BARKING UP THE WRONG TREE? FOREST SUSTAINABILITY IN THE WAKE OF EMERGING BIOENERGY POLICIES

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INTRODUCTION

Twenty years have passed since the Fish and Wildlife Service's controversial listing of the Northern Spotted Owl as an endangered species, triggering highly publicized debate surrounding government-sanctioned clear-cutting of forest habitats throughout the Northwestern United States.[1] The spotted owl controversy revealed that federal forest management policies alone could not guarantee functioning forest ecosystems. At the same time as the owl's listing, agreements made at the 1992 Rio Earth Summit highlighted the mounting pressures on natural systems, thus unofficially marking the advent of sustainable forestry management (SFM).[2] While threats to forest ecosystems from traditional logging practices certainly remain,[3] developed and developing countries have shifted generally toward more sustainable forest management, at least on paper, including codifying various sustainability indicators in public laws.[4]

Nevertheless, dark policy clouds are gathering on the forest management horizon. Scientific consensus has grown in recent years around a new and arguably more onerous threat to all of the world's ecosystems—climate change. Governments' responses have focused on bioenergy policies aimed at curtailing anthropogenic greenhouse gas (GHG) emissions, and mandates for renewables in energy supplies now abound worldwide. In the United

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1. William Yardley, *Plan Issued to Save Northern Spotted Owl*, N.Y. TIMES, June 30, 2011, http://www.nytimes.com/2011/07/01/us/01owls.html?pagewanted=all&_r=O.

2. Andrew Long, *Auditing for Sustainable Forest Management: The Role of Science*, 31 COLUM. J. ENVTL. L. 1, 6–7 (2006); United Nations Conference on Environment and Development, Rio de Janiero, Braz., June 3–14, 1992, *Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests*, Preamble (d) ¶2, U.N. Doc. A/CONF.151/26 (Vol. III), Annex III (Aug. 14, 1992), *available at* http://www.un.org/documents/ga/conf151/aconf15126-3annex3.htm (declaring that its principles were the "first global consensus on forests" and recognizing the role of forests in producing bioenergy and as a carbon sink).

3. Preface, *Evaluating Sustainable Forest Management*, 8 ECOLOGICAL INDICATORS 109, 110 (2008).

4. G.T. McDonald & M.B. Lane, *Converging Global Indicators for Sustainable Forest Management*, 6 FOREST POL. & ECON. 63, 64 (2004); Don Wijewardana, *Criteria and Indicators for Sustainable Forest Management: The Road Travelled and the Way Ahead*, 8 ECOLOGICAL INDICATORS 115, 115 (2008).

States alone, the federal Renewable Fuel Standard (RFS) requires biofuels blending in transportation fuels,[5] and Clean Air Act (CAA) permitting of GHG emissions considers, at least for the moment, biogenic sources as carbon neutral.[6] Various state-level renewable portfolio standards[7] and California's Low Carbon Fuel Standard also incentivize biomass-based fuels.[8] The EU Renewable Energy Directive (RED)[9] and Fuel Quality Directive[10] seek similar ramp-ups in bioenergy portfolios and corresponding carbon reductions.[11] As a signal of its commitment, the European Commission recently announced it would contribute €170 million toward a wood-based biodiesel refinery sourced from logging residues and bark.[12]

Thus, forests could play an important role in achieving these mandates, as they hold potential as feedstocks and carbon sinks. The United States Department of Agriculture (USDA) recently estimated that residues from almost 11 million acres of forests in the U.S. could be used to produce 2.8 billion gallons of advanced biofuel by 2022.[13] The U.S. Department of Energy estimates potential yield from forest and agricultural resources at anywhere from 187 to 602 dry tons by 2022, with each dry ton yielding as

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5. CARLOS RODRIGUEZ-FRANCO, U.S. FOREST SERV., BIOMASS FOR ENERGY & CONSERVATION: CAN WE DO BOTH? 15 (2010), *available at* http://ageconsearch.umn.edu/bitstream/60355/1/FrancoC.pdf; BIOMASS RESEARCH & DEV. INITIATIVE, VISION FOR BIOENERGY AND BIOBASED PRODUCTS IN THE UNITED STATES: BIOECONOMY FOR A SUSTAINABLE FUTURE 7 (2006), *available at* http://www1.eere.energy.gov/biomass/pdfs/final_2006_vision.pdf.

6. Deferral for CO_2 Emissions from Bioenergy and Other Biogenic Sources Under the Prevention of Significant Deterioration (PSD) and Title V Programs, 76 Fed. Reg. 43,489, 43,490–91, 43,495 (July 20, 2011) (codified at 40 C.F.R. pts. 51, 52, 70, 71).

7. U.S. DEP'T OF ENERGY ET AL., DATABASE OF STATE INCENTIVES FOR RENEWABLES AND EFFICIENCY, RENEWABLE PORTFOLIO STANDARDS POLICIES (2013), *available at* http://www.dsireusa.org/documents/summarymaps/RPS_map.pdf (noting over twenty-five states have renewable portfolio standards).

8. CAL. CODE REGS. tit. 17, § 95480 (2013).

9. Council Directive 2009/28/EC, of the European Parliament and of the Council of 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC, 2009 O.J. (L 140) 16 (EC) [hereinafter RED].

10. Council Directive 2009/30, 2009 O.J. (L 140) 88, 89 (EC).

11. *See Renewable Energy: Targets by 2020*, EUR. COMM'N, http://ec.europa.eu/energy/renewables/targets_en.htm (last visited May 4, 2013) (noting the Commission's renewable energy targets).

12. *EU Awards NER300 Technology Grant For UPM's Biorefinery Project in France,* UPM-KYMMENE CORP. (Dec. 18, 2012), http://www.upm.com/EN/INVESTORS/Investor-News/Pages/EU-awards-NER300-technology-grant-for-UPM%E2%80%99s-biorefinery-project-in-France-001-Tue-18-Dec-2012-16-05.aspx; EUROPEAN COMM'N, COMMISSION IMPLEMENTING DECISION OF 18.12.2012: AWARD DECISION UNDER THE FIRST CALL FOR PROPOSALS OF THE NER300 FUNDING PROGRAMME 7 (Dec. 18, 2012), *available at* http://ec.europa.eu/clima/news/docs/c_2012_9432_en.pdf.

13. USDA, A USDA REGIONAL ROADMAP TO MEETING THE BIOFUELS GOALS OF THE RENEWABLE FUELS STANDARD BY 2020 5–6 (June 23, 2010), *available at* http://www.usda.gov/documents/USDA_Biofuels_Report_6232010.pdf (stating that the 2.8 billion gallons would come from 42.5 million dry tons of logging residues).

much as eighty-five gallons per ton.[14] In California alone, estimates of total forest biomass available for energy production range from 402 million to 190 million dry tons.[15]

Worldwide, the 3.9 billion hectares of forested lands have the sequestration potential of five to eleven tons of CO_2 per hectare per year.[16] Deforestation, however, particularly in Southeast Asia and South America, accounts for seventeen percent of the world's yearly total emissions of CO_2.[17] The onslaught of new forest biomass demand created by renewable energy policies could result in further direct and indirect conversion, releasing copious amounts of carbon into the atmosphere. This scenario calls into question the accuracy of various renewable energy policies' accounting for GHG emissions from conversion, in addition to measuring emissions from forestry practices and combustion of forest biomass.[18] The Center for Biological Diversity and other environmental group petitioners have pursued at least two claims against the EPA challenging its conclusion that forest biomass is carbon neutral, or at the very least, worthy of further study before

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14. U.S. DEP'T OF ENERGY, U.S. BILLION-TON UPDATE: BIOMASS SUPPLY FOR A BIOENERGY AND BIOPRODUCTS INDUSTRY 146 (2011), *available at* http://www1.eere.energy.gov/biomass/pdfs/billion_ton_update.pdf.

15. NATURAL RES. DEF. COUNCIL, BIOFUELS FACTS: BUILDING A SUSTAINABLE BIOMASS INDUSTRY IN CALIFORNIA WITHOUT SACRIFICING OUR UNIQUE NATURAL HERITAGE (2009), *available at* http://www.nrdc.org/energy/files/CAbiomassFS_0409_04.pdf (citing CAL. BIOMASS COLLABORATIVE, BIOMASS RESOURCE ASSESSMENT IN CALIFORNIA (2005), *available at* http://www.energy.ca.gov/2005publications/CEC-500-2005-066/CEC-500-2005-066-D.PDF). Another report from 2005 puts per year forest materials availability within California at 14–26 million dry tons. CAL. BIOMASS COLLABORATIVE, BIOMASS IN CALIFORNIA: CHALLENGES, OPPORTUNITIES, AND POTENTIALS FOR SUSTAINABLE MANAGEMENT AND DEVELOPMENT 15 (2005) [hereinafter BIOMASS CHALLENGES], *available at* http://biomass.ucdavis.edu/files/reports/2005-cbc-biomass-in-ca-white-paper.pdf.

16. BRENT SOHNGEN, COPENHAGEN CONSENSUS CENTER, AN ANALYSIS OF FORESTRY CARBON SEQUESTRATION AS A RESPONSE TO CLIMATE CHANGE 5, 7 (2009), *available at* http://fixtheclimate.com/uploads/tx_templavoila/AP_Forestry_Sohngen_v.2.0.pdf. *See also* Gert Jan Nabuurs et al., *Forestry, in* CLIMATE CHANGE 2007: MITIGATION, CONTRIBUTION OF WORKING GROUP III TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, 557–58 (B. Metz et al. eds., 2007) (estimating global annual sequestration potential of forests in 2030 at 13,775 $MtCO_2$ under certain carbon price scenarios).

17. SOHNGEN, *supra* note 16, at 5.

18. *See, e.g.*, Timothy Searchinger et al., *Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land-Use Change*, 319 SCI. 1238, 1238 (2008); Joseph Fargione et al., *Land Clearing and the Biofuel Carbon Debt*, 319 SCI. 1235, 1236 (2008) (noting that switching to biofuels can have greater GHG impacts than fossil fuels because the switch involves indirect land use changes). *See also* U.N. Econ. Comm'n for Eur./Food & Agric. Org. of the U.N., *Forest Products Annual Market Review 2008–2009* 111 U.N. Doc. ECE/TIM/SP/24 (2009), *available at* http://www.unece.org/fileadmin/DAM/timber/publications/Final_FPAMR2009.pdf ("A need exists to coordinate and harmonize the various forestry certification frameworks for sustainable timber production, sustainable biomass production and carbon sequestration.").

arriving at a final accounting.[19] Forest conversion also can cause ecosystem degradation such as loss of biodiversity and a decline in water quality.[20] Fearing this outcome, environmental groups recently unsuccessfully challenged one federally funded, forest-to-bioenergy project on the grounds that existing government and private sustainability certification regimes cannot guarantee that negative ecological impacts from forest harvests will be mitigated.[21]

SFM's policy foundation for the past thirty years provides important insight into how it may evolve in coming decades in response to the newly emerging forest bioenergy feedstock paradigm. As acknowledged in the USDA's 2010 National Forest Sustainability Report, the term "sustainability" can have many different meanings.[22] The Agency increasingly uses the "triple bottom line"—economic, social, and environmental accounting—to describe its commitment to sustainability.[23] Commentators have categorized the triple bottom line approach as "weak" or "strong" depending on the degree to which a policy recognizes that economic activity does not operate within a vacuum.[24] That is, when applying the approach, the needs of society as a whole—including minimum environmental values that "cannot be obtained through any other means" by future generations—should be included in sustainability calculations.[25]

SFM policies consistently reflect the triple bottom line approach. The definition of SFM has evolved to mean "stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, generation capacity, vitality, and their potential to fulfill, now

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19. Request for Correction from the Ctr. for Biological Diversity to the EPA Regarding Emissions from Biomass Combustion in the Inventory of U.S. Greenhouse Gas Emissions and Sinks 1 (July 28, 2010), *available at* http://www.epa.gov/quality/informationguidelines/documents/10006.pdf; *see infra* notes 86–89 and accompanying text (explaining Clean Air Act stationary source litigation).

20. *See, e.g.*, Comments from Cal. Energy Comm'n on the Interagency Forestry Working Group 2 (Mar. 18, 2009), *available at* http://www.bof.fire.ca.gov/board_committees/interagency_forestry_working_group/mission_and_goals/charter/californiaenergycommission.pdf (raising concerns about the sustainability of existing regulations regarding forest biomass collection activities).

21. Klein v. U.S. Dep't of Energy, No. 2:11-cv-514, 32–34 (W.D. Mich. Dec. 11, 2012) (order denying plaintiff's motion for summary judgment).

22. USDA, NATIONAL REPORT ON SUSTAINABLE FORESTS—2010, at I-2 (2011), *available at* http://www.fs.fed.us/research/sustain/docs/national-reports/2010/2010-sustainability-report.pdf.

23. *Id.* (citing Exec. Order No. 13,423, 3 C.F.R. 381 (2007) ("'Sustainable' means to create and maintain conditions under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirement of present and future generations of Americans.")).

24. ALLEN HAMMOND ET AL., WORLD RES. INST., ENVIRONMENTAL INDICATORS: A SYSTEMATIC APPROACH TO MEASURING AND REPORTING ON ENVIRONMENTAL POLICY PERFORMANCE IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT 23 (1995), *available at* http://pdf.wri.org/environmentalindicators_bw.pdf.

25. USDA, *supra* note 22, at I-2.

and in the future, relevant ecological, economic, and social functions at local, national, and global levels.''[26] Seven basic criteria of SFM for temperate and boreal forests have been developed through the Montréal Process, a twelve-country effort that emerged from the 1992 Rio Earth Summit.[27] These criteria reflect the basic human and ecological values inherent in SFM:

> (1) maintenance and enhancement of forest carbon cycles;
> (2) maintenance of forest ecosystem health;
> (3) maintenance and encouragement of forest productive capacity;
> (4) maintenance, conservation, and enhancement of biodiversity;
> (5) maintenance and enhancement of other forest ecosystem services, such as water and soil quality;
> (6) maintenance of other socio-economic functions and conditions; and
> (7) a legal, institutional, and economic framework to implement and foster SFM principles.[28]

The extent to which forests are sustainably managed for bioenergy production and carbon sequestration depends on several factors, including the *type* of forest that generates biomass. Forests are typically classified as primary or secondary. Primary forests are forests of native species without "clearly visible indications of human activities and the ecological processes have not been significantly disturbed," whereas secondary forests are defined as forests formed as a consequence of human impact on forest lands,

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26. Bernhard Wolfslehner et al., *Application of the Analytic Network Process in Multi-Criteria Analysis of Sustainable Forest Management*, 157 FOREST ECOLOGY & MGMT. 157, 158 (2005) (quoting Second Ministerial Conference on the Protection of Forests in Europe Res. H1, General Guidelines for the Sustainable Management of Forests in Europe, June 16–17, 1993, http://www.foresteurope.org/docs/MC/MC_helsinki_resolutionH1.pdf).

27. *History of the Montréal Process*, The MONTRÉAL PROCESS, http://www.montrealprocess.org/The_Montreal_Process/About_Us/history.shtml (last visited May 4, 2013).

