through the production of new stems from an existing stump or root (e.g. coppice or root suckers)." Below, to place this recommendation into context, we provide some background on the basic approaches to forest management,[5] which demonstrate the need for and the appropriateness of broadening the definition of "planted trees" in this manner.

Forests are established either through the process of artificial regeneration (planting or direct seeding) or through a variety of silvicultural techniques designed to regenerate the forest by natural means. Artificially and naturally regenerated forests can be managed using "even-aged" or "uneven-aged" management systems. Even-aged management is the system of managing a stand to grow trees of the same age. Uneven-aged management involves managing trees of different ages throughout the same stand. Different tree species within the forest vary as far as their biological suitability for these different types of management. Some tree species are more shade "tolerant" – that is, they regenerate and grow under partially shaded conditions. Other species tend to be shade "intolerant" – that is they need full sunlight conditions to regenerate and grow well. Landowner objectives are also a factor in choosing which type of system to use.

[5] For a general reference on forestry practices, please also see David Smith, The Practice of Silviculture (1962).

There are a variety of artificial and natural regeneration approaches to forest management. "Artificial" regeneration most commonly involves planting seedlings grown initially in a nursery, and can be done either by machine or hand. However, seed can also be applied directly to a site. Seeding is less costly because it avoids the labor of replanting seedlings, but it can be difficult to control the density of the new forest when using this technique. A landowner often gets too many or too few trees when using direct seeding and may incur additional subsequent costs in replanting or thinning. However, in some instances, direct seeding may be a viable option. "Natural" regeneration approaches will often depend on the ability of certain species of trees to regenerate by sprouting from harvested stumps and roots (referred to as "coppice" regeneration), seed coming from trees retained on-site or in an adjacent stand after a harvest occurs, or from residual seed in the forest soil. Seed can also be deposited by birds or other animals or water in flood events. All sources can provide viable material for the origination of new forest stands, and regeneration planning will involve a combination of these techniques.

The distinction between "artificial" and "natural" regeneration can be more semantic than real, and the choice of regeneration does not mean the resulting forest is more or less "natural" through one technique or the other. Tree planting can be essential to regenerate certain native tree species after harvest, and choosing "natural" regeneration may shift the composition of the subsequent forest away from the historical composition. A good example is Douglas-fir, one of the predominant forest trees in the Pacific Northwest. Douglas-fir trees produce cone crops infrequently – about once every 8-10 years – and foresters have learned from experience that relying on "natural" means will produce sparse regeneration and a marked shift to shrubs and other tree species. To counter this, foresters have developed nursery programs to collect seed from local trees and supplement it with seed from trees grown specifically in "seed orchards." The seeds are then grown in a nursery into seedlings that are transplanted into the forest. Foresters are thus able to guarantee the successful regeneration of this valuable, native tree through "artificial" means, where relying on "natural" means would produce an unnatural change in the composition of the forest.

To prepare a site for regeneration, a variety of silvicultural techniques may be used. These vary from equipment that is used to clear a site of competing vegetation or aerate the soil, to the use of herbicides designed to control competing vegetation, to scarifying the soil to make it more receptive to successfully regenerating through seed, and many others. Even-aged stands can be established through regeneration after clearcutting, or through shelterwood, or seed-tree techniques where the trees supplying the seed are removed after the next stand is well established. Uneven-aged stands are

generally established through harvesting the older or larger trees in a stand of trees. There are also many "mixes" of these types of techniques – for example, a forester may use a series of small "patch" clearcuts in a northern hardwood stand to establish pockets of regeneration. The overall stand might be considered "uneven-aged" but it might also consist of small patches of even-aged stands. Importantly, each species has its own biological requirements: in the same northern regions, aspen is also a common species and needs full-sunlight to regenerate and grow well. As a result, aspen cannot be managed successfully in an uneven-aged system.

Foresters and landowners will decide which of these techniques or combinations of these techniques to use based on conditions specific to a given site. Given the wide-variety of forest types in the United States, all of these techniques are needed in order to provide options for successfully managing forests based on biological and physical conditions and landowner objectives. Accordingly, it is critical that EPA broaden the definition of "planted trees" to allow for a full range of intentionally applied regeneration options.

2. Tree Plantation

EPA should expand the proposed definition of "tree plantation" to provide greater opportunities for renewable biomass derived from forests. The proposed definition would limit tree plantations to stands of "no fewer than 100 planted trees of similar age comprising one or two tree species or an area managed for growth of such trees covering a minimum of 1 acre." *See* 74 Fed. Reg. at 25114 (proposed 40 C.F.R. § 80.1401). These restrictions will unduly limit the number and scope of eligible tree plantations, and frustrate the goal articulated by President Obama of transitioning toward advanced biofuels. Thus, NAFO urges EPA in its discretion to <u>define tree plantation more broadly</u> in the final rule. Specifically, we recommend that EPA adopt the well-established definition in the Society of American Foresters' Dictionary of Forestry, which provides that a plantation is "a stand composed primarily of trees established by planting or artificial seeding.'' *See* http://dictionaryofforestry.org/dict/. This definition is preferred because it would cover stands that have resulted from natural regeneration as well as stands comprised of a mixture of three or more species. It also eliminates the overly restrictive requirement that plantations contain no fewer than 100 trees. This definition also depends on and works in tandem with the recommended definition for "planted trees" discussed earlier.

The definition of "tree plantation" should include stands with trees or understory components that have resulted from purposeful, "natural" regeneration. Natural

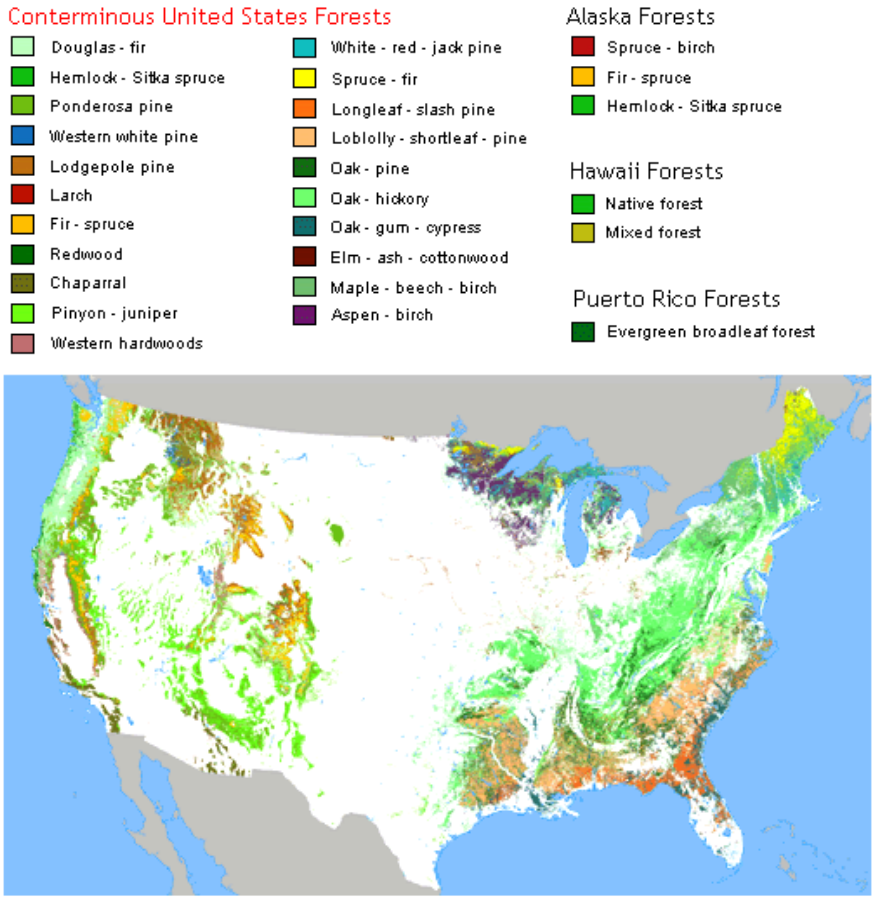
regeneration is a common and useful tool for forest management. Indeed, most forests in the United States are regenerated not by planting, but though "natural" methods. *See, e.g.,* USDA, Draft National Report on Sustainable Forestry – 2010, at page 2-34 (Dec. 8, 2008), *available at* http://www.fs.fed.us/research/sustain/ (stating that planted forests account for only 8 percent of all U.S. forest land); *see generally* David Smith, The Practice of Silviculture (1962) (often referring to natural regeneration techniques and management). For example, Northern hardwoods are suited for management through natural regeneration and are commonly managed using both natural and artificial regeneration.