28. THE MONTRÉAL PROCESS, CRITERIA AND INDICATORS FOR THE CONSERVATION AND SUSTAINABLE MANAGEMENT OF TEMPERATE AND BOREAL FORESTS 2 (4th ed. 2009), *available at* http://www.montrealprocess.org/documents/publications/general/2009p_4.pdf. The Montréal Process covers over eighty-three percent of the world's temperate and boreal forests and forty-nine percent of the world's forests. *Id.* at 3. *See also* Wolfslehner et al., *supra* note 26, at 158 (describing a "common framework of recommendations" that can be used to implement and promote sustainable forest management); Jacek P. Siry et al., *Sustainable Forest Management: Global Trends and Opportunities*, 7 FOREST POL'Y AND ECON. 551, 551–52 (2005) ("Enhanced sustainable forest management will require better reporting and verification, more areas covered and enhanced implementation of sustainable forest management criteria and indicators in the future.").

excluding plantations.[29] In addition to these forests, monocultured trees grown plantation-style specifically for biomass—short-rotation woody crop biomass—likely will become more widespread with increasing genetic discovery.[30] In the future, forests could contain both trees and intercropped grasses such as switchgrass, which could require an additional set of management practices. Ownership also dictates what sustainability regulations apply to a forest in question. For example, in the U.S., government-owned forest land can be subject to either federal or state jurisdiction. If forest land is held privately, the state jurisdiction in which the land sits applies. Nations also may be parties to international treaties that dictate some form of SFM.

The future market for forest energy biomass can determine what SFM practices owners follow. While companies and consumers can create voluntary market pull for more sustainable practices, compliance with government mandates and other laws often requires some form of SFM that is embedded in the very definition of what qualifies as woody biomass. Many question why existing forest management laws cannot be used to meet bioenergy sustainability prescriptions.[31] Others counter that for years, private certification organizations have been developed to fill holes in SFM that national governments either could or would not patch,[32] and that bioenergy policy therefore must exercise precaution.[33]

In an effort to determine which of these positions is more accurate—precaution versus more aggressive sourcing—policymakers must consider and incorporate SFM within newly emerging bioenergy mandates and in light of novel scientific questions. This Article first lays out in Parts I, II and III how bioenergy and general SFM public policies in the U.S., Europe, and other international communities recognize, to varying degrees, the need for forest protections unique to biomass-based energy. Part IV then takes a deep

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29. Food and Agric. Org. of the U.N., Global Forest Resources Assessment 2010, at xviii (2010), http://www.fao.org/docrep/013/i1757e/i1757e.pdf [hereinafter FAO 2010 Assessment]; Richard T. Corlett, *What Is Secondary Forest?*, 10 J. OF TROPICAL ECOL. 445, 445 (1994) (noting that it is possible that this definition does not adequately capture the true nature of secondary forest in the case of tropical secondary forest as virtually all tropical forests have "suffered some form of human impact").

30. G.A. Tuskan, *Short-Rotation Woody Crop Supply Systems in the United States: What Do We Know, and What Do We Need to Know?* 14 BIOMASS & BIOENERGY 307, 311 (1998) (explaining the characteristics of short-rotation woody crop supply systems).

31. I currently chair the U.S. Council for Sustainable Biomass Production, www.csbp.org; sit in a Chamber of the Roundtable for Sustainable Biofuels; and participate in the California Low Carbon Fuel Standard Sustainability Workgroup.

32. *See* Errol Meidinger, *Competitive Supragovernmental Regulation: How Could it be Democratic?*, 8 CHI. J. INTL. L. 513, 513 (2008) (discussing the benefits of competitive supragovernmental regulation as implemented by nonstate actors).

33. Trevor P. Hesselink, *Increasing Pressure to Use Forest Biomass: A Conservation Viewpoint*, THE FORESTRY CHRONICLE, Jan.–Feb. 2010, at 28, 29.

dive into private certification standards and the controversies lying therein, and concludes that applying third-party certification is no panacea to environmental groups' fears. The concluding section reflects on the universe of provisions examined in earlier Parts to determine how policies should move forward to assure critics, while at the same time giving the nascent forest-biomass-to-energy industry an opportunity to demonstrate SFM successfully.

I. BIOENERGY AND SUSTAINABLE FOREST MANAGEMENT POLICIES IN THE U.S.

Industrialized countries, such as the U.S. and the EU Member States, demand enormous amounts of energy for transportation and electricity.[34] Whether in response to climate change, energy insecurity, rural development, or all three, the U.S. and EU have instituted various policy regimes in recent years to displace imported, high-GHG fossil fuels with more renewable feedstocks—including forest and agricultural biomass.[35] To determine the degree of caution that policy support for biofuels must exercise moving forward, the following Sections examine specific carve-outs in bioenergy policy for forest protection and general SFM policies that bioenergy statutes must rely on for foundational support.

A. Federal Bioenergy Policy

The U.S. maintains several federal-level programs that incentivize biomass production and consumption. These include a broad range of mandates for biofuels blending in transportation fuels, cropping subsidies, GHG reduction strategies for stationary sources, and procurement rules. Common elements focus on accounting for carbon fluxes in forests—both directly from energy biomass and indirectly from land conversion—and maintaining or enhancing forest ecosystem values.

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34. Bruce E. Dale, *Energy Consumption, Wealth, and Biofuels: Helping Human Beings Achieve Their Potential*, 6 BIOFUELS, BIOPRODUCTS & BIOREFINING 1, 1–2 (2012) (stating that while "[w]e don't have to consume unlimited power to achieve human potential . . . we do have to consume a lot" and providing a graph of per capita primary power consumption).

35. *See* Jody M. Endres, *Legitimacy, Innovation, and Harmonization: Precursors to Operationalizing Biofuels Sustainability Standards*, 37 S. ILL. U. L.J. (forthcoming) (manuscript at 2–9), *available at* http://www.arb.ca.gov/fuels/lcfs/workgroups/lcfssustain/LawReviewJodyEndres10_3_12.pdf (detailing those regimes).

1. The Renewable Fuel Standard

Congress first ordered mandatory, renewable-transportation-fuels blending in 2005 and expanded the mandate in 2007 to 31 billion gallons by 2020.[36] The program, commonly known as the Renewable Fuel Standard (RFS), prohibits sourcing of any wood-based renewable fuels from federal forests due to the environmental lobbies' fear of overharvesting on federal lands.[37] The Act's definition of "renewable biomass" allows for fuels harvested from planted trees and residues from actively managed tree plantations on nonfederal land cleared prior to its enactment.[38] Slash and precommercial thinnings from nonfederal lands also qualify if not derived from forests with ecological communities that are critically imperiled, imperiled, or rare either globally or in states as ranked by the State Natural Heritage Program.[39] RFS fuels cannot be sourced from old growth forest or late successional forest.[40]

In addition to sourcing restrictions, RFS-qualifying feedstocks must achieve GHG reductions below the 2005 petroleum baseline. The amount of reduction depends on the category of fuel set forth in the statute. "Renewable fuels" (corn starch based) must achieve a 20% reduction, "advanced biofuels" 50%, biomass-based diesel 50%, and cellulosic biofuels 60%.[41] In addition to direct measurement of field and refinery emissions, the statute requires that indirect land use change (ILUC) be included in any pathway calculation, a portion of which is derived from measurement of forest conversion induced by international commodity market price rises.[42] The EPA calculates ILUC through economic models that incorporate remote sensing; government data such as the U.S. Forest Service Forest Inventory and Analysis;[43] third-party research on carbon fluxes from conversion of

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36. The Energy Policy Act of 2005, Pub. L. No. 109, 119 Stat. 594, § 201(a)–(b) (codified at 42 U.S.C. §§ 15801–16538 (2012); Clean Air Act, 42 U.S.C. § 7545(o) (2012).

37. 42 U.S.C. § 7545(o)(1)(I).

38. *Id.* § 7545(o)(1)(I)(ii).

39. *Id.* § 7545(o)(1)(I)(iv).

40. *Id.*

41. *Id.*

42. *Id.* § 7545(o)(1)(H). ILUC refers to "the theory that the use of cropland for biofuels raises food prices and thus increases the incentive to convert forests and grasslands to crop production, thereby releasing stored carbon and decreasing future carbon sequestration." Daniel A. Farber, *Land Use Change, Uncertainty, and Biofuels Policy*, 2011 U. ILL. L. REV. 381, 381 (2011).

43. U.S. FOREST SERV., USDA, FOREST INVENTORY AND ANALYSIS: FISCAL YEAR 2011 BUSINESS REPORT 3 (2012), *available at* http://www.fia.fs.fed.us/library/bus-org-documents/docs/2011%20FIA%20Business%20Report-opt.pdf (stating that "since 1930" the Forest Service has conducted an annual census to "collect, analyze, and report information on the status and trends of America's forests: how much forest exists, where it exists, who owns it, and how it is changing,

forest stands, floors, and soils; and carbon embedded in harvested logs.[44] For direct emissions, EPA uses the Department of Energy Argonne National Laboratory's Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) lifecycle analysis model, which includes forest residue and short-rotation, woody-biomass pathways.[45] To calculate the total carbon footprint of an individual biofuel, EPA takes direct emission numbers from the GREET model and adds them to estimates of domestic and international land use shifts from, for example, forest to cropping systems.[46] Applications are pending from forest-biomass-based companies, and the EPA indicates that it is working on pathways for pulp wood, but it has not issued a final pathway analysis for forest-based cellulosic fuel yet.[47]

Obligated parties harvesting forest-based fuels that qualify for the RFS must keep records such as maps of where the feedstock was produced and product transfer documents.[48] They also must document that forest material is not derived from land converted after the Act, such as through sales records for the trees, purchasing records of inputs, written management plans, participation in government programs or third party certifications, or maintenance of infrastructures such as roads.[49] In the alternative, domestic or foreign renewable fuel producers can arrange for an independent third party to conduct a compliance review or belong to an organization that conducts surveys on compliance.[50] In late 2012, the EPA proposed a more rigorous third-party auditing system in response to renewable identification number (RIN) fraud that also includes ongoing monitoring of whether the feedstock qualifies as renewable biomass.[51]

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as well as how the trees and other forest vegetation are growing, how much has died or been removed, and how the harvested trees are used in recent years").

44. *See* EPA, RENEWABLE FUEL STANDARD PROGRAM (RFS2) REGULATORY IMPACT ANALYSIS 355–57, 468–90 (2010), *available at* http://www.epa.gov/otaq/renewablefuels/ 420r10006.pdf. The RFS2 Analysis also explains the methodologies for domestic and international land use change and direct process emissions, and it uses those methodologies to determine lifecycle assessments for various fuels). *Id.* at 355–446, 468–90.

45. *GREET Model (The Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation Model)*, DOE ARGONNE NAT'L LAB., http://greet.es.anl.gov/ (last visited May 4, 2013).

46. *Id.*

47. *Guidance on New Fuel Pathway Approval Process*, EPA, http://www.epa.gov/otaq/fuels/renewablefuels/compliancehelp/rfs2-lca-pathways.htm (last visited May 4, 2013).

48. 40 C.F.R. § 80.1454(d)(1)(i)–(ii) (2012).

49. *Id.* § 80.1454(d)(2)(i)–(vi).

50. *Id.* § 80.1454(h)(1).

51. EPA, EPA-420-B-12-063, PUBLIC RELEASE OF DRAFT QUALITY ASSURANCE PLAN REQUIREMENTS (2012).

2. The Biomass Crop Assistance Program and Forest Stewardship Management Planning

Congress coupled the RFS's increasing mandates with provisions in the 2008 Farm Bill to establish the Biomass Crop Assistance Program (BCAP), the U.S.'s first subsidy program for energy biomass.[52] Material eligible for the subsidy must be "renewable biomass" and come from "eligible land," which includes nonindustrial, private forest lands and excludes federal- or state-owned land.[53] The statute dictates that successful candidates assess, among other factors, their impacts on soil, water, and related resources,[54] but it does not elaborate how, except that a recipient maintain a forest stewardship management plan or the equivalent.[55] When initially rolled out in 2010, many payments went for the collection, harvest, storage, and transportation (CHST) of forest materials that otherwise would have been used to co-fire lumber mills.[56] This drew the ire of value-added industries, such as mulch and particle board, because the subsidy is paid only if destined for a bioenergy conversion facility.[57] Thus, these industries could not compete against the increased demand. The final rule eliminated CHST payments and added a provision that the subsidy cannot go to forest material that has a higher value in a local market.[58] Thus far, the only forest-related project areas chosen for the subsidy (e.g., a payment for establishment and growing of crops) involve only short-rotation woody biomass.[59]

The Federal Cooperative Forestry Assistance Act and its amendments establish and fund forest stewardship management planning generally.[60] Private forest owners receive funding to create forest stewardship management plans.[61] To receive funding, owners must adhere to U.S. Forest

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52. Food, Conservation, and Energy Act of 2008, 7 U.S.C. § 8111 (2012) [hereinafter 2008 Farm Bill].

53. *Id.* § 8111 (a)(4)–(5).

54. *Id.* § 8111(c)(2)(B)(vi).

55. *Id.* § 8111(c)(3)(B)(iii).

56. MEGAN STUBBS, CONG. RESEARCH SERV., R41296, BIOMASS CROP ASSISTANCE PROGRAM: STATUS AND ISSUES 9–11 (2011), *available at* http://www.fas.org/sgp/crs/misc/R41296.pdf.

57. *Id.* at 9–10.

58. Biomass Crop Assistance Program, 7 C.F.R. § 1450.104(b)(3)–(4) (2012).

59. *See BCAP Project Area Listing*, USDA, http://www.fsa.usda.gov/FSA/webapp?area=home&subject=ener&topic=bcap-pjt-bloc (last modified June 14, 2012, 2:03 PM) (listing projects involving hybrid poplar trees and shrub willow); R.S. Zalesny et al., *Woody Biomass from Short Rotation Energy Crops*, *in* SUSTAINABLE PRODUCTION OF FUEL, CHEMICALS, AND FIBERS FROM WOODY BIOMASS 27, 27, 39 (2011), *available at* http://www.srs.fs.usda.gov/pubs/ja/2011/ja_2011_zalesny_002.pdf (categorizing poplars and shrub willows as short-rotation woody crops).

60. Cooperative Forest Assistance Act, 16 U.S.C. §§ 2101–2114 (2012).

61. *Id.* § 2103a(a).

Service standards.[62] These include the requirement that the plan consider, describe, and evaluate resource elements present, which run the gamut from soil to water, biodiversity, and beyond.[63]

Outside of the BCAP context, one of the public benefits the Federal Cooperative Forestry Assistance program anticipates is the production of renewable energy.[64] To achieve bioenergy goals, forest owners must implement a plan according to National Association of State Foresters' (NASF) guidelines.[65] NASF guidelines address several aspects of sustainability and encourage participation in carbon and woody biomass markets.[66] At a minimum, federal guidelines require that a professional resource manager prepare the plans or verify that they meet the minimum standards, and a state forester must approve them.[67] Plans must also state the landowner objectives, describe the current and desired condition of the forest, and delineate practices to reach those goals within a stated timeframe.[68] The landowner must suggest monitoring activities and demonstrate compliance with applicable laws.[69] State forestry officials also must demonstrate that monitoring programs are in place.[70] Amendments to the Forestry Assistance Act in the 2008 Farm Bill require states to undertake a comprehensive assessment of their forest resources and priority areas, develop a strategy to address priority areas, and update the assessment every five years.[71] At least in theory, state-level assessment efforts could be used to coordinate individual funding to achieve ecosystem values that transcend individual landowner boundaries.