The definition should also allow for a mixture of tree species. The proposed definition's limitation to stands of "one or two tree species" is unnecessarily restrictive. As depicted on the map on page 14 of these comments, forests vary throughout the country, with many forest cover types comprised of more than one or two species. *See also* Eyre, F.H. (ed.), *Forest Cover Types of the United States and Canada* (Society of American Foresters 1980). The map, derived from data from the National Atlas of the United States, illustrates forest cover types in the conterminous United States, including the following: white-red-jackpine, loblolly-shortleaf-pine, oak-gum-cypress, elm-ash-cottonwood, and maple-beech-birch. As their names suggest, these forest types have a natural mix of more than one or two tree species. For example, in the Eastern United States, maple-beech-birch forests are the dominant forest cover type, covering 54 million acres. *See* Draft National Report on Sustainable Forestry – 2010, at pages 2-10. In addition to maple, beech, and birch, these hardwood forests will often also include ash, basswood, and other species. Another common forest type comprised of multiple tree species is the oak-gum-cypress forest type, which covers 20 million acres in the Southern United States. *Id.* at 2-11. The U.S. is fortunate to have native tree species that are commercially valuable, and foresters generally regenerate with some or all of the species native to an area. Even if they plant one or two species, they expect other species to fill in naturally. A definition that is limited to only one or two tree species would thus unnecessarily restrict the number of plantations eligible as renewable biomass.

The proposed definition's limitation to stands of "no fewer than 100 planted trees . . ." is also problematic, especially for tree plantations that primarily produce sawtimber. Plantations that focus on sawtimber tend to plant fewer trees per acre and at wider spacings in order to concentrate the site's growth potential on fewer trees, which results in larger trees. Thinnings may occur one to three times during the rotation to remove poor quality trees and to continue to focus the potential of the site on fewer trees. Although several hundred trees are planted per acre, a first thinning will reduce stocking

down to around 100 trees per acre. Any subsequent mortality is likely to reduce the stocking to less than 100 trees per acre. Finally, depending on the condition of the stand and market conditions, additional thinnings may occur, resulting in a stand with as few as 60 trees per acre.

For these reasons, we recommend that EPA adopt the Dictionary of Forestry definition set forth above.



National Atlas of the United States, *Forest Resources of the United States*, *available at* http://nationalatlas.gov/articles/biology/a_forest.html

3. Actively Managed

NAFO as a general proposition supports EPA's decision to provide several mechanisms to demonstrate a tree plantation is "actively managed," but urges EPA to add several other well-established means to satisfy the actively-managed definition. Under the proposed rule, active management can be evidenced by any of the following:

> (i) Records of sales of planted trees or slash, or records of purchases of seeds, seedlings, or other nursery stock.
>
> (ii) A written management plan for silvicultural purposes.
>
> (iii) Documented participation in a silvicultural program administered by a Federal, state, or local government agency.
>
> (iv) Documented management in accordance with a certification program for silvicultural products.

See 74 Fed. Reg. at 25114 (proposed 40 C.F.R. § 80.1401).

While NAFO supports providing flexibility to demonstrate active management through several types of evidence, the options provided remain too narrow and do not reflect the full scope of established forest management. NAFO thus recommends that EPA expand the above definition so active management can be demonstrated based on the totality of the circumstances. In addition to the options set forth in EPA's proposed definition, EPA should allow active management to be evidenced by the following: (1) harvest conducted by a logging professional; (2) an agreement with a consulting forester; (3) enrollment in a landowner assistance program; (4) an agreement or action involving active forest management; (5) a self-declaration attesting to the existence of a road system or other physical infrastructure with evidence of ongoing maintenance; and (6) a self-declaration attesting to stumps, slash, or evidence of skid trails indicating thinning or other logging within the length of a standard rotation for the region. Renewable fuel producers should be permitted to rely on a suite of options as well as the totality of the circumstances to determine whether the tree plantation from which its feedstock is derived is actively managed.

4. Forestland

EPA has proposed to define "forestland" to exclude tree plantations. The EISA does not define "forestland" nor does it require that EPA adopt a definition that places actively managed tree plantations outside the scope of forestland. NAFO urges EPA to

delete this unnecessary restriction, which is not mandated by the EISA, and use its discretion to broaden the proposed definition of forestland to include tree plantations. Plantations are well-accepted as a type of forestland. *See, e.g.,* Jim Carle & Peter Holmgren, *Definitions Related to Planted Forests* (October 2003) *available at* http://www.fao.org/docrep/007/ae347e/ae347e00.htm. Tree plantations are often referred to as "planted forests," "plantation forests," "semi-natural forests," or "modified natural forests," depending on the type of species and level of management. Indeed, from a management standpoint, there is no simple dichotomy between a tree plantation and other forestland. *See* Friedman, S.T., *Environmental Aspects of the Intensive/Reserve Debate*, *printed in* Price, et al. (eds.), *Plantations and Protected Areas in Sustainable Forestry* at 59-73 (Food Products Press 2005). "Planting a stand does not necessarily mean that it will be managed intensively later; plantations can be extensively managed, and naturally regenerated stands can be intensively managed." *Id.* at 62. Finally, the Dictionary of Forestry definition of a "forest" specifically notes, "forests include special kinds such as industrial forests, nonindustrial private forests, plantations, public forests, protection forests, and urban forests, as well as parks and wilderness" (emphasis added). Defining forestland to exclude tree plantations would therefore be contrary to its established definition and the approach commonly accepted throughout the forestry profession.

B. Proposed Revisions

Consistent with the recommendations above, NAFO proposes the following specific revisions to the definitions set forth in the proposed rule.

Excerpts of Proposed 40 C.F.R. § 80.1401 Definitions

Forestland is generally undeveloped land covering a minimum area of 1 acre upon which the primary vegetative species are trees, including land that formerly had such tree cover and that will be regenerated.

Deleted: Forestland does not include tree plantations.

* * *

Planted trees are trees planted by humans from nursery stock or by seed through direct application to the ground, through intentional natural seeding by mature trees left undisturbed for that purpose, or through the production of new stems from an existing stump or root (e.g. coppice or root suckers).

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Renewable biomass means each of the following:

* * *

(2) Planted trees and slash from a tree plantation located on non-federal land (including land belonging to an Indian tribe or an Indian individual that is held in trust by the U.S. or subject to a restriction against alienation imposed by the U.S.) that was cleared at any time prior to December 19, 2007, and has been continuously actively managed since December 19, 2007. Active management is evidenced, based on the totality of the circumstances, by any of the following:

(i) Records of sales of planted trees or slash, or records of purchases of seeds, seedlings, or other nursery stock.

(ii) A written management plan for silvicultural purposes.

(iii) Documented participation in a silvicultural program administered by a Federal, state, or local government agency.

(iv) Documented management in accordance with a certification program for silvicultural products.

(v) Harvest conducted by a logging professional that has, or is in the process of completing, a state approved Master Logger Program.

(vi) An agreement with a consulting forester.

(vii) Enrollment in a Landowner Assistance Program (e.g., ForestMap).

(viii) An agreement or action requiring or implying active forest management, including a harvest agreement, conservation easement, a silvicultural expenditure or any other similar agreement or action

(ix) A self-declaration attesting to the existence of a road system or other physical infrastructure with evidence of ongoing maintenance.

(x) A self-declaration attesting to stumps, slash, or evidence of skid trails indicating thinning or other logging within the length of a standard rotation for the region.

* * *

Tree plantation is a stand composed primarily of trees established by planting or artificial seeding.

Deleted: of no fewer than 100 planted trees of similar age comprising one or two tree species or an area managed for growth of such trees covering a minimum of 1 acre

C. Other Terms/Concepts

In addition to the key terms discussed above, we offer the following comments on the ranking of globally vulnerable economic communities and the importance of crafting definitions that incorporate all of the available forest biomass.

1. The Ranking of Globally Vulnerable (G3)

EPA has proposed "to prohibit slash and pre-commercial thinnings from all forest ecological communities with global or State rankings of critically imperiled, imperiled, or vulnerable ('rare'' in the case of State rankings) from being used for renewable fuel for which RINs may be generated under RFS2." NAFO believes that such a restriction is not required by the EISA, is not necessary to protect rare forest ecosystems, and would unnecessarily restrict the area of forest available to support biofuel production.

The EISA disqualifies biofuels produced from "forests or forestlands that are ecological communities with a global or State ranking of critically imperiled, imperiled, or rare pursuant to a State Natural Heritage Program, old growth forest, or late successional forest." State Natural Heritage Programs use rankings developed by NatureServe, a private, non-profit organization formed in 2000 by the science division of The Nature Conservancy.[6] The EISA thus restricts biomass from forests ranked under State Natural Heritage Programs as critically imperiled or imperiled when considered at the global scale (G1, G2), or critically imperiled, imperiled, or rare when considered at the national or sub-national (i.e., state or provincial) scale (S1, S2, S3). EPA has specifically sought comment on its interpretation that the EISA language "implies including global rankings determined by NatureServe, including the ranking of vulnerable (G3), in the land restrictions." We believe this interpretation is flawed because it incorrectly assumes that G3 forests qualify among the types of forests

[6] Brown, Nick, Larry Master, Don Faber-Langendoen, Pat Comer, Kat Maybury, Marcos Robles, Jennifer Nichols, and T. Bently Wigley, *Managing Elements of Biodiversity in Sustainable Forestry Programs: Status and Utility of NatureServe's Information Resources to Forest Managers,* p. 2, National Council for Air and Stream Improvement, Technical Bulletin No. 885 (August 2004).

identified in the EISA, namely those with a ranking of "critically imperiled, imperiled, or rare." In fact, the NatureServe rankings do not include a "rare" designation and, we believe, it is inappropriate to assume that the EISA's reference to "rare" forests includes forests with a NatureServe "vulnerable" ranking.

Restricting biofuel production from forests categorized as G3 is not necessary to protect rare forest ecosystems. The EISA's definitions already address old-growth and late successional forests, and forests ranked as G1, G2, S1, S2, and S3. EPA's proposal, therefore, would restrict forest types that are, by definition, *not* rare at the national or sub-national level. These forest types are also, by definition, second-growth forests. This means the ecological community in question is one that has proven resilient to timber harvest and regeneration – it may even be one that needs the disturbance of timber harvest to thrive. A forest that is a G3 ecological community may be globally rare because it occurs entirely within a given region. Within the region, however, the community may not be at risk. If the ecological community is rare nationally or regionally, it will be ranked S1-S3 and come within the EISA's definitions. There would thus be little or no environmental benefit in adding G3 communities, and restricting regionally common forest types would burden landowners and further limit the availability of forest-derived biomass.

2. Other Sources of Forest Biomass

In issuing regulations to effectuate the EISA's definition of "renewable biomass," EPA should not overlook any important sources of forest biomass. For example, we are concerned that EPA has overlooked intercropping as a potential source of renewable biomass. Intercropping is an innovative concept that forest landowners are exploring, whereby foresters are planting perennial plants (such as switchgrass) between rows of young trees. These landowners hope to achieve annual harvests for at least ten years after establishment, before the crops are shaded out by adjacent trees.

Another important source of forest biomass is understory vegetation, including shrubs, brush, and other plants. Such vegetation is often removed to maintain desireable forest conditions and improve tree growth. The resulting biomass can and should be eligible for use as a fuel source along with eligible biomass from trees. Although not specifically identified in the definition of renewable biomass, it is reasonable to assume that Congress intended such material to qualify as eligible biomass, as it is a byproduct of ordinary forest operations producing brush, slash, and other types of forest residues.

We urge that EPA's regulations be drafted broadly so that the greatest array of forest vegetation, including crops produced through intercropping and understory plants, are eligible as renewable biomass.

IV. The lifecycle analysis in the final RFS2 must rely on best available science.

The EISA specifies the volumes of cellulosic biofuel, biomass-based diesel, advanced biofuel, and total renewable fuel that must be used in transportation fuel each year, with the volumes increasing over time. 74 Fed. Reg. at 24904. Each of these categories of renewable fuels are defined based, in part, on their greenhouse gas emission performance or lifecycle analysis ("LCA"). See e.g. 42 U.S.C. § 7545(o) (defining "advanced biofuel" as "renewable fuel, other than ethanol derived from corn starch, that has lifecycle greenhouse gas emissions. . . that are at least 50 percent less than baseline lifecycle greenhouse gas emissions"); (defining "cellulosic biofuel" as "renewable fuel derived from any cellulose, hemicellulose, or lignin that is derived from renewable biomass and that has lifecycle greenhouse gas emissions . . . that are at least 60 percent less than the baseline lifecycle greenhouse gas emissions.") (emphasis added). Therefore, EPA is required to conduct lifecycle analyses for all fuels in order to determine which ones qualify under the different renewable fuel standards. These analyses should rely on the best available science and most refined methodologies available, and all analysis should be undertaken in a transparent manner.

NAFO commends EPA for conducting an LCA workshop on June 10-11, 2009 to describe its analysis. However, EPA's failure to include in the proposed RFS2 any LCA of forest derived biomass places NAFO at a disadvantage in fashioning our comments, as we cannot fully anticipate EPA's approach, methodology, and application of LCA to our products. We urge EPA to make every effort to complete a LCA for forest derived biomass that reflects the widely held observation that forest derived biomass could constitute a significant portion, if not the majority, of cellulosic feedstocks available to meet the requirements of the Renewable Fuels Standard, especially in the early years. We also respectfully request an opportunity to comment on the LCA for forest derived biomass when it is complete. According to Roger A. Sedjo and Brent Sohngen of Resources for the Future:

> The principal sources of [cellulosic] feedstock would be wood or grasses. Although grasses may prove to be a feasible long-term alternative, in the near term the onus of meeting the mandated targets would probably fall

> on wood because large inventories of wood and an infrastructure currently exist for harvest and transport; these are not available for grasses. [7]

The State of California's Air Resources Board, in the development of a proposed Low Carbon Fuel Standard, has life cycle analysis well underway for what they regard as their most plausible fuel pathways. Their analysis includes both forest waste and trees, which were found to be among the very best environmental performers of all fuel/conversion/use pathways they have analyzed thus far.

Although we were heartened to hear an EPA representative at the June 10th workshop indicate, in response to an audience question, that the LCA for forest derived biofuels in the scientific literature looked very promising, we believe EPA must finalize the specific LCA for forest biomass at the earliest opportunity and prior to implementation of the RFS2. In finalizing its LCA for forest biomass, we recommend that EPA closely consider the LCA described in the scientific literature, which we describe further below.

The desire to delve deeper into questions such as "indirect land use impacts" may be a worthy scientific effort that can, over time, yield improved methodologies and useful data, but at present, the methodologies and data remain too crude or speculative to be relied upon for purposes of rulemaking. Many of the public concerns expressed during EPA's LCA workshop centered on the extreme variability in academic and public purpose studies purporting to calculate "indirect impacts." In this regard, both NAFO and EPA have been prescient in past notices and comments. In its April 2007 Regulatory Impact Analysis for the Renewable Fuels Standard Program, EPA expressed apprehension about the precision of LCA: "Lifecycle modeling typically provides only general comparisons, based on industry-wide estimates and assumptions … results of this type of analysis are highly dependent upon the input data used, the variables considered, and the assumptions made."[8]

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[7] Roger A. Sedjo and Brent Sohngen. The Implications of Increased Use of Wood for Biofuel Production. Issue Brief #09-04, Resources for the Future, June 2009.

[8] EPA, Regulatory Impact Analysis: Renewable Fuel Standard Program, EPA420-R-07-004 219 (April 2007) available at http://www.epa.gov/oms/renewablefuels/420r07004.pdf.

Similarly, NAFO, in earlier comments to EPA,[9] illustrated how researchers focused on a single feedstock-to-biofuel pathway (corn to ethanol via the traditional fermentation and distillation process) reached widely varying conclusions in their LCA. Our point was simple—if a seemingly straightforward analysis looking solely at the fossil energy balance of a single biofuels pathway can produce radically different results, then a more complex effort to evaluate the direct *and indirect impacts* of multiple feedstocks (corn, sugarcane, straw, wood chips, slash), transformed into various fuels (ethanol, synthetic natural gas, bio oil, biodiesel) using various conversion processes (biochemical, thermochemical, hybrid bio-thermochemical) quickly invites paralyzing complexity and the possibility of grave error. This is particularly true because the factors relevant in bio-feedstock production (nutrient and water demands, soil types, tillage method, and microclimatic factors) vary widely among regions and localities.

In spite of these uncertainties and the likelihood of imprecision in the effort, EPA seems determined to include "indirect land use impacts" in its analysis. While we contend that the Administrator has the discretion to avoid doing so if she finds that the data and/or methodologies employed in such an analysis is unavailable or unsound, EPA has made it clear that it intends to proceed, doing the best it can. We understand the difficult challenge that Congress has created by asking EPA to take into account such a broad range of variables, and we hope our comments are helpful in this challenge.

Notably, Congress is reconsidering the requirement that "international indirect land use changes" be included in the LCA of renewable fuels. Specifically, section 551 of H.R. 2454, as passed by the House of Representatives, would exclude this factor from the LCA, pending review by the National Academy of Sciences, a further determination by EPA and USDA, and subsequent rulemaking. Although the Senate has not acted on H.R. 2454, we understand that the original provision in the Energy Independence and Security Act of 2007 requiring the inclusion of indirect effects has emerged from the House of Representatives. The fact that the House has reversed itself in this matter is instructive.

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[9] NAFO Comments on Advance Notice of Proposed Rulemaking: Regulating Greenhouse Gases under the Clean Air Act, 73 Fed. Reg. 44354 (July 30, 2008), Docket # EPA-HQOAR-2008-0318.

A. Existing studies suggest a very favorable LCA for forest derived biofuels.

The scientific literature suggests that forest-derived biofuels offer superior environmental performance, not only in terms of life cycle greenhouse gas emissions, but also in terms of broader environmental performance.