The Regional Forester, or Area or Institute Director, periodically monitors compliance by randomly sampling participants.[72] The requirement for a forest-stewardship management plan therefore is not one rooted in regular audits or verification, and it is unclear whether BCAP administrators

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62. *Id.* § 2103a(f); U.S. FOREST SERV., USDA, FOREST STEWARDSHIP PROGRAM NATIONAL STANDARDS AND GUIDELINES 4–5 (2009), http://www.fs.fed.us/spf/coop/library/fsp_standards&guidelines.pdf.

63. U.S. FOREST SERV., *supra* note 62, at 6.

64. *Id.* at 4.

65. *Id.* at 5.

66. NAT'L ASS'N OF STATE FORESTERS, STEWARDSHIP HANDBOOK FOR FAMILY FOREST OWNERS 1 (2009), *available at* http://www.stateforesters.org/files/NASF-Stewardship-Handbook-print.pdf.

67. U.S. FOREST SERV., *supra* note 62, at 5.

68. *Id.*

69. *Id.*

70. *Id.* at 9.

71. 2008 Farm Bill, 16 U.S.C. §§ 2101, 2103, 2109, 2113 (2012); U.S. FOREST SERV., USDA, FARM BILL REQUIREMENT & REDESIGN COMPONENTS: STATE ASSESSMENTS & RESOURCE STRATEGIES FINAL GUIDANCE 4 (2008), *available at* http://www.fs.fed.us/spf/redesign/state_assess_strategies.pdf.

72. U.S. FOREST SERV., *supra* note 71, at 8.

will audit compliance with such a plan regularly. If the USDA's policy for audits of conservation planning in the agricultural landscape is any indication, it is unlikely that regular audits will occur.[73] Instead, producers will be selected randomly for SFM verification.

3. The Clean Air Act GHG Tailoring Rule

Although not a bioenergy policy per se, the US Supreme Court's landmark 2007 decision in *Massachusetts v. EPA* gave the green light to rulemaking under the CAA to curtail GHG emissions from major stationary sources.[74] Under what is known as the Title V and Prevention of Significant Deterioration (PSD) Tailoring Rule, the EPA has set GHG limits on major sources, including coal-fired power plants.[75] Its final rule did not assign a GHG footprint to "biogenic carbon."[76] Instead, in July 2010, the EPA issued a Call for Information soliciting comments from the public and expanded its consideration to other sustainability considerations.[77] With specific regard to forest biomass, the EPA asked "what specific indicators would be useful" in determining whether it could be classified as "renewable" or "sustainable."[78]

In August of that year, the National Association of Forest Owners (NAFO) petitioned the EPA to reconsider the Final Tailoring Rule's (non)position on biogenic carbon to one that excluded biomass from GHG permitting because of its carbon neutrality.[79] Because the EPA had received comments to the contrary—that biomass actually increased GHG emissions

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73. *See* U.S. GOV'T ACCOUNTABILITY OFFICE, AGRICULTURAL CONSERVATION: USDA NEEDS TO BETTER ENSURE PROTECTION OF HIGHLY ERODIBLE CROPLAND AND WETLANDS 4 (2003), *available at* http://www.gao.gov/assets/240/237878.pdf (noting that National Resource Conservation Service's field offices implement conservation provisions inconsistently, thus making it more likely that farmers will receive payments despite impermissibly high erosion rates on their land).

74. Massachusetts v. EPA, 549 U.S. 497, 528 (2007).

75. *See generally New Source Review: Clean Air Act Permitting for Greenhouse Gases*, EPA, http://www.epa.gov/nsr/ghgpermitting.html (last updated Feb. 20, 2013) (explaining CAA permitting programs covering GHG emissions).

76. Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 Fed. Reg. 31514, 31590–91 (June 3, 2010), *available at* http://www.epa.gov/NSR/actions.html#2010.

77. *See* Call for Information: Information on Greenhouse Gas Emissions Associated with Bioenergy and Other Biogenic Sources, 75 Fed. Reg. 41,173, 41,173–77 (July, 15, 2010), *available at* http://www.epa.gov/climatechange/Downloads/ghgemissions/Biogenic_GHG_Srcs_CFI_7.15.10_FR.pdf (soliciting "information and viewpoints from interested parties on approaches to accounting for greenhouse gas emissions from bioenergy and other biogenic sources").

78. *Id.* at 41,176.

79. National Alliance of Forest Owners' Petition to Reconsider the Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule and to Stay the Rule Pending Reconsideration 14 (Jul. 30, 2010), *available at* http://www.sidley.com/files/News/4952ec85-a991-4cb8-8f6f-0ec018cd928c/Presentation/NewsAttachment/af86db7a-0e51-4091-a2bd-123589ec2138/Final%20Petition%20for%20Reconsideration%20Tailoring%20Rule.pdf.

when taking into account indirect land use change—the EPA granted NAFO's petition only to the extent that the Agency will defer permitting of biomass-based emissions for three years while it studies carbon accounting methodologies.[80]

The EPA states in the deferral that it considers forest sustainability outside the scope of the deferral, but it did charge a Scientific Advisory Board (SAB) to review its proposed accounting framework issued in September 2011.[81] The Framework acknowledges that the EPA should account for ways in which forest sustainability certification can verify that land is managed to maintain or increase carbon stock.[82] While the EPA does not consider sustainability factors beyond carbon, such as biodiversity or water quality, the fact that certification would qualify as a formal means to track GHG emissions necessarily would mean that management must meet biodiversity and water quality requirements. The SAB's last working draft, which all but one member agreed to, eliminates its formal recommendation of certification as an option because "such systems could also encounter many of the same data, scientific and implementation problems."[83] The USDA and the forest industry pushed against certification in comments to the proceedings due to cost,[84] while others pointed out that certification provides real-time, on-the-ground data on management practices versus the theoretical, aggregated data that underlies GHG models that the panel was considering.[85]

Curiously, the ILUC controversy that has plagued the RFS and California Low Carbon Fuel Standard (LCFS) was not nearly as pronounced during SAB hearings. This is perhaps because environmental groups are litigating the three-year deferral in the Federal Court of Appeals for the D.C.

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80. *See* 40 C.F.R § 71.2 (2012) (defining "subject to regulation" so that, prior to July 21, 2014, GHG shall not include carbon dioxide emissions from biomass, effective on July 20, 2011); *see also* Deferral for CO_2 Emissions From Bioenergy and Other Biogenic Sources Under the Prevention of Significant Deterioration (PSD) and Title V Programs, 76 Fed. Reg. 43490, 43492 (July 20, 2011) (noting that the three-year deferral will allow EPA to examine the science of accounting for carbon dioxide from biomass).

81. EPA, ACCOUNTING FRAMEWORK FOR BIOGENIC CO_2 EMISSIONS FROM STATIONARY SOURCES iv (2011), *available at* http://www.epa.gov/climatechange/Downloads/ghgemissions/Biogenic-CO2-Accounting-Framework-Report-Sept-2011.pdf.

82. *Id.* at v.

83. EPA, SCIENCE ADVISORY BOARD, SAB REVIEW OF EPA'S ACCOUNTING FRAMEWORK FOR BIOGENIC CO_2 EMISSIONS FROM STATIONARY SOURCES (SEPTEMBER 2011) 44 (2012) http://yosemite.epa.gov/sab/sabproduct.nsf/0/57B7A4F1987D7F7385257A87007977F6/$File/EPA-SAB-12-011-unsigned.pdf.

84. Letter from William Hohenstein, Dir., Climate Change Program Office, EPA, to Dr. Holly Stallworth, Designated Fed. Official, Sci. Advisory Bd., EPA (May 25, 2012), *available at* http://yosemite.epa.gov/sab/sabproduct.nsf/F6C9D838DF864B8685257A09006F3D16/$File/USDA+CCPO+Comments+-+Hohenstein+5-25-12.pdf.

85. Jody Endres, Letter to the SAB (May 23, 2012), http://yosemite.epa.gov/sab/sabproduct.nsf/D9CF6AF96AE9EE3685257A0800492C5F/$File/Jody+Endres+5_23_12.pdf.

Circuit.[86] The EPA contends that as part of its incremental "tailoring" process, the CAA does not prohibit it from deferring permitting of biogenic combustion pending further scientific review.[87] Environmentalists disagree that any type of *de minimis* or "one-step-at-a-time" doctrine applies.[88] The case is currently pending for decision, but the same court has upheld the EPA's other incremental implementation of the Tailoring Rule.[89]

Prior to the finality of the deferral, the EPA issued guidance for determining Best Available Control Technology (BACT) for any facility that applied for a permit.[90] Interestingly, the guidance includes a requirement that permitting authorities "consider the economic, energy, and environmental impacts arising from each option . . . under consideration."[91] These include environmental impacts such as "potential sequestration of carbon in biogenic resources outside the boundaries of the facility."[92] One way in which a permittee could demonstrate net sequestration off-site for purposes of BACT, as recognized by the SAB, would be through feedstock suppliers' certification that documents the benefits to soil, water quality, and biodiversity.[93] The bottom line on GHG stationary source permitting under the CAA is that sustainability certification for biodiversity and other environmental protection, as well as accounting for GHG emissions, is undecided. Based on the EPA's GHG accounting framework and my observations at SAB hearings, however, it is ultimately unlikely that the EPA will couple sustainability certification with accounting for a forest's carbon footprint.

4. Federal Procurement

Bioenergy has the potential to satisfy a significant portion of federal procurement needs, and vice versa—federal procurement rules undoubtedly will incentivize biomass-based energy and products. All agencies must have

86. Ctr. for Biological Diversity v. EPA, No. 11-1101 (consolidated) (D.C. Cir. Filed Mar. 16, 2012).

87. Final Brief of Respondents at 6–7, Ctr. for Biological Diversity v. EPA, No. 11-1101 (consolidated) (D.C. Cir. Jul. 23, 2012).

88. Final Opening Brief of Petitioners (corrected) at 19–20, Ctr. for Biological Diversity v. EPA, No. 11-1101 (consolidated) (D.C. Cir. Jul. 24, 2012).

89. Coal. for Responsible Regulation, Inc., v. EPA, 684 F.3d 102, 148 (D.C. Cir. 2012).

90. *See* OFFICE OF AIR & RADIATION, EPA, GUIDANCE FOR DETERMINING BEST AVAILABLE CONTROL TECHNOLOGY FOR REDUCING CARBON DIOXIDE EMISSIONS FROM BIOENERGY PRODUCTION 3–5 (2011), *available at* http://www.epa.gov/nsr/ghgdocs/bioenergyguidance.pdf (providing overview and purpose of guidance material provided).

91. *Id.* at 17.

92. *Id.* at 21.

93. *See id*. at 21–23 (discussing the accounting of net atmospheric GHG impact of proposed facilities using certain feedstocks).

plans in place to achieve GHG reductions to 2008 levels by 2020, including through fleet and other purchases.[94] In addition to GHG reduction, all executive agencies follow the Federal Acquisition Regulation (FAR) to make "sustainable acquisitions."[95] Ninety-five percent of new contract actions must require that the product is, among other qualities, water efficient, biobased, and environmentally preferable.[96] Products qualifying under the FAR include the USDA's biobased program and the EPA's Environmentally Preferable Purchasing guidelines.

The Farm Security and Rural Investment Act of 2002 (FSRIA) established the program for the federal procurement of biobased products.[97] Under the FSRIA, each agency must establish affirmative procurement programs (APPs), otherwise known as green purchasing plans (GPPs), of biobased products.[98] The USDA and EPA both maintain guidelines regarding what products may qualify.[99] The EPA's Final Guidance on Environmentally Preferable Purchasing is based on the goal of pollution prevention by considering multiple attributes from a lifecycle perspective.[100] The Guidance states that there is no "hierarchy that ranks the attributes or environmental impacts that are most important," but agencies consider factors like recovery time and geographic scale, differences between competing products, and human health.[101] Although sustainability certification is not required, it is one way that federal officials can evaluate a product for qualification.[102] The Guidance also maintains an annex with a list of "[e]nvironmental [a]ttributes," including ecosystem impacts, water consumption, and pollution.[103]

The USDA's Guidelines for Designating Biobased Products for Federal Procurement, on the other hand, forbid a procuring agency from requesting more information required of other vendors but "encourages" them to provide information on environmental and public health benefits based on "industry

94. Exec. Order No. 13514, 74 Fed. Reg. 194, 52,117 (Oct. 8, 2009).

95. 48 C.F.R. § 23.103 (2012).

96. *Id.* § 23.103.

97. 7 U.S.C. § 8102 (2012).

98. OFFICE OF FED. PROCUREMENT POLICY, REPORT ON AGENCY IMPLEMENTATION OF BUY-RECYCLED AND BUY-BIOBASED PRODUCTS IN THE RESOURCE CONSERVATION AND RECOVERY ACT AND FARM SECURITY AND RURAL INVESTMENT ACT 1–2 (2009), *available at* http://www.whitehouse.gov/sites/default/files/omb/assets/procurement_green/rcra_and_fsria_rpt.pdf.

99. *Id.* at 1.

100. *Id.* at 2.

101. Final Guidance on Environmentally Preferable Purchasing: Notice, 64 Fed. Reg. 45,810, 45,822–24 (Aug. 20, 1999).

102. *Id.* at 45,825.

103. *Id.* at 45,840.

accepted analytical approaches."[104] Biobased products do not include electricity or motor fuels, and will not be designated if the product has a mature market (like fuels and electricity).[105] Two Congressmen recently introduced the Forest Products Fairness Act of 2012 that would open up the program to forest-based products regardless of market maturity, including pellets.[106] The Bill, however, contained no SFM reference.

In 2008, Congress required the Department of Defense to study ways that alternative fuels could be used to reduce GHG emissions.[107] The study concluded that it remains uncertain whether alternative fuels can be produced sustainably.[108] Its recent Request for Proposals to supply biofuels, however, stipulates that only "renewable biomass" as defined by BCAP and the 2008 Farm Bill qualify,[109] and an awardee must demonstrate sustainable practices and lifecycle GHG reduction.[110]

B. The Role of Government SFM Policy in Achieving Bioenergy Sustainability

The previous Sections demonstrate that policymakers certainly have SFM on their radar screens when designing bioenergy policy, although exactly how SFM is achieved and monitored often remains unanswered. Thus, one of the key debates surrounding forests' role in bioenergy systems will be how existing government policies will protect forest ecosystems and carbon sequestration adequately in light of increased bioenergy demand. The following Sections seek answers within both federal and state SFM policies.

1. Federal SFM Policy

Harvests on public lands have typically been off-limits under bioenergy laws like the RFS and BCAP, but at least one amendment has been introduced

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104. Guidelines for Designating Biobased Products for Federal Procurement, 77 Fed. Reg. 25,632, 25,641 (May 1, 2012) (to be codified at 7 C.F.R. § 3201.8).

105. 7 C.F.R. § 3201.5 (2012) (concerning item designation).

106. Forest Products Fairness Act of 2012, H.R. 5873, 112th Cong. (2012).

107. *See* Duncan Hunter National Defense Authorization Act for Fiscal Year 2009, Pub. L. No. 110-417, § 334, 122 Stat. 4356, 4421–22 (2008) (mandating a study on clean energy alternatives for reducing carbon emissions).