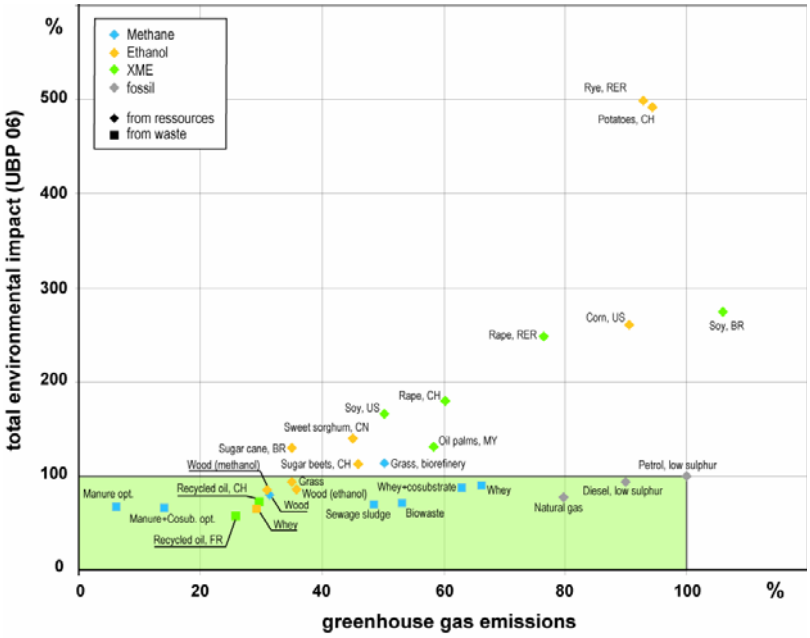
There are various combinations of biofuels, the feedstocks with which they can be produced, and the processes by which they can be made. Biofuels can be made from corn, soybeans, sugar cane, sugar beets, potatoes, rye, wood, grass, algae, rapeseed, sunflower, fish oils, separated municipal solid waste, forest residues, agricultural waste and more. Biofuels can be made through a variety of processes, including biochemical methods utilizing hydrolysis and fermentation; through the transesterification of fats and oils; and through thermochemical processes that gasify feedstocks for catalytic conversion into fuels or that pyrolyze cellulose into oils by subjecting them to short pulses of heat in the absence of oxygen. Each of these combinations of feedstocks, processes and fuels must ultimately be evaluated, on a life-cycle basis, for their greenhouse gas emissions and to the extent possible, their other impacts on the environment. Scientific institutes and agencies around the world are beginning to do this, and early results are enlightening.

In general, cellulosic feedstocks and wood in particular are considered to be among the more environmentally sustainable feedstocks. Indeed, a recent Swiss study[10] looking at the life cycle implications of greenhouse gas emissions and a wide variety of other environmental factors concluded that, of all of the feedstocks and methods studied that could be employed to make ethanol, only ethanol made from wood, grass and whey outperformed gasoline from an environmental point of view using one methodology for measuring total life cycle environmental impact, and only ethanol made from wood, whey and sugar beets outperformed gasoline using an alternative methodology for measuring total environmental impact.

This point is illustrated by the following two diagrams from the study, which plot the relative position of various feedstocks and fuels against their life cycle greenhouse gas emissions and aggregate environmental impacts. Two different life-cycle impact methodologies were used—a Swiss method of assessing ecological scarcity (UPB 06) and a leading European life cycle analytical method designed to quantify damage to

[10] Rainer Zah, Heinz Böni, Marcel Gauch, Roland Hischier, Martin Lehmann & Patrick Wäger (Empa): *Life Cycle Assessment of Energy Products: Environmental Assessment of Biofuels,* May 2007

human health and ecosystems (Eco-Indicator 99). The total environmental impact, as assessed by these two methodologies, is shown on the y-axis. Life cycle greenhouse gas emissions are shown on the x-axis. Gasoline is established at the 100% point on each axis, such that only those feedstocks and fuels in the green area of the diagrams are judged to emit fewer greenhouse gasses and diminished overall environmental impact when judged against gasoline.


%
Methane
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from ressources
from waste
total environmental impact (UBP 06)
500
400
300
200
100
0
Rye, RER
Potatoes, CH
Corn, US
Soy, BR
Rape, RER
Rape, CH
Soy, US
Sweet sorghum, CN
Oil palms, MY
Sugar cane, BR
Wood (methanol)
Sugar beets, CH
Grass, biorefinery
Petrol, low sulphur
Grass
Wood (ethanol)
Whey-cosubstrate
Whey
Diesel, low sulphur
Manure opt.
Recycled oil, CH
Wood
Sewage sludge
Biowaste
Natural gas
Manure+Cosub. opt.
Whey
Recycled oil, FR
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20
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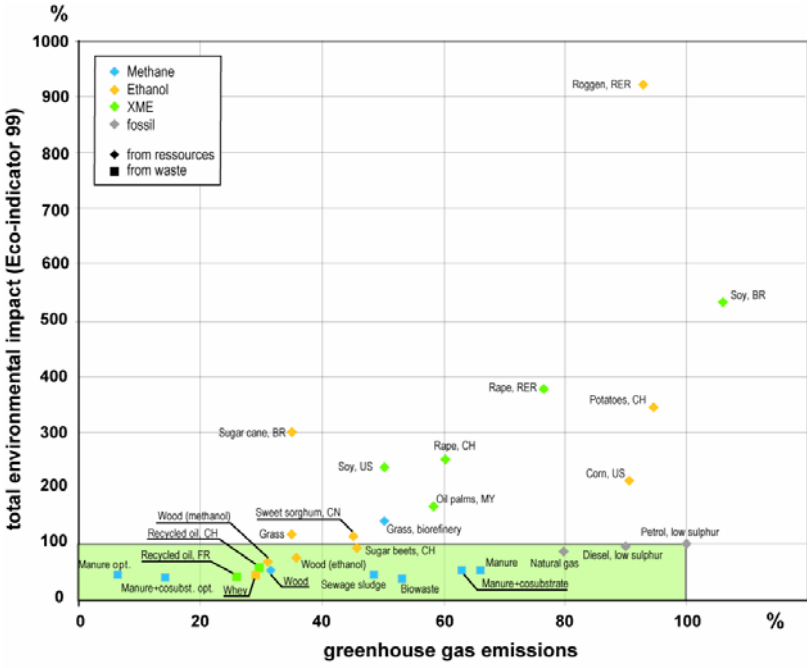
greenhouse gas emissions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total environmental impact (Eco-indicator 99)
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200
100
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Roggen, RER
Soy, BR
Rape, RER
Potatoes, CH
Sugar cane, BR
Rape, CH
Soy, US
Corn, US
Oil palms, MY
Wood (methanol)
Sweet sorghum, CN
Grass, biorefinery
Recycled oil, CH
Grass
Petrol, low sulphur
Sugar beets, CH
Manure
Natural gas
Diesel, low sulphur
Recycled oil, FR
Manure opt.
Wood (ethanol)
Wood
Sewage sludge
Biowaste
Manure+cosubstrate
Manure+cosubst. opt.
Whey
0
20
40
60
80
100
%
greenhouse gas emissions

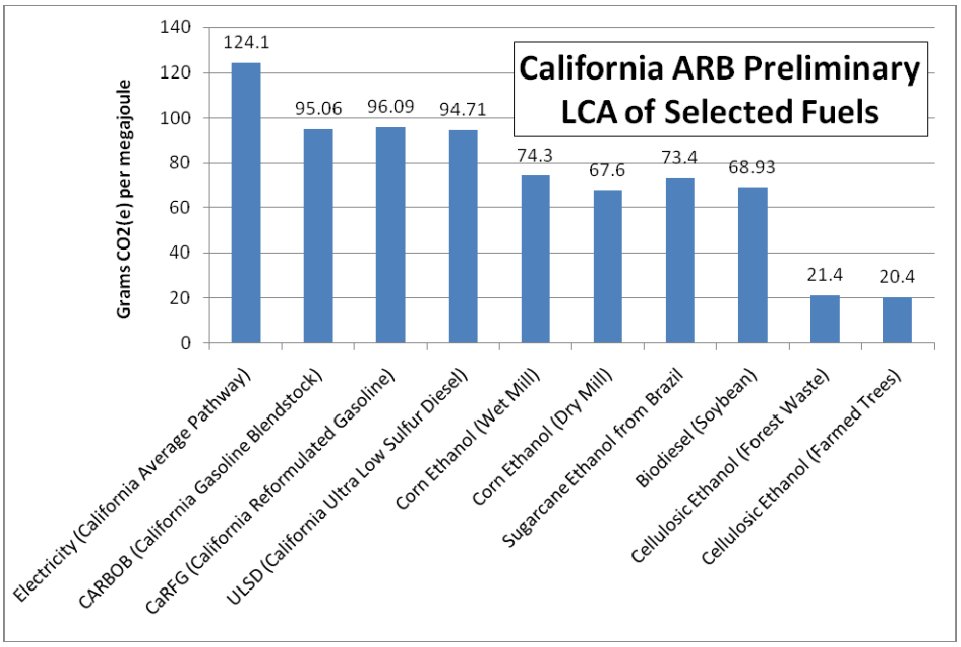
We recognize that EPA is not attempting to consider all the other environmental factors embodied in the Swiss study. Nevertheless, it is instructive that this study found that wood is a top performer when broader environmental factors are taken into account.

Analyses conducted in the United States have also concluded that wood and forest biomass are among the very best in terms of overall environmental performance. For example, the California Air Resources Board ("ARB") work related to California's proposed Low Carbon Fuel Standard attempts to take indirect effects into account. Early results from their analysis clearly suggest that forest waste and trees offer superior life cycle environmental performance.

The most recent California-modified GREET[11] Model model runs made available on the ARB website (version 2.1, February 27, 2009) provide the following values for resulting from their working group investigations of the lifecycle GHG emissions of available transportation fuel pathways, taking into account sustainability, land use conversion, fuel co-products, and known uncertainties.[12]

[11] GREET is an acronym for Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation, originally developed by Argonne National Laboratory.

[12] Chart adapted from a variety of ARB products at http://www.arb.ca.gov/fuels/lcfs/lcfs.htm in development and review. Information dated February 27, 2009. Website accessed June 22, 2009.



Of all the liquid fuel pathways analyzed thus far, none have outperformed cellulosic ethanol from trees and forest waste.

B. EPA in the final RFS2 should identify forest derived biomass as a qualifying cellulosic and advanced biofuel.

Based on the life cycle analysis undertaken thus far, represented by the examples cited above, wood and forest biomass will meet the "advanced biofuel" or "cellulosic biofuel" criteria in terms of lifecycle GHG emissions displacement. We urge EPA to confirm these conclusions through its own LCA for wood and forest derived biomass in the final RFS2.

Further, as described in Part II.C, in addition to GHG displacement benefits, responsibly managed forests provide watershed protection, wildlife habitat, carbon dioxide absorption, and other "environmental services," even as they provide wood, fiber, fuel, employment and economic activity. This is particularly important, because the concerns of Congress about "indirect land use impacts" largely arise from the fear that forests in the United States and around the world, and their ancillary environmental benefits, will be lost as a consequence of their conversion to agricultural production—including energy crop production. Conversely, the maintenance of U.S. working forests,

responsibly managed to produce income streams from wood, fiber, and fuel, is the method by which we may encourage forest landowners to resist conversion and keep working forest lands as forests, and thus maximize energy and environmental benefits. It follows, therefore, that providing new income sources from sales of wood and woody biomass for working forest owners is beneficial because it provides an incentive for them to keep their lands as productive working forests, rather than converting them to other competing economic uses. This tends to maintain the delivery of the forests' other environmental services to a greater extent than would be the case in the absence of this income opportunity from biofuels. Therefore, the traditional "energy production vs. environmental protection" tradeoffs can be largely avoided through the use of forest derived biofuels. It is possible to enhance both.

C. Additional comments concerning EPA LCA methodologies

The Proposed Rule sought public comment on several narrow technical aspects of LCA methodologies, including the treatment of harvested wood products (HWP) and the so-called "foregone sequestration" associated with forests that have been cleared in the context of indirect international impacts. NAFO members share many widely held concerns about tropical deforestation. However, we also believe that LCA methodologies should strive to maximize accuracy, and an accurate LCA methodology must include HWP as a legitimate carbon pool. We also believe that an LCA methodology that assumes immediate release of standing stock carbon plus future losses from 80 years of "foregone sequestration" will generally overstate the effects of deforestation. For example, if a deforested plot was comprised of mature forest in general equilibrium, sequestering little if any additional carbon, it would be appropriate to count "immediate release" less any related sequestration in HWP, but it would not be appropriate to include "foregone sequestration," because little additional sequestration was occurring.

The calculation used by EPA for immediate release is based on the average carbon stock for a particular Food and Agriculture Organization of United Nations ("FAO") ecozone and continent, which represents all stages of age and management for that area. Carbon accumulation for an additional 80 years is then added to this immediate release to result in the total indirect land-use change impact. Based on our spot checks of the data used in the Draft Regulatory Impact Analysis ("DRIA"), it appears that adding the average accumulation (which takes into account growth in early years) for 80 years to an area with an already established forest is overestimating the

carbon emissions.[13] We suggest either limiting foregone sequestration to a shorter time period (*e.g.* 20-40 years) or lowering the average accumulation to reflect biomass accumulation of older standard (*e.g.* greater than 60-80 years) or both.

Again, in raising these technical issues, we do not wish to diminish the overriding concerns about tropical deforestation and its overall impact on atmospheric greenhouse gas concentrations, but we do believe it is critical to have greater precision in any LCA performed for this purpose.

V. The Final RFS2 Should Provide For Flexible Means to Satisfy Verification

NAFO proposes to work with EPA and other stakeholders to develop an appropriate and enforceable verification program for inclusion in the final rule. We recommend that such a program allow renewable fuel producers to choose between a variety of verification tools, including self-certification. Below, we provide background information on forest ownership and supply chains that we believe is relevant to developing appropriate verification options. In addition, as a starting point for establishing even more specific guidance for verification, we have outlined several verification approaches that are consistent with the EISA and compatible with industry practice.

A. The need for flexibility with verification for forest biomass.

In the preamble to the RFS2, EPA expresses concerns that existing government and third-party verification programs may not be well tailored for verifying renewable biomass under RFS2. 74 Fed. Reg. at 24938. As EPA observed, third-party certification covers only a small portion of the total available land and forests expected to qualify for renewable biomass production. *Id.* In addition, EPA believes the existing certification schemes are generally not designed to verify all the elements necessary for the RFS2 program. *See id.* (noting that many third-party certifiers are limited in the scope of products that they certify and that no third-party certifiers have definitions or

[13] It is unclear what numbers are actually used because Table 2.6-30 is not found in the DRIA, *see* DRIA at page 387. However, because all other calculations are based on the 2006 IPCC Agriculture, Forestry, and Other Land Use ("AFOLU") Guidelines and other global sets (*see* DRIA at section 2.6.5.4.2.2), we assume that Table 4.7 of the 2006 IPCC AFOLU Guidelines is used for average above-ground biomass. By this table, a tropical rainforest in South America has an average biomass of 300 tonnes biomass/ha. Table 4.9 (used to determine foregone sequestration) estimates that tropical rainforests in South America accumulate an average of 3.1 tons biomass/ha/yr. By these calculations the *average* forest in South America has stands that have been accumulating biomass for 96 years. Assuming a 96 year old stand will accumulate biomass at the same rate for the next 80 years is an over-estimation.

criteria that perfectly match the EISA requirements). EPA requests input on whether a chain-of-custody program should be required for forest-derived renewable fuel, and on other options.

NAFO believes that a true chain-of-custody tracking system would be an overly-burdensome verification option that would prove to be too costly for forest-derived biomass. As explained below, wood supply chains can be complicated. Moreover, such a verification program would place undue burden on the feedstock producers, suppliers, and handlers.

B. Forest supply chains do not lend themselves to true chain of custody.

"Chain of custody" is often misunderstood to mean that a forest products manufacturer can trace all of its raw material supplies "upstream" – that is, back to the acre from which they originated; can trace certain types of wood (such as wood from certified forests) through the manufacturing process; and can trace products "downstream" to the retailer's shelves. This model, originally conceived by the Forest Stewardship Council, proved to be unworkable in the United States, with its diverse forest ownership and multiple supply chains leading to multiple products.

Forest land ownership is fragmented in the United States and dominated by small private landowners – about two-thirds of the working forests in the United States are owned by individuals and families owning 100 acres or less. Even the largest landowner in a supply basin typically supplies less than 10% of a forest products customer's needs. In addition, because forestry is a long-term enterprise, many small landowners will only harvest or thin their forest once or twice in their adult lives. A complex verification system based on chain of custody would be especially difficult for such landowners. The fragmented nature of forestland ownership has created in many areas a supply chain that is facilitated by brokers who aggregate supply from many diverse sources to bring it to market. For paper or energy markets, this aggregator often chips material to end user specifications, combining fiber from multiple sources. Again, such a process makes it extremely difficult to trace material through a chain of custody verification approach. Similarly, for biomass generated by thinning and slash from non-plantations, landowners typically grind or chip the material onsite to facilitate handling and transportation. This process makes it impossible to specifically link processed material to the qualifying portion of a harvested tree.

C. NAFO supports the alternative of bringing together renewable fuel producers and feedstock suppliers to develop a reliable and efficient quality assurance program.

EPA has appropriately identified the complex issues involved in implementing and enforcing the renewable fuel definitions in EISA. At the outset, NAFO agrees with EPA that under the RFS2, accountability should rest with the renewable fuel producers that are responsible for generating RINs, not with biomass suppliers. To effectuate the verification requirements, NAFO recommends that in the final rule, EPA adopt a framework for a flexible quality assurance program, that allows renewable fuel producers – and feedstock suppliers – to choose among a variety of approved verification tools to implement RFS2. As noted above, NAFO proposes to work with EPA, renewable fuel producers, forest feedstock suppliers, and other stakeholders to develop an "appropriate, practical and enforceable implementation scheme for renewable biomass under RFS2." 74 Fed. Reg. at 24938.