108. JAMES T. BARTIS & LAWRENCE VAN BIBBER, RAND NATIONAL DEFENSE RESEARCH INSTITUTE, ALTERNATIVE FUELS FOR MILITARY APPLICATIONS 65 (2011), *available at* http://www.rand.org/content/dam/rand/pubs/monographs/2011/RAND_MG969.pdf.

109. U.S. DEP'T OF DEFENSE, *Funding Opportunity Announcement: Defense Production Act Title III Advanced Drop-In Biofuel Production Project* 18, 22 (Jun. 27, 2012), *available at* https://www.fbo.gov/utils/view?id=d786f3e7ee8301999b512409757cdfbe.

110. *Id.* at apps.

to open them to biofuels harvests in order to prevent forest fires.[111] If that occurred, the U.S. Forest Service and the Department of the Interior[112] administer several pieces of general laws and rules aimed at fostering the "multiple use" of federally owned forests.[113] These include the Forest Service Organic Administration Act establishing the Forest Service,[114] the Sustained Yield Act of 1944,[115] the Multi-Use and Sustained Yield Act of 1960 (MUSYA),[116] and the National Forest Management Act of 1976 (NFMA).[117] Environmentalists often claim that the Forest Service has pursued the concepts of "sustained yield" and "multiple use" in a way that favors harvest levels to the detriment of sustained ecological function of the forest.[118]

In addition to these federal forest-specific management policies, federal forest actions also are subject to general environmental laws, such as the National Environmental Policy Act of 1969 (NEPA),[119] the Clean Water Act (CWA),[120] and the Endangered Species Act (ESA),[121] as well as administrative rules that address the extent of the public's involvement in Forest Service decision-making.[122] Historically, questions often have arisen as to how environmental laws are reconciled with Forest Service rules. This very term, the U.S. Supreme Court is determining whether CWA permitting applies to discharges from road building in national forests,[123] arguably

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111. *Thune Reintroduces Legislation to Encourage Biofuel Production from National Forests*, JOHN THUNE: U.S. SENATOR-SOUTH DAKOTA (Apr. 11, 2011), http://www.thune.senate.gov/public/index.cfm/press-releases?ID=e084223f-0ac7-40ed-b042-f9dde19f77a6.

112. HANS GREGERSEN ET AL., CTR. FOR INT'L FOREST RES., FOREST GOVERNANCE IN FEDERAL SYSTEMS: AN OVERVIEW OF EXPERIENCES AND IMPLICATIONS FOR DECENTRALIZATION 38 (2004), *available at* http://www.forest-trends.org/documents/files/doc_122.pdf (explaining the origin of Forest Service jurisdiction); *see generally* Deborah Scott & Susan Jane M. Brown, *The Oregon and California Lands Act: Revisiting the Concept of "Dominant Use,"* 21 J. ENVTL. L. & LITIG. 259, 260 (2006) (explaining the concept of Bureau of Land Management jurisdiction).

113. Robert L. Glicksman, *Sustainable Federal Land Management: Protecting Ecological Integrity and Preserving Environmental Principle*, 44 TULSA L. REV. 147, 147 (2008).

114. 16 U.S.C. §§ 473–482, 551 (2012).

115. 16 U.S.C. §§ 583–583i (2012).

116. 16 U.S.C. §§ 528–531 (2012).

117. 16 U.S.C. §§ 1600–1614 (2012).

118. James Briggs, *Ski Resorts and National Forests: Rethinking Forest Service Management Practices for Recreational Use*, 28 B.C. ENVTL. AFF. L. REV. 79, 86–93 (2000) (detailing the history of "multiple use" and "sustained yield" and environmentalists' mounting confrontations with the Forest Service over interpretation of the terms).

119. National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321–4347 (2012).

120. Water Pollution Prevention and Control Act, 33 U.S.C. §§ 1251–1387 (2012).

121. Endangered Species Act of 1973, 16 U.S.C. §§ 1531–1544 (2012).

122. Appeals Reform Act, 16 U.S.C. § 1612 (2012); 36 C.F.R. §§ 215.3(a), 218.1–218.16 (2012); Administrative Procedure Act, 5 U.S.C. §§ 701–706 (2012).

123. Adam Liptak, *E.P.A. Rule Complicates Runoff Case for Justices*, N.Y. TIMES, Dec. 3, 2012, http://www.nytimes.com/2012/12/04/us/epa-rule-complicates-supreme-court-case-on-logging-runoff.html.

proving that the question of forest sustainability remains "among the most controversial natural resource management issues" in U.S. public lands law.[124]

a. The National Forest Management Act

Although NFMA does not allow environmental values to trump economic uses of federal forests completely, NFMA does require the Forest Service to prepare management plans that provide for "sustained" yields[125] and issue regulations that consider plant, animal, and tree diversity.[126] The Forest Service Manual[127] and other guidance (e.g., best management practices for water quality[128]) play primary roles in implementing forest plans. Until 2012,[129] federal planning rules were based on a 1982 rule.[130] The Clinton Administration proposed a revised rule in 2000, but the George W. Bush Administration refused to implement the rule.[131] Instead, the Bush Administration proposed its own rules twice, which essentially eliminated environmental review and gave little incentive to the Forest Service to plan for wildlife conservation.[132] Courts on both occasions struck down the rules, opening an opportunity for the Obama Administration to finalize a new rule that is now in effect.[133]

Whether or not the current rule will be overturned in a similar fashion is uncertain. The Center for Biological Diversity, the organization behind the two successful suits, has criticized the rule for weakening longstanding biodiversity protections by eliminating the requirement that the Forest Service maintain viable populations of species in favor of deference to localized decisions.[134] Instead, the rule focuses on ecosystem integrity and biodiversity that is dependent on the regional forester's discretion as to what

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124. Long, *supra* note 2, at 2.

125. 16 U.S.C. § 1604(e)(1) (2012).

126. *Id.* § 1604(g)(3)(B).

127. *Forest Service Manual: All Issuances*, U.S. FOREST SERV., USDA, http://www.fs.fed.us/im/directives/dughtml/fsm.html (last modified Nov. 3, 1997).

128. U.S. FOREST SERV., USDA, NATIONAL BEST MANAGEMENT PRACTICES FOR WATER QUALITY MANAGEMENT ON NATIONAL FOREST SYSTEM LANDS 7–8 (2012), *available at* http://www.fs.fed.us/biology/resources/pubs/watershed/FS_National_Core_BMPs_April2012.pdf .

129. National Forest System Land Management Planning, 36 C.F.R. § 219 (2012).

130. Charles Davis, *The Politics of Regulatory Change: National Forest Management Planning Under Presidents Bill Clinton and George W. Bush*, 25 REV. POL'Y RES. 37, 42 (Jan. 2008).

131. *Id.* at 44.

132. *Id.* at 48.

133. Juliet Eilperin, *Administration Rewrites Forest Rules*, WASH. POST, Jan. 27, 2012, at A20.

134. *See* Holly Doremus, *New Forest Service Planning Rule Highlights the Tension Between Flexibility and Accountability*, LEGAL PLANET (Mar. 27, 2012), http://legalplanet.wordpress.com/2012/03/27/new-forest-service-planning-rule/ (discussing negative public comments about the final rule).

species are of concern and whether the Forest Service has the authority and capability to maintain a viable population.[135] That does not mean that the Forest Service can ignore species conservation; its plans must "maintain or restore ecological conditions within the plan area to contribute to maintaining a viable population of the species within its range."[136] Conservationists argue that the rule's focus on species of concern lessens protections for all native species and its diffusion of decision-making authority to lower levels risks capture by local economic interests.[137] The Forest Service currently maintains technical guidelines for species monitoring, but it is unclear how those might change in light of the new rule.[138]

The final rule "recognizes . . . that development of renewable and non-renewable energy resources are among the potential uses in a plan area. However, the final rule does not dictate the activities that may occur or not occur on administrative units of the NFS."[139] Assessments for planning purposes must account for energy resources.[140] The extent to which those resources are accessible depends on other sustainability factors incorporated into planning, such as biodiversity and water quality conditions. New provisions contain the core sustainability metrics for forest planning, spanning ecosystem integrity, air quality, soils, and water quality. Persistent violation of state water quality standards led to an added requirement in the final rule that the Forest Service Chief promulgate national-level best management practices to maintain and restore water quality and a system of ensuring that lessees implement them.[141]

b. Stewardship Contracts

Beginning in the late 1980s, the Forest Service began searching for a way to reduce its forest management costs.[142] By 2003, Congress granted the

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135. 36 C.F.R. § 219.9.

136. *Id.*

137. Doremus, *supra* note 134.

138. PATRICIA N. MANLEY ET AL., MULTIPLE SPECIES INVENTORY AND MONITORING TECHNICAL GUIDE 1–6 (2006), *available at* http://www.fs.fed.us/rm/pubs_other/wo_gtr073.pdf.

139. National Forest System Land Management Planning, 77 Fed. Reg. 21,162, 21,257 (Apr. 9, 2012) (to be codified at 36 C.F.R. pt. 219).

140. 36 C.F.R. § 219.6(b)(10).

141. U.S. FOREST SERV., *supra* note 128, at 7–8.

142. PINCHOT INST. FOR CONSERVATION, THE ROLES OF COMMUNITIES IN STEWARDSHIP CONTRACTING: FY 2011 PROGRAMMATIC MONITORING REPORT TO THE USDA FOREST SERVICE 6 (2012), *available at* http://www.fs.fed.us/restoration/documents/stewardship/reports/2011/FinalFY11USFSMonEvalReport.pdf (describing stewardship contracts as service agreements with contractors that "offer[] discretion to contractors in how they achieve[] the desired end-results while working within the broad parameters established in the contracts").

Forest Service and the Bureau of Land Management authority through 2013 to enter into stewardship contracts that include SFM.[143] The seven goals of stewardship contracting include: (1) maintaining or obliterating roads and trails to restore or maintain water quality; (2) soil productivity, habitat for wildlife and fisheries, or other resource values; (3) setting prescribed fires to improve the composition, structure, condition, and health of stands or improve wildlife habitat; (4) removing vegetation or other activities to promote healthy forests, reduce fire hazards, or achieve other land management objectives; (5) restoring and maintaining watersheds; (6) restoring and maintaining wildlife and fish habitat; and (7) controlling noxious and exotic weeds and reestablishing native plant species.[144] Contractors also must comply with all other applicable laws, including NEPA.[145]

To the extent that contract offerings are economically attractive to bidders, stewardship contracting could be used in federal forests to harvest energy biomass in a sustainable manner. It is unclear from public documents, however, how the goals of the program are translated to specific SFM practices on the ground or how they are enforced or otherwise monitored.

c. The Healthy Forests Restoration Act

While environmentalists were successful in blocking Bush Administration changes to the NFMA forest planning rule, the Administration was successful in passing the Healthy Forests Restoration Act of 2003 (HFRA).[146] The HFRA and implementing regulations attempted to create categorical exemptions from environmental review of certain activities related to preventing fires and curtailing public participation rights in decision-making.[147] For example, by redefining "extraordinary circumstances" in the Forest Service Handbook, the Forest Service excluded from automatic environmental assessment various "resource conditions," such as the presence of threatened or endangered species, wilderness or wilderness study areas, and municipal watersheds.[148] This redefinition, in

143. *Id.* at 8.

144. U.S. FOREST SERV., USDA, FOREST SERVICE HANDBOOK, 2409.19 § 61.2 (2008), *available at* http://www.fs.fed.us/im/directives/fsh/2409.19/2409.19_60.doc.

145. *Id.* § 60.3(2)–(3).

146. 16 U.S.C. § 6501 (2012).

147. David J. Willms, *The Mountain Pine Beatle: How Forest Mismanagement and a Flawed Regulatory Structure Contributed to an Uncontrollable Epidemic*, 10 WYO. L. REV. 487, 502–03 (2010); Eric E. Huber, *Environmental Litigation and the Healthy Forests Initiative*, 29 VT. L. REV. 797, 803 (2005).

148. Willms, *supra* note 147, at 503–04.

turn, provided the Forest Service with new grounds for categorical exclusions from environmental review.[149] The Forest Service also introduced new appeal procedures that severely limit the ability to stop these types of projects before they begin—if, for example, done under an "emergency" to prevent economic loss or categorical exclusion.[150] Categorical exclusions include "hazardous fuels reduction and rehabilitation activities" on large tracts of forests (e.g., up to 4,500 acres in some cases) and live tree harvests on up to 250 acres—even with temporary road construction.[151] The Forest Service also eliminated consultation with the Fish and Wildlife Service for these projects.[152] In 2007, however, environmentalists successfully stopped these fuels-related categorical exclusions through litigation.[153] One commentator contends that until Congress exempts these projects from NEPA review directly in the HFRA, NEPA, and ESA statutes, fuels reduction projects under the HFRA likely will be subject to environmental impact assessments that can be drawn out for periods of time disproportionate to the fire danger presented by the build-up of forest fuels.[154]

Recognizing that the HFRA plays a large role in the utilization of biomass for bioenergy, the Departments of Agriculture, Interior, and Energy signed a Memorandum of Understanding in 2003 setting "Policy Principles for Woody Biomass Utilization for Restoration and Fuel Treatments on Forests, Woodlands, and Rangelands."[155] The principles include mapping of potential biomass resources and encouraging sustainable development that incorporates "sustainability measures."[156] In 2008, the Forest Service issued its "Woody Biomass Utilization Strategy," which recognizes the need to

149. *Id.* at 504; Huber, *supra* note 147, at 803.

150. Huber, *supra* note 147, at 804.

151. *Id.* at 804–05.

152. *Id.* at 805.

153. Letter from Abigail R. Kimbell, U.S. Forest Serv., District Court Issues Injunction in Sierra Club v. Bosworth, 04-2114, (E.D. Cal.) Prohibiting Use of the Hazardous Fuels Reduction Categorical Exclusion, Subject to Certain Exceptions (Dec. 1, 2008), *available at* http://www.fs.fed.us/emc/nepa/nepa_handbook_docs/chief_1570_memo.pdf; *see also* U.S. GOV'T ACCOUNTABILITY OFFICE, GAO 10-337, FOREST SERVICE: INFORMATION ON APPEALS, OBJECTIONS, AND LITIGATION INVOLVING FUEL REDUCTION ACTIVITIES, FISCAL YEARS 2006 THROUGH 2008 17 (Mar. 2010), *available at* http://www.gao.gov/new.items/d10337.pdf (concluding that about two percent of HFRA projects were litigated by environmentalists).

154. Willms, *supra* note 147, at 490, 514.

155. USDA ET AL., MEMORANDUM OF UNDERSTANDING ON POLICY PRINCIPLES FOR WOODY BIOMASS UTILIZATION FOR RESTORATION AND FUEL TREATMENTS ON FORESTS, WOODLANDS, AND RANGELANDS 1 (2003), *available at* http://www.fs.fed.us/woodybiomass/documents/BiomassMOU_060303_final_web.pdf.

156. *Id.* at 4, 6.

develop management practices for sustainability.[157] The Forest Service has also developed a Woody Biomass Toolkit and a Utilization Desk Guide, which recognize the environmental implications of increased harvest, but do not recommend specific practices, instead relying on NEPA (and the now enjoined categorical exclusions) for environmental protection.[158]

d. Private Certification on Federal Lands

In 2007, the Forest Service commissioned a study gauging the effectiveness of its existing forest management practices compared to certain third-party certification standards.[159] While auditors commended the thoroughness of planning, comprehensive use of scientific data, and stakeholder engagements, they found shortcomings in Forest Service policy related to forest sustainability practices.[160] The auditors cite the primary lapses as delayed silvicultural treatments and unachieved ecological, social, and economic management goals.[161] The report cites increased pest and disease infestations, increased potential for "stand-replacing" wildfires, and the inability to achieve desired forest structure and composition (e.g., bird habitat) as some of the ramifications of the failure to manage forests for sustainability.[162] The report notes that lack of financial resources and capacity led to these delays.[163] Forest officials further admitted their inability to adequately enforce rules meant to reduce the detrimental environmental impacts of off-road vehicle use.[164] The report also found some inadequacies related to scale and access with management of late-succession and old growth forests.[165]

The 2007 study reveals that public laws, standing alone, have not been enough to ensure sustainability of forest harvests in some cases. Assuming that federal forests will be opened to harvests for energy biomass, to combat

157. U.S. FOREST SERV., USDA, WOODY BIOMASS UTILIZATION STRATEGY 2–3 (2008), *available at* http://www.fs.fed.us/woodybiomass/strategy/documents/FS_WoodyBiomassStrategy.pdf.

158. BARRY WYNSMA ET AL., U.S. FOREST SERV., USDA, WOODY BIOMASS UTILIZATION DESK GUIDE 54–59 (2007), *available at* http://www.forestsandrangelands.gov/Woody_Biomass/documents/biomass_deskguide.pdf.

159. THE PINCHOT INST. FOR CONSERVATION, NATIONAL FOREST CERTIFICATION STUDY: AN EVALUATION OF THE APPLICABILITY OF FOREST STEWARDSHIP COUNCIL (FSC) AND SUSTAINABLE FOREST INITIATIVE (SFI) STANDARDS ON FIVE NATIONAL FORESTS 6 (2007), *available at* http://www.fs.fed.us/projects/forestcertification/full-report.pdf.

160. *See id.* at 27–29 (discussing the strengths and weaknesses of Forest Service policy when using the FSC standard).

161. *Id.* at 28.

162. *Id.*

163. *Id.*

164. *Id.* at 29.

165. *Id.*

the threat of overharvesting, future general federal forest laws could require regular audits of Forest Service policies to third- party certification principles, criteria, and indicators, similar to the 2007 study.[166] Alternatively, private leases in federal forests could be subject to actual third-party certification. A combination of both public and private requirements would ensure that both whole-forest and site-level sustainability are better achieved.

e. The Lacey Act and Imports from Illegal Logging

Congress passed the Lacey Act in the early 1900s to prevent illegal fish and wildlife trafficking.[167] The 2008 Farm Bill expanded Lacey Act prohibitions on the interstate and international trade in illegally harvested timber under U.S. or any foreign law covering theft, taking from protected or officially designated areas, and taking without prior authorization.[168] Forest-based bioenergy imported into the U.S. is subject to the Lacey Act, which, at least in theory, should deter sourcing materials from illegal deforestation.[169]

All importers must file a declaration with the USDA's Animal and Plant Health Inspection Service (APHIS) stating the scientific name of the tree, the quantity and value of the shipment, and the country from which the tree was taken.[170] It does not require importers to maintain a chain-of-custody establishing sustainability,[171] but it carries stiff criminal penalties if the importer knowingly sources illegally harvested timber, including woody biomass for energy such as pellets.[172] If the producer does not knowingly import such products but fails to exercise "due care," the importer is subject to lesser misdemeanor charges and civil penalties.[173] The U.S. Department of Justice has stated that "due care means that degree of care which a reasonably prudent person would exercise under the same or similar circumstances," and that it "is applied differently to different categories of persons with varying

166. In the US, the Renewable Fuel Standard's definition of "renewable biomass" does not include any materials from federal forests. *See supra* note 37.

167. Rachel Salzman, *Establishing a "Due Care" Standard Under the Lacey Act Amendments of 2008*, 109 MICH. L. REV. FIRST IMPRESSIONS 1, 1 (2010).

168. 2008 Farm Bill, *supra* note 52, § 8204 (codified as amended at 16 U.S.C. §§ 3371–3372 (2012)).

169. ENVTL. INVESTIGATION AGENCY, THE U.S. LACEY ACT FREQUENTLY ASKED QUESTIONS ABOUT THE WORLD'S FIRST BAN ON TRADE IN ILLEGAL WOOD 1 (2007), *available at* http://www.eia-global.org/lacey/P6.EIA.LaceyReport.pdf.

170. *Id.*; 2008 Farm Bill, *supra* note 52, § 8204 (codified as amended at 16 U.S.C. § 3372 (2012)).

171. ANIMAL & PLANT HEALTH INSPECTION SERV., USDA, LACEY ACT: COMPLETE LIST OF QUESTIONS AND ANSWERS pt. 17 (2012), *available at* http://www.aphis.usda.gov/plant_health/lacey_act/downloads/faq.pdf.

172. Salzman, *supra* note 167, at 1.

173. *Id.* (citing 16 U.S.C. § 3373(d)(2) (2008)).

degrees of knowledge and responsibility."[174] The ambiguous nature of the "due care" standard[175] has lead industry groups like the Flooring Institute to issue their own guidance that includes a written company policy, standard operating procedures and checklists, asking suppliers to explain the due diligence they exercised in sourcing wood products, and knowing where the biomass is harvested from through third- party certifications.[176]

C. State Bioenergy and SFM Policies

Federalism has caused a patchwork of SFM regulation at the federal, state, and local levels. Each state maintains its own rules for state forests and private lands within its borders.[177] Many are not biomass specific, while others have evolved in recognition of increased biomass demand for bioenergy programs such as renewable portfolio standards (RPS).[178] The following Sections highlight two states, California and Massachusetts, to demonstrate this variation in protection of forest sustainability.

1. California

California has the most aggressive and comprehensive set of bioenergy policies in the U.S., if not the entire world, much of which focuses on the reduction of GHG emissions. The Global Warming Solutions Act of 2006 created a multi-faceted regulatory program to reduce California's GHG emissions to 1990 levels by 2020, and eighty percent below 1990 levels by 2050.[179] Strategies include a Cap-and-Trade Program,[180] a Low Carbon Fuel

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174. Thomas Swegle, *The Lacey Act Amendments*, ENV'T & NATURAL RES. DIV., DOJ (Sept. 23, 2009), http://www.eli.org/pdf/seminars/09.23.09dc/swegle.pdf.

175. Francis G. Tanczos, *A New Crime: Possession of Wood–Remedying the Due Care Double Standard of the Revised Lacey Act*, 42 RUTGERS L.J. 549, 567 (2011).

176. JIM GOULD, FLOOR COVERING INST., LLC, CONTINUING WOOD TRADE UNDER THE LACEY ACT AMENDMENTS, *available at* http://www.floorcoveringinstitute.com/files/Lacey__Act__Article15_2.pdf (last visited May 4, 2013).

177. *See* PAUL V. ELLEFSON ET AL., GOVERNMENT REGULATION OF FORESTRY PRACTICES ON PRIVATE FORESTLAND IN THE UNITED STATES: AN ASSESSMENT OF STATE GOVERNMENT RESPONSIBILITIES AND PROGRAM PERFORMANCE v–vii (2004) (providing an overview of the wide variety of state rules).

178. *See, e.g.*, PA. DEP'T. OF CONSERVATION & NATURAL RES., GUIDANCE ON HARVESTING WOODY BIOMASS FOR ENERGY IN PENNSYLVANIA 1 (2008), *available at* http://www.dcnr.state.pa.us/PA_Biomass_guidance_final.pdf.

179. California Global Warming Solutions Act, CAL. HEALTH & SAFETY CODE §§ 38500, 38550 (West 2012); EXECUTIVE ORDER S-3-05 (June 1, 2005), *available at* http://gov38.ca.gov/index.php?/print-version/executive-order/1861/.

180. CAL. CODE REGS. tit. 17, § 95801 (2013).

Standard (LCFS),[181] an RPS,[182] and feed-in tariffs.[183] In addition, Assembly Bill 118 (A.B. 118) provides a funding mechanism for alternative and renewable fuel technologies that depends, in part, on the application of sustainability criteria.[184] A "Scoping Plan" guides implementation of Assembly Bill 32's GHG reduction goals.[185]

Regardless of the program, California recognized early on that its aggressive bioenergy policies and incentives must also take into account sustainability. As early as 2004, California conducted a series of baseline assessments of biomass resources in the state.[186] Further, state agencies are directed in the California Renewable Energy Standard to develop biomass plans to meet those targets through cooperation on the Bioenergy Interagency Working Group (BIWG).[187] The BIWG issued a Bioenergy Action Plan in 2006 that laid out priority areas of research for forest biomass, including establishing demonstration forests (replanted); determining the highest market value and use potential for "forest fuel, harvest residues, and other small wood forest products" as fuel, power, or chemicals; and demonstrating efficient harvesting technologies for small forests.[188] The BIWG has issued Progress Reports toward these goals regularly.[189]

The most recent, issued in 2012, recognizes that policies must be developed "to increase sustainable use of biomass residues from the forestry, agricultural, and urban sectors with safeguards to protect and restore

181. Exec. Order S-01-07 (2007), *available at* http://www.arb.ca.gov/fuels/lcfs/eos0107.pdf.

182. CAL. PUB. UTIL. CODE §§ 399.11–399.32 (West 2012); *see also* Sen. 107, 2006 Leg. (Cal. 2006) (increasing the mandate from 20% by 2017 to 20% by 2010); Exec. Order S-21-09 (2009), *available at* http://gov.ca.gov/executive-order/13269/ (increasing the amount to thirty-three percent by 2020).

183. Assemb. B. 1969, 2006, chap. 731 (Cal.), codified at CAL. PUB. UTIL. CODE § 399.20.

184. CAL. HEALTH & SAFETY CODE § 44272(a), (c)(3), (c)(5) (West 2012).

185. CAL. AIR RES. BD., CLIMATE CHANGE SCOPING PLAN 1 (2008), *available at* http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf.

186. CAL. BIOMASS COLLABORATIVE, BIOMASS RESOURCE ASSESSMENT IN CALIFORNIA (2005), *available at* http://www.energy.ca.gov/2005publications/CEC-500-2005-066/CEC-500-2005-066-D.PDF; *see also* BIOMASS CHALLENGES, *supra* note 15, at 15 (estimating the annual available biomass in California for 2005).

187. Exec. Order S-06-06 (2006), *available at* http://www.dot.ca.gov/hq/energy/Exec%20Order%20S-06-06.pdf (establishing biofuels targets of 20% by 2010, 40% by 2025, and 75% percent by 2050; and, for biomass to electricity, a twenty percent target "within the established state goals for renewable generation for 2010 and 2020").

188. BIOENERGY INTERAGENCY WORKING GRP., BIOENERGY ACTION PLAN FOR CALIFORNIA 3 (2006), *available at* http://www.energy.ca.gov/2006publications/CEC-600-2006-010/CEC-600-2006-010.PDF.

189. *Bioenergy Action Plan*, CAL. ENERGY COMM'N, http://www.energy.ca.gov/bioenergy_action_plan/ (last visited May 4, 2013).

ecosystem health."[190] It states that standards will be issued by 2013.[191] In addition to the BIWG reports, the California Department of Forestry and Fire Protection recognizes in its 2010 Forests and Rangelands Assessment that "[e]merging markets for renewable energy, ecosystem services and niche products are impacting how forest and rangelands are managed," and that "[d]eveloping appropriate policies requires a better understanding of the benefits and environmental impacts of these emerging markets and how society values the various market and non-market products and services provided by forests and rangelands."[192]

The Board of Forestry and Fire Protection (BoF) established an Interagency Forestry Working Group on Climate Change (IFWG) to lead forest-related efforts.[193] Specifically, the group's mission is to improve GHG inventory of the forest sector, evaluate the adequacy of existing forest regulations and programs for achieving GHG targets, define biomass sustainability for biofuel utilization incentivized by the LCFS and A.B. 118, develop and promote incentives for private and public landowners to increase and maintain carbon stocks, and identify educational opportunities about climate change for forest landowners.[194] In March 2012, the IFWG reported on progress toward establishing sustainability criteria.[195] The group specifically identifies its goal in this regard as "defining scientifically based guidelines for achieving sustainable forest landscapes when forest biomass is utilized for biofuels—in terms of resiliency from disease, drought and fire; ecological function and health; and biological productivity."[196] The group also indicates that it will focus on economic and social sustainability[197] and is conducting public outreach and research (including pilot-scale case

190. BIOENERGY INTERAGENCY WORKING GRP., 2012 BIOENERGY ACTION PLAN 17 (2012), *available at* http://www.resources.ca.gov/docs/2012_Bioenergy_Action_Plan.pdf.

191. *Id.* at 20–21.

192. CAL. STATE BD. OF FORESTRY & FIRE PROT., CALIFORNIA'S FORESTS AND RANGELANDS: 2010 ASSESSMENT 193 (2010), *available at* http://frap.fire.ca.gov/assessment2010/pdfs/california_forest_assessment_nov22.pdf.

193. CAL. STATE BD. OF FORESTRY & FIRE PROT., 2009 CHARTER, INTERAGENCY FORESTRY WORKING GROUP ON CLIMATE CHANGE 2 (2009), *available at* http://www.bof.fire.ca.gov/board_committees/interagency_forestry_working_group/mission_and_goals/charter/ifwg_charter_final4-7-09.pdf.

194. INTERAGENCY FOREST WORKING GRP., THE EFFECTS OF FOREST AND RANGELAND REGULATIONS ON GREENHOUSE GAS GOALS 2 (2012), *available at* http://www.bof.fire.ca.gov/board_committees/interagency_forestry_working_group/current_projects/ifwg_task_2_final_3_20_12.pdf.

195. BILL KINNEY, CAL. ENERGY COMM'N, IFWG TASK # 3—PROGRESS REPORT: PRESENTATION TO BOARD OF FORESTRY AND FIRE PROTECTION 1 (2012), *available at* http://www.bof.fire.ca.gov/board_committees/interagency_forestry_working_group/current_projects/presentation_to_the_board_february_and_march_2012/task3_bof_030712.pdf.

196. *Id.* at 2.

197. *Id.*

studies) that will lead to strategies that address the three tenets of sustainability.[198] Understandably, its research has centered on wildfires and the impact of fuel treatments (which can be used as feedstocks for fuels) on wildlife and biodiversity, water quality, soils, and nutrient cycling.[199] Lastly, it is applying lifecycle analysis to compare various treatment strategies and "[b]enchmarking state and federal management guidelines with 3rd party forest certification systems and protocols."[200]

a. The Low Carbon Fuel Standard

The LCFS requires fuel suppliers to reduce the carbon intensity of their entire portfolio each year relative to the 2006 petroleum baseline, with the goal of reducing the overall intensity of California's transportation fuel supply by ten percent by 2020.[201] While this strategy differs from the RFS volumetric mandate, it still operates in the same way to incentivize forest biomass feedstocks.