NAFO believes a workable framework for forest-based biomass verification can incorporate many of the alternatives that EPA discussed in its preamble to the proposed rule. Flexibility is important, because the supply chain associated with different wood products will vary. Supply chains are often complicated as there can be multiple layers of vendors spread across different geographies, including regions outside the United States. For logs or standing trees purchased directly from a landowner, the contract or transport documents can usually be used to trace the wood to the acre. For logs from a logger, broker, or other wood producer, however, the feedstock may be more difficult and costly to trace. And once collected and processed through a sawmill or chip mill, logs lose their link to individual landowners in the same way agricultural crops lose their link to individual farms in a grain elevator or railroad car. Fifteen years of experience and experimentation under forest certification systems have produced some key lessons that NAFO can help EPA apply to biofuel feedstock tracing. Providing the flexibility to choose among various verification options under differing circumstances is critical to the effective and efficient implementation of the RFS2 on forests.

As one option, a verification framework should allow biomass producers to accept self-certification from feedstock suppliers. Some suppliers will find this the most efficient option, either because they are landowners themselves, or because their supply chains enable them to create a straight-forward chain of auditable contract requirements through upstream suppliers. EPA should look to existing government programs such as USDA's Biomass Crop Assistance Program for guidance on developing a verification program for forest biomass.

As another option, a verification framework should allow biomass producers to rely on third-party certification systems. *See* 74 Fed. Reg. at 24937-38. EPA is correct that none of the existing forest certification standards address all of the criteria in EISA. *Id.* at 24938. It is reasonable to expect they may amend their standards, however, and that certifications may arise specifically for biofuel feedstocks. In addition, ISO 9000 or 14001 standards provide a means for consulting foresters or other intermediaries to certify supplies under their control.

As a third option, a verification framework should use information gathered through other programs to facilitate reasonable presumptions in demonstrating the type of land used to produce feedstock.[14] *See* 74 Fed. Reg. at 24937 (describing USDA programs). Such an approach should include:

- Presumptions based on publicly available information (e.g., in many regions there may be no biomass from federal lands available on the market);
- Risk-based analysis that balances reliability and cost effectiveness;
- Certain limited de minimis exceptions;
- Documentation or declarations from feedstock suppliers as needed to fill gaps in regional information.

For residual chips, pulp, and veneer, because the wood can be traced to the primary mill, no additional verification should be required. Such an approach would be compatible with industry practice. For example, the FSC classifies co-products such as residual chips as controlled and does not require a risk assessment to meet the controlled wood standard. In addition, under the Sustainable Forestry Initiative's objectives for sustainable forestry, procurement programs may reach out to wood producers that supply wood fiber directly from the forest for commercial purposes. *See*

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[14] For example the Forest Stewardship Council's ("FSC's") Controlled Wood standard, which was written to ensure that wood coming from poor forestry practices is not included in wood products that carry the claim of "FSC Mixed Sources," uses a risk-based assessment to verify compliance. *See* Alberto Goetzl, et al., *Assessment of Lawful Harvesting & Sustainability of US Hardwood Exports* at 129-130 (October 1, 2008), *available at* http://www.ahec-europe.org/fileadmin/docs/Seneca_Creek_Study/. Based on five risk categories that consider the legal framework where the wood is harvested, past and current practices, and other factors, the area is classified as "low risk" or "not low risk"; only if an area is "not low risk" will the buyer be required to seek verification at the level of the particular forest management unit. *Id.*

SFI*, 2005-2009 Standard*, *available at* http://www.sfiprogram.org/files/pdf/sfi-standard-2005-2009-sept%2008%20update.pdf.

Finally, under EPA's proposal, a renewable fuel producer would still be required to trace the source of their feedstock even if they planned to sell the resulting fuel without RINs. 74 Fed. Reg. at 24938 ("A renewable fuel producer would only be permitted to produce and sell renewable fuel without RINs if he demonstrates that the feedstocks used to produce his fuel do not meet the definition of renewable biomass.") This requirement is unnecessarily burdensome and, in some circumstances, because of the complications associated with tracing forestry biomass to the source, will be impossible to satisfy. Therefore, NAFO urges EPA to remove this requirement from the final rule. So long as the final rule adopts flexible verification approaches, as recommend above, fuel producers will not have a disincentive to avoid the generation of RINs.

VI. Conclusion

NAFO appreciates the opportunity to comment on this important rulemaking and looks forward to working with EPA to realize the contributions our private forests can make to achieve the benchmarks in the RFS2 program.

Respectfully Submitted,

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

ATTACHMENT 1

NAFO

National Alliance of Forest Owners

The Environmental Regulation of Private Forests in the United States

Private forestry operations are regulated by a fairly complex set of laws, regulations, and non-regulatory policies at the federal, state and local level. While the resulting framework is fairly complicated and can vary widely between jurisdictions, it has been effective in improving the environmental performance of forestry operations, and can be expected to do so in the future.

In addition to useful forest products, jobs and economic activity, working forests provide significant environmental benefits. Watershed protection, wildlife habitat, carbon dioxide absorption, and other "environmental services" are currently provided by private landowners at little or no cost to society. Whenever policymakers consider new environmental requirements on private forestry, such as eligibility requirements for biomass feedstocks intended for energy use, the implications for the economic viability of working forests should be considered. If new regulatory requirements reduce the private forest owner's ability to realize value from a working forest; or if new market limitations constrain market opportunities for working forests, private forest owners might be compelled to consider other uses for their forests, which could result in the reduction of many of the broader environmental benefits they provide.

Background

Private forests are currently regulated at the federal, state, and local level. The Federal Clean Water Act, Clean Air Act, Endangered Species Act, Insecticide Fungicide and Rodenticide Act, and the Coastal Zone Management Act each apply to private forest operations. These laws have been implemented through a variety of state programs, regulations, court decisions, agency precedents and policies. More narrowly focused State forest management regimes, local land use requirements, zoning and other stipulations have also been used to regulate or manage forestry operations. Additionally, third party sustainable forestry programs and a variety of voluntary agreements have also been used to achieve desired environmental goals.

There is considerable evidence that this complex framework of regulatory and non-regulatory activities has substantially reduced adverse environmental impacts from forestry, and will continue to do so in the future. While this paper will not exhaustively chronicle the scope of methods available to government at every level to regulate, manage, encourage or influence activities on private forests, many of the primary methods are listed here.

The Clean Water Act

The Clean Water Act[1] is arguably the federal law of predominant relevance and application. Since forestry operations generally involve the construction of access roads and water crossings, as well as the disturbance or removal of trees and plants that

[1] The Federal Water Pollution Control Act of 1972 (Public Law 92-500), as amended.

would otherwise tend to control erosion, most of the environmental concerns related to forestry operations involve the protection of water quality and aquatic habitat. Forestry operations can also involve the disturbance of plant litter and soil, the application of herbicides and fertilizers, equipment lubrication and refueling.

Under the Clean Water Act, "point sources" such as industrial facilities and wastewater treatment plants with effluents that can be directly monitored at known outfalls are regulated with a permit system based on technology-based effluent limitations. Conversely, "non point sources" such as runoff from forests and farms cannot be so easily monitored, measured or regulated. This is particularly true with forestry, since forestry activities generally involve numerous relatively small operations occurring sporadically over large amounts of space and long periods of time, often by different landowners operating independently of one another. Complicating the situation is the fact that different forests, even those in close proximity with one another, may have vastly different characteristics in terms of topography, tree species, soil types, wildlife habitat, geology and hydrology. Consequently, the approach to protecting the environment from forestry activities must be adapted to local conditions and circumstances.

Efforts to control non point source pollution from forest operations have been fairly successful. National Water Quality Inventories conducted by the Environmental Protection Agency now contend that "the most significant source of water quality impairment to rivers and streams and lakes, ponds, and reservoirs is *agriculture*, and the most significant source of impairment to estuaries is *municipal point sources* of pollution."[2] Other significant sources include urban runoff, storm sewer discharges, and pollutants deposited from the atmosphere.[3]

Although forestry operations create fewer water quality impacts than agricultural operations, urban runoff and storm water, sewage plants and natural sources,[4] major hydrologic events such as 100 year storms can nevertheless result in significant releases of sediments[5] when sound forest management practices have not been employed. Although forest watershed protection efforts began on an ad hoc basis in the early half of the 20th Century, Section 208 of the Clean Water Act, adopted in 1972, directed states to develop watershed or regional water quality management plans to identify significant non point sources and assess their cumulative effects, and to "set forth procedures and methods (including land use requirements) to control to the extent feasible such sources."[6] In 1987, the Clean Water Act was amended to include, among other provisions, Section 319, requiring states to develop control plans for any non point source activities that were causing state waters to fall short of water quality goals. Taken together, sections 218 and 319 comprise the authority for States to control non point source pollution, with oversight by EPA.

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[2] National Management Measures to Control Nonpoint Source Pollution from Forestry. Page 1-1. EPA-841-B-05-001, United States Environmental Protection Agency, April 2005. (Emphasis added.)
[3] Ibid.
[4] National Water Quality Inventory: 2002 Report to Congress. EPA 841-R-07-001, United States Environmental Protection Agency, October 2007.
[5] National Management Measures to Control Nonpoint Source Pollution from Forestry. EPA-841-B-05-001, United States Environmental Protection Agency, April 2005.
[6] Section 208(2)(F)(ii) of the Federal Water Pollution Control Act of 1972.