Regulated parties must use lifecycle analysis to determine the intensity "pathway" of each fuel they sell.[202] As with the federal RFS, no pathway has been created for forest-based fuels. The Air Resources Board (ARB) relies on GREET for direct emissions calculations and incorporates ILUC into fuel footprints.[203] With regard to other sustainability factors, throughout 2011–2012 the ARB convened workgroup meetings to discuss sustainability metrics for feedstocks converted into LCFS-qualifying fuels.[204] The ARB proposed criteria and indicators addressing soil and water quality and biodiversity protection.[205] Whether or not formal certification will be required is uncertain, particularly in light of pending litigation on the constitutionality of extending sustainability measures like LCFS carbon accounting beyond California's borders.[206] ARB and some workgroup

198. *See id.* at 4 (explaining that the group's "Core Work Plan" involves "conduct[ing] public workshops"; "fund[ing] research on economic, policy and forest science questions"; and "develop[ing] pilot-project case studies that would demonstrate and evaluate biomass sustainability").

199. *Id.* at 12.

200. *Id.*

201. AIR RES. BD., CAL. ENVTL. PROT. AGENCY, LOW CARBON FUEL STANDARD: FINAL STATEMENT OF REASONS 5 (2009), *available at* http://www.arb.ca.gov/regact/2009/lcfs09/lcfsfsor.pdf.

202. *Id.* at 15–16.

203. *Id.* at 107.

204. *Low Carbon Fuel Standard Sustainability Workgroup*, CA.GOV, http://www.arb.ca.gov/fuels/lcfs/workgroups/lcfssustain/lcfssustain.htm (last visited May 4, 2013).

205. *Id.* (embedding criteria in slide presentations).

206. *See generally* Jody M. Endres & Daniel Szewczyk, *Carbon and the Constitution: Barriers to Lifecycle Assessment Threaten the Credibility of State Bioenergy Policies*, A.B.A. ENERGY COMM. NEWSLETTER (AM. BAR ASSOC., CHI., ILL.), no. 2, May 2012, at 16 (discussing litigation claiming that carbon intensity application violates the dormant commerce clause and is preempted by federal law).

members have emphasized that ARB must assess whether additional certification (e.g., through a private standard) beyond application of existing laws and policies is necessary.[207] This will require "benchmarking" of laws such as the Forest Practice Rules to basic concerns enumerated in the draft criteria and indicators. BoF officials routinely attend workgroup meetings, and discussions often recognize that further coordination between the LCFS working group and the IFWG will be necessary to ensure consistency in SFM initiatives.

b. The Cap-and-Trade Program, Renewables Portfolio Standard, and A.B. 118 Investment

California's Cap-and-Trade Program exempts forest biomass-based fuels from carbon accounting if produced under a timber management plan and harvested to reduce fires or improve stands.[208] However, entities must still report volume and contact information for this biomass under the mandatory reporting regulation if a certain minimum threshold emission level is triggered.[209] Otherwise, direct emissions from combustion of nonexempt biomass falls within the cap, with carbon values calculated using either a federal GHG reporting rule methodology, or those set forth in the cap-and-trade regulation.[210] Aside from the timber management plan requirement, other sustainability provisions are being considered in the context of offset credits that can be generated from REDD projects.[211] Specifically, the Governors' Climate and Forests Task Force is continuing to work on integrating sustainability mechanisms in REDD projects that qualify for the Cap-and-Trade Program.[212]

Renewable energy credits (RECs) generated through the RPS currently lack concrete definitions of "renewability," except as broadly defined in the RPS statute as that which does not "cause or contribute to any violation of a California environmental quality standard or requirement."[213] While it remains unclear how the California Energy Commission (CEC) will verify

207. *Id*. at 18.

208. CAL. CODE REGS. tit. 17, § 95852.2(a)(4) (2013).

209. *Id.* §§ 95103(j), 95852.2.

210. *Id.* §§ 95582(i), 95752.1, 95103(j); *see* 40 C.F.R. § 98.33 (2012) (providing federal calculation methodology for GHG emissions).

211. *See infra* notes 480–482 and accompanying text.

212. GOVERNORS' CLIMATE & FORESTS TASK FORCE, GCF DESIGN RECOMMENDATIONS FOR SUBNATIONAL REDD FRAMEWORKS 5–6 (2011), *available at* http://www.gcftaskforce.org/documents/REVISED_DRAFT_Task%201_Subnational_REDD_Frameworks_Report.pdf.

213. CAL. PUB. RES. CODE § 25741(a)(2)(B)(ii) (West 2012); OFFSET QUALITY INITIATIVE, MAINTAINING CARBON MARKET INTEGRITY: WHY RENEWABLE ENERGY CERTIFICATES ARE NOT OFFSETS 2–3 (2009), *available at* http://www.climatetrust.org/pdfs/ JuneBrief.pdf.

environmental compliance, it does participate in the IFWG. The CEC recently issued a study of the lifecycle effects of certain energy systems, including one using forest maintenance feedstocks, and found significant net reductions of CO_2.[214]

Some of the sustainability research conducted by the IFWG is funded through A.B. 118, passed in 2007 to advance alternative fuels and vehicle technology investment.[215] The CEC applies sustainability criteria to make A.B. 118 awards.[216] With regard to forest biomass resources, A.B. 118 regulation requires that:

> Projects that use forest biomass resources as part of their feedstock, and that demonstrate the advancement of natural resource protection goals, are those that use forest biomass collection or harvesting practices that do not diminish the ecological values of forest stands, and that are consistent with forest restoration, fire risk management and ecosystem management goals.[217]

The regulation states that preference for funding will be given to those projects that "strictly follow" third-party certification and provides examples of certification regimes including the Forest Stewardship Council.[218]

c. Generic Environmental Review for Forest Projects

In addition to the sustainability provisions in California's bioenergy statutes, California maintains comprehensive generic forest protection policies and carbon accounting considerations. The Timberland Productivity Act of 1982 designates commercial timberland zones within the state[219] to control uses of timberlands to ensure long-term productivity of California's forest resources.[220] However, environmental considerations are part of "productivity" under the many environmental statutes that apply. California requires environmental review of state action through the California

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214. MARGARET K. MANN ET AL., NAT'L RENEWABLE ENERGY LAB., LIFE CYCLE ASSESSMENT OF EXISTING AND EMERGING DISTRIBUTED GENERATION TECHNOLOGIES IN CALIFORNIA 44 (2011), *available at* http:// www.energy.ca.gov/2011publications/CEC-500-2011-001/CEC-500-2011-001.pdf.

215. Assemb. B. 118, 2007, chap. 750 (Cal. 2007) (codified at CAL HEALTH & SAFETY CODE, §§ 44270–74).

216. CAL. CODE REGS. tit. 20, § 3101.5(b) (2013).

217. CAL. CODE REGS. tit. 12, § 3101.5(b)(2)(F) (2013); CAL. ENERGY COMM'N, 2011–2012 INVESTMENT PLAN FOR THE ALTERNATIVE AND RENEWABLE FUEL AND VEHICLE TECHNOLOGY PROGRAM 84 (2011), *available at* http://www.energy.ca.gov/2011publications/CEC-600-2011-006/CEC-600-2011-006-CMF.pdf.

218. CAL. CODE REGS. tit. 12, § 3101.5(b)(3).

219. California Timberland Productivity Act of 1982, CAL. GOV'T CODE § 51103 (West 2012).

220. *Id.* § 51102.

Environmental Quality Act (CEQA), which is similar to federal review under NEPA.[221] CEQA reaches private forest lands when the state finances the activities or when a government agency must approve them.[222] Under CEQA, if alternatives are available, the project sponsor must incorporate them into the project proposal to "[p]revent significant, avoidable damage to the environment."[223] A "significant" impact will cause or has the potential to cause substantial, adverse change in physical conditions of the proposed project area[224] and cumulative impacts. [225]

GHG emissions are assessed under CEQA[226] for "potential incremental contribution of GHGs" instead of an overall review of "the potential effect itself (i.e., climate change)."[227] Lead agencies must make a good-faith effort to calculate or estimate the amount of GHG emissions resulting from a project when determining significance.[228] The method, however, is left to the lead agency's discretion,[229] and the agency may determine that a project complies with an existing GHG regulatory program such as the LCFS.[230] Indeed, anyone conducting a CEQA analysis of GHG emissions would likely want to borrow from complex methodologies that have already been developed. If cumulative GHG emissions are considerable, and thus require

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221. California Environmental Quality Act of 1970, CAL. PUB. RES. CODE §§ 21000–165 (West 2012); *see* Katherine M. Baldwin, Note, *NEPA and CEQA: Effective Legal Frameworks for Compelling Consideration of Adaptation to Climate Change*, 82 S. CAL. L. REV. 769, 786 (2009) (including a general explanation of NEPA).

222. CAL. CODE REGS. tit. 14, § 15002(b) (2013). "Governmental action" triggers the CEQA Guidelines, which is defined as "(1) [a]ctivities directly undertaken by a governmental agency, (2) [a]ctivities financed in whole or in part by a governmental agency, or (3) [p]rivate activities which require approval from a governmental agency." *Id*.

223. *Id.* § 15002(a)(3).

224. CAL. CODE REGS. tit. 14, § 15382 (2013).

225. "Cumulative impacts" is defined by the CEQA Guidelines as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." CAL. CODE REGS. tit. 14, § 15355 (2013). The CEQA Guidelines further explain that "[t]he individual effects may be changes resulting from a single project or a number of separate projects," and that "[c]umulative impacts can result from individually minor but collectively significant projects taking place over a period of time." *Id*.

226. CAL. PUB. RES. CODE § 21083.05 (West 2012); CAL. NATURAL RES. AGENCY, FINAL STATEMENT OF REASONS FOR REGULATORY ACTION, AMENDMENTS TO THE STATE CEQA GUIDELINES ADDRESSING ANALYSIS AND MITIGATION OF GREENHOUSE GAS EMISSIONS PURSUANT TO SB97 10 (2009), *available at* http://ceres.ca.gov/ceqa/docs/Final_Statement_of_Reasons.pdf. *See also* Baldwin, *supra* note 221, at 793 (stating that legislation required the Office of Planning and Research "to develop new CEQA Guidelines explaining how to evaluate GHGs in environmental impact assessments by July 1, 2009").

227. CAL. NATURAL RES. AGENCY, *supra* note 226, at 12.

228. CAL. CODE REGS. tit. 14, § 15064.4(a) (2013).

229. *Id.* § 15064.4(a)(1).

230. *Id.* § 15064.4(b)(3).

preparation of an environmental impact report (EIR), the agency must consider feasible GHG emission mitigation measures.[231]

As part of the environmental review of biodiversity effects, the California Natural Resources Agency (CNRA) determines whether incremental contributions are cumulatively considerable in relation to whether the proposed project complies with previously approved habitat conservation plans (HCPs) or natural community conservation plans (NCCPs).[232] An EIR must still be prepared, however, if "there is substantial evidence" that potential effects of a proposed project "are still cumulatively considerable" despite compliance with a previously approved plan.[233] If a lead agency determines that the proposed project's incremental contribution is not cumulatively considerable through reliance on a previously approved plan, the agency must explain how implementing the plan will "ensure that the project's incremental contribution to the cumulative effect is not cumulatively considerable."[234]

Forestry projects go through a CEQA environmental checklist that includes the assessment of GHG emissions and efforts to reduce emissions.[235] A registered professional forester (RPF) prepares the checklist in order to determine whether the proposed project may potentially and significantly affect each natural resource concern on the checklist.[236]

d. Biodiversity Protection

Both the ESA[237] and the California Endangered Species Act (CESA)[238] apply to forestry operations. CESA prohibits taking, harming, or degrading of the habitats of plant and animal species that are classified as threatened or endangered without a permit.[239] When a private forestry project is likely to "take" a threatened or endangered species on a federal or state list, an

231. *Id.* §§ 15064.4(b)(3), 15126.4.

232. *See* CAL. CODE REGS. tit. 14, § 15064.4(b)(3) (2013) (describing the need to conform to other regulations and requirements regarding greenhouse gas emissions); CAL. NATURAL RES. AGENCY, *supra* note 226, at 14–15.

233. CAL. CODE REGS. tit. 14, § 15064.4(b)(3) (2013).

234. *Id.* § 15064(h)(5).

235. CAL. CODE REGS. tit. 14, ch. 3 app. G (2013), *available at* http://ceres.ca.gov/ceqa/guidelines/pdf/appendix_g-3.pdf.

236. *Id.*

237. Endangered Species Act of 1973, 16 U.S.C. §§ 1531, 1536, 1539 (2012); *Federal Habitat Conservation Planning*, CA.GOV, http://www.dfg.ca.gov/habcon/conplan/fed_hcp/ (last visited May 4, 2013).

238. California Endangered Species Act of 1999, CAL. FISH & GAME CODE §§ 2050–2085 (West 2012).

239. *Id.* §§ 2080–2081.1.

incidental take permit (ITP) must be obtained for project approval.[240] The California Department of Fish and Game (CDFG) may approve an ITP only if review of the HCP reveals that, among other things, impacts will be mitigated fully and that funding for such mitigation and monitoring is available.[241]

California also maintains the Natural Community Conservation Planning Program (NCCPP), a broad ecosystem initiative designed to protect declining populations of plant and animal species while at the same time accommodating compatible land uses.[242] Similar to HCPs,[243] the NCCPP authorizes the CDFG to enter into incidental take agreements with private or public entities for proposed projects.[244] The program targets both listed and unlisted species.[245] A goal of the NCCPP is to implement conservation measures that will prevent the future necessity of categorizing plant and animal species as threatened or endangered.[246] Agreements authorized by the NCCPP must be made pursuant to an NCCP.[247]

Both HCPs and NCCPs have received extensive criticism since their inception.[248] The majority of criticism has centered on the "no surprises"

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240. 16 U.S.C. § 1539 (2012); U.S. FISH & WILDLIFE SERV., HABITAT CONSERVATION PLANS, SECTION 10 OF THE ENDANGERED SPECIES ACT 1 (2002), *available at* http://library.fws.gov/Pubs9/hcp_section10.pdf.

241. CAL. CODE REGS. tit. 14, § 783.4 (2013).

242. *Natural Community Conservation Planning (NCCP)*, CAL. DEP'T. OF FISH & GAME, http://www.dfg.ca.gov/habcon/nccp/ (last visited May 4, 2013).

243. CAL. NATIVE PLANT SOC'Y, CNPS MANUAL ON THE HCP-NCCP PROCESS 1, 5 (1999), *available at* http://www.cnps.org/cnps/archive/handbooks/hcp-nccp.pdf.

244. Natural Community Conservation Planning Act of 2003, CAL. FISH & GAME CODE § 2810 (West 2012).

245. *Id.* §§ 2801(i), 2805(e); CAL. NATIVE PLANT SOC'Y, *supra* note 243, at 1, 5.

246. CAL. FISH & GAME CODE §§ 2801(i), 2805(e).

247. *Id.* § 2810. Requirements of NCCPs include: (1) a definition of "the geographic scope of the conservation planning area"; (2) a list of potential "natural communities, and the endangered, threatened, candidate, or other species known, or reasonably expected to be found, in those communities" that may be impacted; (3) identification of "preliminary conservation objectives for the planning area"; (4) description of "a process for the inclusion of independent scientific input," which will recommend (a) "scientifically sound conservation strategies for species and natural communities" included within the plan, (b) "a set of reserve design principles that addresses the needs of species, landscapes, ecosystems, and ecological processes in the planning area," (c) "management principles and conservation goals that can be used in developing a framework for the monitoring and adaptive management component of the plan," and will (d) "[i]dentify data gaps and uncertainties so that risk factors can be evaluated"; (5) compliance with ESA, including "coordination with federal wildlife agencies"; (6) encouragement of "concurrent planning for wetlands and waters of the [U.S.]"; (7) establishment of an interim review process for the project; and (8) establishment of a public participation process. *Id.*

248. *See* Spirit of Sage Council v. Kempthorne, 51 F. Supp. 2d 31, 35, 36 (D.D.C. 2007) (challenging the validity of the federal "no surprises" policy); George F. Wilhere, *Three Paradoxes of Habitat Conservation Plans*, 44 ENVTL. MGMT. 1089, 1090 (2009) (listing literature that criticizes HCPs). *See also* Envtl. Prot. Info. Ctr. v. Cal. Dep't of Forestry & Fire Prot., 187 P.3d 888, 920–21, 933 (Cal. 2008) (holding that the Incidental Take Permit was deficient to the extent it included a "no surprises" clause, which is determined by the HCP).

policy[249] contained in both HCP and NCCP processes.[250] The "no surprises" policy assures HCP and NCCP participants that no additional mitigation measures or conservation practices, including financial compensation or land use restrictions, will be required for "unforeseen circumstances"[251] not addressed in the original HCP or NCCP.[252] Opponents of the "no surprises" policy argue that it significantly hinders agencies from appropriately responding to "future threats to protected species."[253]

Like many states, California has developed a Wildlife Action Plan as a condition for receipt of federal State Wildlife Grants Program monies. The Wildlife Action Plan is used to guide conservation decisions by identifying wildlife, stressors affecting them, and actions to ensure their future abundance.[254] California also supports SFM through programs like the Forest Stewardship Program and Forest Improvement Program, which provide technical assistance to private land owners and communities.[255] In exchange for financial assistance, the latter program requires checklists for owners and RPFs to evaluate impacts of the proposed improvement[256] and a mini-management plan.[257] Biodiversity programs not specific to forestry include

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249. DANIEL POLLAK, THE FUTURE OF HABITAT CONSERVATION? THE NCCP EXPERIENCE IN SOUTHERN CALIFORNIA 30 (2001), *available at* http://www.library.ca.gov/crb/01/09/01-009.pdf (explaining that criticism of HCPs and NCCPs "often focuses on the federal 'No Surprises' assurances").

250. 50 C.F.R. §§ 17.22, 17.32 (2012); CAL. FISH & GAME CODE § 2820(f)(2).

251. 50 C.F.R. § 17.3 (defining "[u]nforeseen circumstances" as "changes in circumstances affecting a species or geographic area covered by a conservation plan or agreement that could not reasonably have been anticipated by plan or agreement developers and the Service at the time of the conservation plan's or agreement's negotiation and development, and that result in a substantial and adverse change in the status of the covered species").

252. *Id.* §§ 17.22, 17.32; CAL. FISH & GAME CODE § 2820(f)(2). *See also* Wilhere, *supra* note 248, at 1090 (citing 50 C.F.R. § 17.22) (describing application of the "no surprises" policy to HCPs).

253. POLLAK, *supra* note 249, at 30.

254. CAL. DEP'T OF FISH & WILDLIFE, CALIFORNIA WILDLIFE: CONSERVATION CHALLENGES, CALIFORNIA'S WILDLIFE ACTION PLAN xi (2007), *available at* http://www.dfg.ca.gov/wildlife/WAP/docs/report/full-report.pdf.

255. *CA Forest Stewardship Program*, CA.GOV, http://ceres.ca.gov/foreststeward/index.html (last visited May 4, 2013); *California Forest Improvement Program*, CA.GOV, http://calfire.ca.gov/resource_mgt/resource_mgt_forestryassistance_cfip.php (last visited May 4, 2013).

256. CAL. DEP'T OF FORESTRY & FIRE PROT., CALIFORNIA FOREST IMPROVEMENT PROGRAM (CFIP) PROJECT REVIEW ENVIRONMENTAL CHECKLIST (2011), *available at* http://calfire.ca.gov/resource_mgt/downloads/CFIP/Locked_CFIP_Environmental_CheckList_110211.doc; CAL. DEP'T OF FORESTRY & FIRE PROT., 2011 CFIP RPF CHECKLIST (2011), *available at* http://calfire.ca.gov/resource_mgt/downloads/CFIP/Locked_2011_CFIP_RPF_CHECKLIST.doc.

257. CAL. DEP'T OF FORESTRY & FIRE PROT., CFIP MINI MANAGEMENT PLAN FAS CHECKLIST, *available at* http://calfire.ca.gov/resource_mgt/downloads/CFIP/CFIP_MiniManagementPlan_CHECKLIST.doc.

the Fisheries Restoration Grant Program,[258] the California Essential Habitat Connectivity Project,[259] and the Areas of Conservation Emphasis program.[260]

e. The Forest Practices Act and Other Generic Environmental Laws

The Z'Berg-Nejedly Forest Practices Act (FPA) establishes standards governing private forest management activities in California.[261] The FPA charges the California Board of Forestry and Fire Protection (BoF), the authority responsible for implementing policies of the California Department of Forestry (CAL FIRE), with regulation of all timberlands to ensure sustainability and productivity.[262] The FPA requires BoF to divide the state into forest districts and develop and adopt Forest Practice Rules (FPRs) for each district.[263] The FPRs incorporate CEQA considerations,[264] as well as requirements of the Porter-Cologne Water Quality Control Act (PCWQCA), the CESA, and all other environmental laws.[265] How these rules affect forestry requires an extensive analysis beyond the scope of this Article.[266] This abbreviated examination is not intended to gloss over criticisms that California forest and environmental rules have not stopped destructive practices.[267] Instead, it highlights the most significant structures to inform future debate over whether they adequately address the potential environmental ramifications of increased harvests of energy biomass from forests.

The Timberland Productivity Act requires the California Department of Forestry (CDF) to manage forests for maximum sustained yield production

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258. *Fisheries Restoration Grant Program*, CA.GOV, http://www.dfg.ca.gov/fish/Administration/Grants/FRGP/ (last visited May 4, 2013).

259. *Connectivity*, CA.GOV, http://www.dfg.ca.gov/habcon/connectivity/ (last visited May 4, 2013).

260. CAL. DEP'T OF FISH & WILDLIFE, AREAS OF CONSERVATION EMPHASIS (ACE-II): PROJECT REPORT 4, 6 (2010), *available at* https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=24326&inline=1.

261. Z'Berg-Nejedly Forest Practice Act of 1973 (codified as amended at CAL. PUB. RES. CODE §§ 4511–4628 (West 2001 & West 2012)).

262. *Id.* §§ 4513, 4516.5.

263. *Id.* §§ 4531, 4551.

264. SHARON E. DUGGAN & TARA MUELLER, GUIDE TO THE CALIFORNIA FOREST PRACTICE ACT AND RELATED LAWS 255 (2005). The THP serves as the functional equivalent of the CEQA EIR, although all other aspects of CEQA, such as public review and mitigation, apply. *Id.*

265. CAL. CODE REGS. tit. 14, § 896 (2013).

266. DUGGAN & MUELLER, *supra* note 264. The authors have written an entire book on the FPA, and thus those interested in more intricate details should look there. *Id.*

267. *See, e.g.*, Thomas N. Lippe & Kathy Bailey, *Regulation of Logging on Private Land in California Under Governor Gray Davis*, 31 GOLDEN GATE U. L. REV. 351, 353–55 (2001) ("[A]ll of the independent programmatic reviews of the state's regulation of logging have found that California is not achieving its professed goal of protecting the environment.").

(MSP).[268] Thus, the challenge with any increased energy biomass harvesting will be balancing the statutory charge to maximize yields with sustainability, just as with federal forests under the MUSYA. Any timber operation on private land triggers application of and compliance with FPRs,[269] including preparation and submission of a Timber Harvesting Plan (THP) by a RPF.[270] The THP must "[a]chieve a balance between growth and harvest over time" while "[m]aintain[ing] functional wildlife habitat in sufficient condition for continued use . . . within the planning watershed."[271] This includes retaining older and diverse sets of habitat to provide connectivity[272] and identifying watercourses within the area of the proposed timber operation.[273]

These requirements to protect wildlife and habitat, therefore, at least on paper, would prevent an argument that they may be considered only in relation to silvicultural support of productivity. Harvest applicants may demonstrate achievement of MSP in three ways, including alternatives to THPs for smaller or non-industrial owners;[274] each must consider, however, environmental impacts.[275] The FPA requires the Director of the BoF to review THPs to ensure compliance with the FPA and FPRs,[276] with the ultimate goal of maintaining healthy and naturally diverse forests.[277] FPRs charge the BoF Director with responsibility for reviewing THPs on a large-scale, cumulative basis to ensure maintenance of higher scale biological diversity and watershed integrity.[278] In this review, the Director applies the following guiding principles:

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268. CAL. PUB. RES. CODE § 4513(b).

269. *Id.* §§ 4527, 4551.5 (defining "[t]imber operations" as "the cutting or removal, or both, of timber or other solid wood forest products, including Christmas trees, from timberlands for commercial purposes, together with all the incidental work, including, but not limited to, construction and maintenance of roads, fuelbreaks, firebreaks, stream crossings, landings, skid trails, and beds for the falling of trees, fire hazard abatement, and site preparation that involves disturbance of soil or burning of vegetation following timber harvesting activities, but excluding preparatory work such as treemarking, surveying, or roadflagging").

270. *Id.* § 4581. For a list of current THPs submitted for public comments, see *California 2012 Timber Harvest Plan (THP) Database*, THP TRACKING CENTER, http://www.thptrackingcenter.org/database/thpca2012.html (last visited May 4, 2013).

271. CAL. CODE REGS. tit. 14, § 897(b)(1)(A)–(B); DUGGAN & MUELLER, *supra* note 264, at 158.

272. CAL. CODE REGS. tit. 14, § 897(b)(1)(C).

273. *Id.* § 1034.

274. DUGGAN & MUELLER, *supra* note 264, at 160–64.

275. *Id.* at 161–64. For a more detailed analysis of standards for the protection of animals and plants, see *id.* at 253–317.

276. CAL. CODE REGS. tit. 14, § 897.

277. *Id.*

278. *Id.*

- Achieve a balance between growth and harvest over time consistent with the harvesting methods within the rules of the Board.
- Maintain functional wildlife habitat in sufficient condition for continued use by the existing wildlife community within the planning watershed.
- Retain or recruit late and diverse seral stage habitat components for wildlife concentrated in the watercourse and lake zones and as appropriate to provide for functional connectivity between habitats.[279]
- Maintain growing stock, genetic diversity, and soil productivity.[280]

Thus, at least on paper, BoF should consider landscape impacts from increased biomass harvests if they occur. The public, too, is entitled to review THPs,[281] although the CDF "almost always approves" them.[282] Any person seeking to convert three contiguous acres or more to a non-timber use (e.g., agriculture) must apply for a Timber Conversion Permit.[283] Conversion to agricultural energy biomass, such as short-rotation woody crops, has been a major concern of environmental groups.

FPRs require maintenance, protection, and restoration of affected beneficial uses of water and beneficial functions of riparian zones during and after timber operations.[284] PCWQCA gives the State Water Resources Control Board the authority to implement state water rights and water quality policies.[285] PCWQCA divides California into nine Regional Water Quality Control Boards, which must develop Basin Plans.[286] The Basin Plans designate beneficial uses of water, water quality standards, and necessary actions to maintain those standards,[287] including regulation of point and non-point sources of pollution to state surface water and groundwater resources

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279. *Id.* The US Fish and Wildlife Service defines "seral stage" as "[a]ny plant community whose plant composition is changing in a predicable way," which is "characterized by a group of species or plant community that will eventually be replaced by a different group of species or plant community." U.S. FISH & WILDLIFE SERV., APPENDIX FOR THE FINAL COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT FOR THE LITTLE PEND OREILLE NATIONAL WILDLIFE REFUGE, at A-11 (2000), *available at* http://www.fws.gov/pacific/planning/LPOccp/v2.pdf. "Late seral stage forest" is defined as "[a] forest in the mature stage of development, usually dominated by large, old trees." *Id.* at A-6.

280. CAL. CODE REGS. tit. 14, § 897.

281. CAL. PUB. RES. CODE § 4582.7.

282. DUGGAN & MUELLER, *supra* note 264, at 129.

283. CAL. CODE REG. tit. 14, §§ 1104, 1110.

284. *Id.* §§ 4514.3, 4562.7.

285. Porter-Cologne Water Quality Control Act of 1969, CAL. WATER CODE §§ 13000–14076 (West 2012).

286. *Id.* §§ 13200, 13240.

287. *Id.* § 13241.

through issuing pollution discharge permits.[288] The Director must disapprove THPs that would otherwise violate water quality control plans created by the State Water Resources Control Board.[289]

f. Hazard Prevention

The CNRA has expressed concerns about the effects of climate change on forest fires.[290] Warmer climates generally lead to longer summers and to drier vegetation that fuels and hastens fire ignition and spread.[291] The CNRA has concluded that this changed weather cycle is "expected to increase the number and intensity of forest fires."[292] The California Office of Environmental Health Hazard Assessment (OEHHA) also has determined that long-term fire management strategies and land uses that are intended to suppress surface fires generally change the structure and density of vegetative biomass, which can increase the likelihood of forest fires that release copious amounts of carbon into the atmosphere.[293]

One of the greatest sources of angst regarding the sustainability of forest-to-energy biomass originates in hazard-reduction exemptions often contained in forestry regulations. In California, operators are exempt from preparing a THP[294] when harvesting "dead, dying or diseased trees"; "fuelwood or split products"; and "trees which are unmerchantable as sawlog-size timber from substantially damaged timberlands"; and when removing or cutting trees that reduce flammable materials, such as vegetative fuels and tree crowns, to create fuelbreaks.[295] Persons conducting timber operations that fall within an exemption category still must submit, however, "a notice of proposed timber operations" on a form provided by CAL FIRE before commencing timber operations.[296] Exemptions are presumed to impose no significant adverse environmental effects and are not subject to the BoF review standards imposed on THPs. Proposals are approved automatically within a specified

288. *Id.* § 13260.

289. CAL. CODE REGS. tit. 14, § 898.2h; *Id.* tit. 23, § 3.

290. CAL. NATURAL RES. AGENCY, *supra* note 226, at 7.

291. *Id.* (citing A.L. WESTERLING ET AL., CLIMATE CHANGE CTR., CLIMATE CHANGE, GROWTH, AND CALIFORNIA WILDFIRE 10 (2009), *available at* http://www.energy.ca.gov/2009publications/CEC-500-2009-046/CEC-500-2009-046-D.PDF).

292. *Id.* (citing OFFICE OF ENVTL. HEALTH HAZARD ASSESSMENT, INDICATORS OF CLIMATE CHANGE IN CALIFORNIA 131 (2009), *available at* http://oehha.ca.gov/multimedia/epic/pdf/ClimateChangeIndicatorsApril2009.pdf).