To control non point source pollution from forestry operations, most states have adopted Best Management Practices (BMPs) designed to take regional climate, soils, topography, biota, legal, technical and socioeconomic factors into account. BMPs vary widely among jurisdictions, which is understandable since a BMP that is appropriate for a coastal plain pine forest in Georgia may be wholly inadequate for a mountainous temperate rainforest in Oregon.

In spite of their variations, there are aspects common to most BMPs across jurisdictions. The general philosophy of BMPs is to "avoid, minimize, and mitigate." More specifically, BMPs will generally strive to 1) minimize soil compaction and the extent of bare soils; 2) separate exposed soils from surface waters; 3) separate fertilizer and herbicide applications from surface waters; 4) inhibit hydraulic connections between bare ground and surface waters; 5) provide forested buffers around watercourses; and 6) promote stable roads and watercourse crossings.[7]

Different states manage BMPs in different ways. Some states employ mandatory BMPs administered by State Foresters under a focused state forest practices act. Other states employ non-regulatory BMPs developed or approved by state agencies, with landowner education to encourage compliance, and authority for agencies to take action against landowners who do not comply. Regardless of the approach, BMPs and the broader non point source pollution prevention programs implemented by the states are subject to EPA oversight and approval. States whose water quality inventories fail to show continued improvement invite closer scrutiny and review by the EPA, and poor performance can result in grant funding reductions or a federal takeover of the state program. Over time, BMPs have become an accepted, well understood, widely adopted method of protecting water quality in the waters of the United States.

Although it is beyond dispute that BMPs are widely stipulated, it is appropriate to consider 1) how effective they are in protecting water resources and other environmental values, 2) what the compliance rates are for BMP implementation, and 3) the factors associated with high rates of implementation and compliance.

There is a high correlation between high water quality and forested areas. Most of the waters failing to meet EPA-approved water quality standards and requiring the establishment of Total Maximum Daily Load (TMDL) specifications are in urban or industrial areas. But this correlation alone does not prove the effectiveness of BMPs. Fortunately, a variety of watershed scale research projects in the published literature have evaluated the effectiveness of BMPs in the United States. These studies, some of which are summarized by Stednick and Ice,[8] have found BMPs to be highly effective when they are used. Other studies point out that the major impediment to the protecting water quality is the lack of compliance with BMPs.[9]

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[7] Olszewski, R. and C.R. Jackson. 2006. Best management practices and water quality. *In* A primer on the top ten forest environmental and sustainability issues in the southern United States. NCASI Special Report No. 06-06. Research Triangle Park, NC: National Council for Air and Stream Improvement, Inc.

[8] Ice, G.G.; Stednick, J.D. (eds). 2004. A Century of Forest and Wildland Watershed Lessons. Bethesda, MD, USA: Society of American Foresters. 292 p.

[9] Ice, G.G.; Stewart, G.W.; Waide, J.B.; Irland, L.C.; Ellefson, P.V; July, 2007. 25 Years of the Clean Water Act: How Clean are Forest Practices? Journal of Forestry. Pages 9-13.

A more expansive treatment of this subject is contained in a technical paper currently in draft[10] by the National Council for Air and Stream Improvement (NCASI), soon to be published as a NCASI Technical Bulletin. Some of its key points are as follows:

- Forestry BMP prescriptions vary among jurisdictions due to a multitude of factors, but properly implemented BMPs are effective regardless of jurisdictional requirements;
- While monitoring programs and protocols vary among jurisdictions, rates of BMP implementation are generally very high.
- Jurisdictions having long-term monitoring programs in place have shown steady improvement in compliance rates over time.
- Forest certification programs, along with education and outreach programs, have had a positive and significant role in increasing BMP compliance with the various jurisdictional recommendations and/or recommendations.

This last point is particularly important. According to NCASI, the high rates of BMP compliance reported for industrially managed forestlands "are primarily attributable to sustainable forestry programs" such as the Sustainable Forestry Initiative (SFI), the Forestry Stewardship Council (FSC), and the American Tree Farm program. NCASI contends that these third party verification programs have been documented to result in higher compliance rates with BMPs.

BMPs have become, therefore, effective tools to advance the goals of the Federal Clean Water Act. As a consequence of this success, BMPs are increasingly being used to address ancillary issues such as wildlife habitat and other issues, some of which fall under the cognizance of other federal laws.

The Endangered Species Act

The Endangered Species Act[11] (ESA) applies to private forestry operations as a direct federal regulatory program which relies mainly on prohibitions against the "taking" of listed threatened or endangered plant and animal species. About 1,320 species in the United States and U.S. waters have been listed as threatened or endangered,[12] many of which spend at least part of their life cycle in forests or waters affected by forestry activities.

Although the ESA does not enlist the support of States or state programs in ways comparable to other federal environmental laws, States and localities have amended their laws, regulations, land use plans, policies and BMPs to help protect ESA-listed species and their habitats. In addition, some private landholders have entered into habitat conservation plans (HCPs) designed to improve habitat for listed species, although HCPs have often proven to be costly, difficult and time-consuming to negotiate.

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[10] National Council for Air and Stream Improvement, Inc. (NCASI). 2008. *Compendium of state and provincial forestry best management practices*. Technical Bulletin or Special Report *In Draft*. Research Triangle Park, N.C.: National Council for Air and Stream Improvement, Inc.

[11] 7 U.S.C.136; 16 U.S.C.460 et seq.

[12] See http://www.nmfs.noaa.gov/pr/species/esa/

Still other private landholders have been encouraged by the ESA to engage in land sales and exchanges to bring important habitat into conservation easements, non-profit ownership, or public ownership.

The Clean Air Act

The Clean Air Act[13] directs the Environmental Protection Agency to establish air quality standards protective of public health and welfare. States, in turn, develop plans and programs to achieve those standards. The direct impact of these plans and programs on forest management activities is to limit slash burning and prescribed fires. Indirect impacts include the demand for fuel wood in homes and other facilities. Finally, the motor vehicles and equipment used in forestry must be compliant with all applicable air quality standards.

The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)

The Federal Insecticide, Fungicide and Rodenticide Act,[14] or FIFRA, establishes comprehensive programs regulating use of pesticides in forestry, agriculture and other situations. Under its provisions, pesticide compounds must be "registered" with (approved by) EPA for specific purposes and used only in accordance with EPA-approved "label" instructions designed to protect environmental resources. Pesticides which could pose environmental or health hazards if improperly handled or used by untrained people are restricted so they can be purchased and applied only by applicators trained and licensed by state agencies under EPA-approved programs.

Although FIFRA is applicable to private forest lands, the forestry market for pesticides is relatively small compared to agricultural and urban markets. Because trees grow for long periods compared to food and forage crops, forest-use pesticides usually are applied on particular lands only rarely (e.g. when establishing new plantations or responding to rare pest infestations), in contrast to agriculture, urban lawns, golf courses and other areas where the same chemicals are applied more often. It is not surprising, therefore, that environmental damage from forest-use pesticides has not been documented in the legal or scientific literature as a significant problem.

Coastal Zone Management Act

Unlike the Clean Water Act, Endangered Species Act, Clean Air Act, and Federal Insecticide, Fungicide and Rodenticide Act, the Coastal Zone Management Act[15] directly addresses broader land use issues rather than narrower environmental concerns. Twenty-nine states bordering on the West, East and Gulf Coasts, Pacific Ocean or Great Lakes participate in voluntary federal-state partnerships under the CZMA,[16] including most major private timber producing states.[17] These CZMA programs are developed with technical assistance and funding from, and then subject to approval of, the National

[13] The Clean Air Act (42 U.S.C. 7401–7626) consists of Public Law 159 (July 14, 1955; 69 Stat.322) and the amendments made by subsequent enactments.
[14] 7 U.S.C. 136 et seq.
[15] Public Law 92-583, 16 U.S.C.1451-1456, as amended.
[16] See http://coastalmanagement.noaa.gov/mystate/welcome.html , a NOAA website containing a map of participating and eligible states and territories. Illinois is the only eligible state currently not participating.
[17] Except Montana, Arkansas, Tennessee, West Virginia and New Hampshire.

Oceanographic and Atmospheric Administration (NOAA) through its Office of Ocean and Coastal Resource Management (OCRM). They address a wide range of issues including coastal development, water quality, shoreline erosion, public access, natural resource protection, energy facility siting, and coastal hazards such as hurricanes and flooding.[18] Other states also address these issues through land use planning laws, local zoning ordinances, etc. Summaries of NOAA-approved CZMA programs are available through a NOAA website.[19]

An important component of CZMA programs is the Coastal Nonpoint Pollution Control Program under which states and territories with approved coastal zone management programs must develop and implement programs to control nonpoint source pollution from six main sources including forestry and losses of wetland and riparian areas.[20] Understandably, there are considerable variations among the states on how forestry issues are addressed in CZMA programs, reflecting differences in state constitutions, agency roles, court decisions, political and economic factors and environmental conditions.

State Forestry and Land Use Programs

States have adopted a wide variety of regulatory and non-regulatory programs addressing forest-related environmental and land use issues. Generally these are incorporated into federally approved programs under the federal statutes listed above, but many deal with other forestry issues as well. All 50 states have a State Forester, who is responsible for administering forestry programs and coordinating regulatory and non-regulatory programs administered by his department and other agencies.[21]

Some states have forest practices acts regulating all or most forest management activities. Some require reforestation after timber harvests. Some require local government approval to convert forestlands to non-forest uses. Some provide various kinds of tax incentives to encourage forest owners to keep their lands in forests. All states provide landowner education and technical assistance delivered by State Foresters, land grant colleges and universities, and other institutions, often with federal funding through the by U.S. Forest Service state and private forestry programs and Natural Resources Conservation Service extension service programs.

Some states have struggled to contend with stakeholders who wish to see stricter regulation of forestry activities, notwithstanding the nearly universal view that greater environmental benefits result when forest owners keep their lands in forests rather than convert them to other uses. If forest owners encounter environmental regulations or environmental litigation risks that make forest management uneconomic, many are often compelled to consider alternative ways to obtain economic returns from their property. The problem is compounded by the fact that most forestry investments are "sunk" at or near the beginning of a forest stand rotation while most of the economic return is

[18] See http://oceanservice.noaa.gov/topics/coasts/management/
[19] At http://coastalmanagement.noaa.gov/mystate/welcome.html. Click on the map to bring up a summary for a particular state.
[20] CZMA Sec. 3217; see also http://coastalmanagement.noaa.gov/programs/coast_div.html
[21] See National Association of State Foresters website, http://www.stateforesters.org/

received decades later when the stand is harvested. Therefore, willingness to invest in new forest stands can depend on perceptions about whether harvest will be allowed decades later and what costs might be imposed by regulatory programs at that time. Many states have addressed this dilemma by trying to keep both administrative "transaction" costs and operational costs of forest regulation reasonable, relying on landowner education and voluntary cooperation as much as possible, providing technical assistance on forestry issues, favorable tax treatment for forestlands and forestry activities, and other incentives to encourage owners to increase forestry investments and keep lands in forest use. This incentive-based approach has sometimes been criticized by those seeking more regulatory mechanisms, but overall it seems to have produced good results: The amounts of forestland have been gradually increasing in most states for about 90 years as forests have grown back on former farmlands and pasture lands at faster rates than forestlands have been lost to urban development and other non-forest uses. For example, in some New England states land uses have shifted from about 80% agriculture to about 80% forests over the last 100 years or so. Similarly in southern states many lands formerly used for grazing, tobacco, cotton or other agricultural uses have returned to forests. In most regions the volumes of standing timber and other biomass have been increasing and could increase further if landowners could be induced to increase forestry investments to enhance timber growth and thus increase their forestry-based economic returns.

Voluntary Cooperative Activities

In addition to the regulatory and non regulatory approaches listed above, some innovative cooperative projects between private landowners, states, and private foundations have resulted in the protection of critically important natural ecosystems and the interests of private landowners and other stakeholders. Here are a few recent notable examples:

- In 2007, the Nature Conservancy, the Lyme Timber Company, Conservation Forestry LLC and the State of Tennessee completed the largest conservation transaction in Tennessee since the creation of the Great Smoky Mountains National Park in the 1930s, protecting nearly 130,000 acres of hardwood forests, mountains and streams on the Cumberland Plateau, through a combination of working forest agreements, conservation easements, and land purchases.

- In 2008, Plum Creek Timber Company and King County, Washington entered into an agreement to protect the Green River Watershed by granting the county a conservation easement at no cost to the taxpayer, in exchange for Development Credits that allowed for increased development density in urban areas.

- In 2007, Forest Capital Partners signed an agreement with the Minnesota Department of Natural Resources that will restrict development on more than 51,000 acres of their privately owned forestland in Itasca and Koochiching counties in Minnesota. State and private money was used to purchase a working forest conservation easement from Forest Capital Partners, the largest single transaction for conservation in three decades in Minnesota. The terms of the conservation

easement, which is in perpetuity, guarantees public access for outdoor recreation, ensures sustainable forest management, and conserves wildlife habitat.

- In 2001, the Pingree family forest ownership in Maine, in partnership with the New England Forestry Foundation, created the world's largest conservation easement (764,000 acres) designed to maintain this land in an undeveloped condition while promoting continued use of the acreage as a working forest.

These kinds of creative arrangements—employed alongside the methods already available to the federal, state and local governments to regulate, manage, or influence activities on private forests through direct regulation, regulatory and non-regulatory BMPs, land use planning, and incentive arrangements—constitute a rich set of tools that can be used in pursuit of national goals, while remaining responsive to local needs and interests.

Will an Increased Demand for Energy Biomass require Changes in Forest Management Regulation?

As a result of the growing dependence of the United States of foreign oil and the desire to increase the supply of renewable energy sources, working forests have been increasingly viewed as an important potential source of wood and biomass for conversion into electricity or liquid fuels such as cellulosic ethanol. Some have expressed concern that a "biomass boom" might result in the wholesale conversion of working forests into plantations of short rotation woody crops for the exclusive purpose of energy production, resulting in a loss of wood supply for saw logs, wood chips for pulp, or other forest products. Still others have expressed concerns that such a conversion might result in a loss of some of the environmental benefits that working forests provide.

It is important to note the forest products industry is already a major producer and user of renewable electricity, and that biomass already produces roughly 53% of the nation's non-hydro renewable electricity.[22] Forest landowners have harvested biomass for energy in some locations for more than 20 years. In many instances, forest management that includes biomass harvesting has been included in BMP audits and third party certification programs.

Market history also suggests that wholesale conversion of working forests to dedicated energy crops is unlikely, since biomass intended to be used as an energy feedstock generally has a lower market value than other forest products. While wholesale conversion may be a valid concern in the case of "row crop" agriculture, where native grasslands, lands set aside for conservation purposes, or lands in food production might be converted to dedicated energy crops, such is not the case for working forests where energy biomass removals are likely to be in addition to, not in lieu of, the existing production of higher value products.

But there probably are opportunities for working forests to be managed, in the pursuit of higher value products, to produce increasing amounts of biomass for renewable energy production. To ensure that soil productivity, wildlife habitat, or other values are not compromised by the removal of additional material that would otherwise be left in the forest without an ancillary

[22] U.S. EIA at www.eia.doe.gov/cneaf/alternate/page/renew_energy_consump/table3.html - Biomass is the primary energy source for 55.4 billion kilowatt hours of the 103 billion kilowatt hours of non-hydro renewable energy produced in 2007 (preliminary figures, subject to revision).

market for biomass energy feedstocks, some states are exploring approaches to revise existing BMPs, or to establish new guidelines in addition to existing BMPs, to guide in the harvest of biomass for large scale energy. Because BMPs or the development of other BMP-like guidelines can take local factors into account, it seems prudent that enhancements or adjustments to state practices and guidelines be considered without federal interference, particularly as we gain a greater understanding of how biomass conversion technologies and markets will actually evolve.

With respect to the other potential impacts of increased forest biomass utilization for energy on air and water quality, wildlife habitat, and pesticide use, it is difficult to speculate beyond broad generalizations. However, the removal of additional biomass could be *beneficial* to air quality to the extent that it reduces the need for prescribed burns, lowers the risk of catastrophic wildfire or displaces fossil fuels as an energy source. Water quality would arguably be unchanged, since the largest factor in non-point source pollution associated with forest operations involves the construction and placement of roads, and biomass collection would likely occur using the same roads and access points used for the higher value product harvests. Increased use of wood for renewable electric power generation is unlikely to occur to the detriment of ESA-listed species since most wood-based biofuels have been and probably will continue to be byproducts of timber harvests conducted primarily for production of lumber, pulp, paper and other traditional forest products. Increased use of wood for renewable energy could contribute to increased pesticide use in some intensively managed plantations, mainly at the time new crops are being established. However, healthy fast-growing intensively managed timber crops are seldom subject to the kinds of insect and disease problems that sometimes require use of insecticides in "overmature" timber stands or other stands containing large amounts of dead, dying or damaged trees that attract forest pests. Therefore increased use of wood-based biomass seems unlikely to generate widespread pesticide problems or increased use of pesticides in the forestry sector.

Conclusion

A robust yet flexible array of tools, in the form of federal, state and local laws, regulations, programs and Best Management Practices have measurably improved the environmental performance of forest operations in the United States. In addition, voluntary activities and third party sustainability programs have worked to promote environmental goals without sacrificing jobs and economic activity. As policymakers consider the imposition of new environmental requirements on private working forests, or market limitations on the participation of private working forests in emerging renewable energy markets, the implications for the economic viability of working forests must be considered to avoid inviting an unintended result—compelling private forest owners to consider alternative uses for working forests that do not provide the environmental services that provide healthy watersheds, wildlife habitat, carbon sequestration and similar benefits that are highly valued by society.

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