293. OFFICE OF ENVTL. HEALTH HAZARD ASSESSMENT, *supra* note 292, at 134.

294. CAL. CODE REGS. tit. 14, § 1038 (2013).

295. *Id.*

296. *Id.* § 1038.2.

time period if the Director fails to act on the proposal.[297] As with the litigation that eventually enjoined the categorical exemptions contained in the federal HFRA, lack of review for exemptions creates fears that the forest industry will exploit exemption standards to avoid more stringent and time consuming THP standards.[298]

Recognizing possible loopholes in the exemption standards, the BoF has imposed limitations and penalties on timber operations subject to exemptions.[299] For example, the BoF has clearly indicated that all exempt timber operations must still comply with provisions of the FPA and FPRs that would be applicable to THPs,[300] including rules and regulations governing timber harvesting requirements and environmental protection measures.[301] All timber operation exemptions are limited to one year.[302] In addition, the harvest of dead, dying, or diseased trees and fuel wood or split products is limited to "less than [ten] percent of the average volume per acre" within the geographic area of the timber operations.[303] Removing or cutting trees to reduce flammable materials and create a fuel break is limited only to trees within 150 feet of an "approved and legally permitted structure."[304]

Conscious of the severity and likelihood of operators exploiting FPR procedures, the California legislature passed Senate Bill 621 in 1999 to impose harsher penalties on violators of the FPRs.[305] Conscious violators of the FPRs can incur a civil penalty of up to $10,000 per violation.[306] While biomass harvesting for bioenergy can lend support to fire prevention measures, the practice runs the risk of being merely a pretext to avoid preparation of a THP. The limited scope of exempt timber operations and the

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297. *Id.* § 1038. *See also* CHRISTOPHER A. DICUS & KENNETH DELFINO, A COMPARISON OF CALIFORNIA FOREST PRACTICE RULES AND TWO FOREST CERTIFICATION SYSTEMS 44 (2003), *available at* http://sotsnf.org/pdf/Cal_Poly-Forest_Practices-2003.pdf ("[E]xemptions are 'ministerial' (automatically approved without discretion) and are presumed to have a minimal adverse effect on the environment.").

298. DICUS & DELFINO, *supra* note 297, at 44.

299. CAL. CODE REGS. tit. 14, §§ 1038, 1038.1, 1038.2.

300. *Id.* § 1038.1.

301. HEATHER MORRISON, YANA VALACHOVIC & CLARALYNN NUNAMAKER, LAWS AND REGULATIONS AFFECTING FORESTS, PART I: TIMBER HARVESTING 7 (2007), *available at* http://anrcatalog.ucdavis.edu/pdf/8249.pdf.

302. CAL. CODE REGS. tit. 14, § 1038.1.

303. *Id.* § 1038.

304. *Id*. An "approved and legally permitted structure" must comply with the California Building Code. *Id.*

305. S.B. 621 (1999) (codified at CAL. PUB. RES. CODE §§ 4612, 4554.5, 4601.1, 4601.2, 4601.3, 4601.4, 4601.5 (2012)). *See also* DICUS & DELFINO, *supra* note 297, at 51 (explaining that, prior to 2000, "there was little enforcement available" for violators of the FPRs, but after enactment of S.B. 621 in January 2000, "much stiffer penalties for conscious violators of the FPRs" were available).

306. CAL. PUB. RES. CODE § 4601.1 (West 2012).

stiff penalties imposed on violators of the FPRs, however, may significantly reduce the likelihood of overharvest.

2. Massachusetts

While California contemplates bioenergy-specific standards for forest biomass, the Massachusetts Department of Energy Resources (DOER) issued rules in 2012 specifically addressing the sustainability of forest biomass feedstocks qualifying for the state's RPS.[307] The rules are based in part on the much-publicized Manomet Study—the first national study to assess the possible impacts on forests and GHG emissions from the transition from traditional fossil fuels to bioenergy.[308] The study analyzed three core questions: (1) the GHG implications of forest biomass substitution, (2) the amount of available forest biomass necessary to support the state's energy goals, and (3) the potential ecological impacts of increased biomass harvests in state forests and the policies necessary to ensure the continued sustainability of the harvests.[309] With regard to the latter, the study examines sustainability rules in various states and recommends generally how to structure standards.[310] The report recognizes the need for additional standards because of "general public anxiety over environmental protection," "the obligation to correct misapplied forestry practices," "the need for greater accountability," "growth of local ordinances," "landscape-level concerns," and "following the lead of others."[311]

Massachusetts's new rules define sources of "eligible woody biomass," which, as seen in North Carolina's implementation of its RPS, can be

307. 225 MASS CODE REGS. §§ 14.01–14.13 (2013).

308. MANOMET CTR. FOR CONSERVATION SCI., BIOMASS SUSTAINABILITY AND CARBON POLICY STUDY 6 (Jun. 2010), *available at* http://www.manomet.org/sites/manomet.org/files/Manomet_Biomass_Report_Full_LoRez.pdf.

309. *Id.*

310. *Id.* at app. 150–57.

311. *Id.* at app. 151.

controversial.[312] Massachusetts includes residues,[313] thinnings,[314] forest salvage,[315] and non-forest derived residues including trees removed for non-agricultural and agricultural land use change.[316] Additional restrictions are enumerated in a set of spreadsheet guidelines for "biomass fuel certificates" required from regulated parties to prove compliance with the RPS rules.[317] The certificate must detail that residues have been derived from harvest byproducts or from damage caused by invasive species to prevent prohibited material or materials in prohibited amounts from entering the supply chain.[318] Excluded material includes biomass from old growth forests stands, naturally down woody material, forest litter, forest floor roots and stumps, live cavity trees, den trees, and live but decaying trees and snags.[319] In addition, the amounts of biomass eligible to be taken away from a harvest site are tied to the overall tonnage of biomass harvested and to the quality of the soil and slope at the harvest site.[320]

The regulation places great emphasis on soil structure and function. For areas deemed to be of poor soil quality, 100% of the tops and branches from the forest material must remain on site in order to prevent erosion and to supplement soil conditions and quality.[321] In cases where soil quality is "good," twenty-five percent of the tops and branches from the harvest must remain on site.[322] In all cases, thirty percent of material eligible for thinning

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312. The lack of a definition of "biomass" led to litigation to resolve whether whole trees can be combusted for electricity generation and still count toward North Carolina's RPS. *See* North Carolina v. Envtl. Def. Fund, 716 S.E.2d 370, 371, 372 (N.C. Ct. App. 2011). For a general discussion of the debate about how to define qualifying sources, see Inge Stupak et al., *Criteria and Indicators for Sustainable Forest Fuel Production and Harvesting: A Review of Current Standards for Sustainable Forest Management*, 35 BIOMASS & BIOENERGY 3287, 3291 (2011) (noting that, because woodfuels are collected from a wide variety of sources, some confusion has arisen over the very definition of a forest).

313. The regulation defines residues as "[t]ops, crooks and other portions of trees produced as a byproduct during the normal course of harvesting material" and as "[o]ther woody vegetation that interferes with regeneration or the natural growth of the forest, limited to locally invasive native species and non-native invasive woody vegetation." 225 MASS. CODE REGS. § 14.02 (2013).

314. The regulation defines thinnings as including whole trees that are "weak or have low vigor" and "[t]rees removed during thinning operations, the purpose of which is to reduce stand density and enhance diameter growth and volume of the residual stand." *Id.*

315. The regulation defines salvage as "[d]amaged, dying or dead trees" due to weather events or disease, as well as trees removed to reduce fire hazard, but it does not include those trees removed due to competition. *Id.*

316. *Id.*

317. MASS. DEP'T OF ENERGY RES., FOREST DERIVED ELIGIBLE BIOMASS WOODY FUEL GUIDELINE (2012), *available at* http://www.mass.gov/eea/docs/doer/renewables/biomass/ma-rps-regulation-biomass-eligibility-and-certificate-guideline-doer-112012.xlsx.

318. *Id.* at tab "Biomass Restrictions."

319. *Id.*

320. *Id.*

321. *Id.*

322. *Id.*

must remain.[323] A soil designation of "good" or "poor" is determined by set criteria established by DOER and the USDA Natural Resource Conservation Service.[324]

From a carbon perspective, the regulation requires that the generation unit demonstrates a fifty percent reduction of lifecycle GHG emissions over a twenty-year life cycle, compared to a new natural gas generating facility.[325] In addition, each year the unit must document total tonnage through its biomass fuel certificates.[326] The certificate is used also to verify the source of forest-derived residues and thinnings through either a Massachusetts Department of Conservation and Recreation "cutting plan" or equivalent state plan prepared by a licensed forester or by obtaining the signature of a professional forester.[327]

Beyond regulation and guidance specific to the RPS, any forest harvesting activity in the state above a certain volume must be conducted in accord with the approved cutting plan pursuant to the Forest Cutting Practices Act (FCPA),[328] including compliance with the Best Management Practices (BMP) Manual.[329] Like BMPs in other states, Massachusetts's BMPs address—through requirements and voluntary guidance—aspects of sustainability such as planning, access roads and trails, landings, measures to combat sedimentation runoff, stream crossings, wetlands, vernal pools, rare and endangered species, chemical management, prescribed burning and wildfire, site closure, and compliance with Massachusetts's "slash"[330] laws to address aesthetics, fire hazard, and water quality.[331] Like California, Massachusetts maintains its own Endangered Species Act,[332] which the BMP manual explains with regard to the cutting plan and review by the state forester for protection of species on the state's Natural Heritage Atlas.[333]

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323. *Id.*

324. *Id.*

325. 225 MASS CODE REGS. § 14.02, 14.05(1)(a)(7) (2013).

326. *Id.* § 14.05(8)(2)(a).

327. *Id.* § 14.05(8)(3)(a).

328. MASS. GEN. LAWS ch. 132, §§ 42, 44 (2013).

329. DAVID B. KITTREDGE, JR. & MICHAEL PARKER, MASSACHUSETTS FORESTRY BEST MANAGEMENT PRACTICES MANUAL 1 (3d prtg. 1999), *available at* http://www.mass.gov/dep/water/drinking/forstbmp.pdf.

330. Slash includes the "residue, e.g., treetops and branches, left on the ground after logging." *The Dictionary of Forestry*, SOCIETY OF AM. FORESTERS, http://dictionaryofforestry.org/dict/term/slash (last visited May 4, 2013).

331. KITTREDGE & PARKER, *supra* note 329.

332. MASS. GEN. LAWS, ch. 131A (2013); 321 MASS. CODE REGS. § 10.00 (2013).

333. MASS. GEN. LAWS, ch. 131A § 44.

II. EU BIOENERGY AND SFM POLICY

European bioenergy policy arguably has engendered the most controversy regarding forest protection. Unlike the U.S. renewable fuels policy that relies primarily on corn ethanol, Europe's transportation fleet depends in large part on substitution of fossil fuels with biodiesel.[334] While the majority of vegetable-based biodiesel consumed has been from rapeseed (canola) and soy, palm oil feedstocks used for biodiesel production in Europe have steadily increased in recent years, mostly imported from Southeast Asia.[335] Described as an "eco-nightmare," palm oil demand has "brought about the clearing of huge tracts of Southeast Asian rainforest and the overuse of chemical fertilizer there."[336] At the same time, wood and woody biomass sourced within Europe accounts for about five percent of the total EU energy supply and is projected to constitute more than ten percent of the EU's gross final energy consumption in 2020.[337] With forty-five percent of land area in Europe under forest cover, domestic forest biomass has the potential to play a part in satisfying bioenergy mandates.[338]

The following Sections detail the myriad SFM policies within the E. U., both at the EU and Member State level and within both bioenergy and general forestry policies. The execution of these policies will be critical to public acceptance of biofuel policy by Europeans and environmental organizational stakeholders.

A. The Renewable Energy Directive

Article 17 of the EU RED sets forth sustainability criteria for transport fuels (but *not* for electricity) to combat potential deforestation and other unsustainable practices resulting from sourcing forest-based biomass.[339]

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334. Toby Price, *Biofuel Consumption Wanes in Europe*, ENERGIAS RENOVABLES (Jul. 27, 2012), http://www.energias-renovables.com/article/biofuel-consumption-growth-wanes-in-europe ("Biodiesel is still the main biofuel in European transport with a 78% share of total consumption, as against 21% for bioethanol.").

335. BOB FLACH ET AL., EU-27 ANNUAL BIOFUELS REPORT 23–25 (2011), *available at* http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Biofuels%20Annual_The%20Hague_EU-27_6-22-2011.pdf.

336. Elisabeth Rosenthal, *Once a Dream Fuel, Palm Oil May be an Eco-Nightmare*, N.Y. TIMES, Jan. 31, 2007, http://www.nytimes.com/2007/01/31/business/worldbusiness/31biofuel.html.

337. EUROPEAN COMM'N, STANDING FORESTRY COMM. BY THE STANDING FORESTRY AD HOC WORKING GROUP VII, CONTRIBUTING TO THE DEVELOPMENT OF A NEW EU FOREST STRATEGY 18 (June 2012), *available at* http://ec.europa.eu/agriculture/fore/publi/sfc_wg7_2012_full_en.pdf [hereinafter STANDING FORESTRY COMM. REPORT].

338. FAO 2010 Assessment, *supra* note 29, at 15.

339. RED, *supra* note 9, at art. 17.

Areas with high biodiversity, such as primary forest,[340] and those lands protected by law for nature and rare, threatened, or endangered species, as recognized by the International Union for the Conservation of Nature, are off-limits unless the regulated party can show no interference.[341] Further, sourcing from high carbon stock lands is prohibited, including continuously forested areas, such as:

- Land spanning more than one hectare with trees higher than five meters and a canopy cover of more than thirty percent, or trees able to reach those thresholds in situ; and
- Land spanning more than one hectare with trees higher than five meters and a canopy between ten percent and thirty percent, or trees able to reach those thresholds in situ, unless evidence is provided that the carbon stock of the area before and after conversion [would meet GHG thresholds set forth in the Directive].[342]

Like the U.S. RFS cutoff of December 19, 2007 for conversion,[343] the RED establishes January 2008 as the date of land conversion disqualification.[344] While agricultural crops must cross-comply with sustainability requirements of the EU Common Agricultural Policy (CAP), no EU treaty provisions allow for a common forestry policy with which the RED could direct cross-compliance.[345] If forestry material is used for transportation fuel (again, electricity is exempt from Article 17 sustainability requirements), Member States must maintain an auditing system that provides information about compliance with the RED's sustainability provisions.[346] In turn, the European Commission is to report by the end of 2012 on national measures to ensure sustainability compliance with the RED's sustainability provisions and with impacts on soil, water, and air.[347]

With regard to carbon, the RED requires all qualifying transportation fuels to reduce GHG emissions 35% through 2016, with a 50% reduction starting in 2017 and a 60% reduction in 2018 for new installations.[348] Annex

340. The RED follows the UN FAO definition. *See* FAO 2010 Assessment, *supra* note 29, at 11.

341. RED, *supra* note 9, at art. 17(3).

342. *Id.* at art. 17(4)(b)–(c).

343. Clean Air Act, 42 U.S.C. § 7545(o)(1)(I) (2012) (defining "renewable biomass" as sources from land cleared or cultivated at any time prior to enactment).

344. RED, *supra* note 9, at art. 17(4).

345. *See id.* at art. 17(6).

346. *See id.* at art. 17(7) (requiring the European Commission to report to the European Parliament and Council every two years on national measures taken concerning set sustainability criteria and the impact of increased demand for biofuel on various issues).

347. *Id.*

348. *Id.* at art. 17(2).

V of the RED sets forth GHG pathways for ethanol from "waste wood" and farmed wood methanol.[349] The European Parliament has criticized the Commission's "biofuel criteria" for emissions accounting as "not suitable."[350] It has called on the Commission to create "new legally binding sustainability criteria" for energy biomass that are consistent with other forest policies, do not make the "carbon neutrality assumption," address indirect emissions, and do not undermine biodiversity targets.[351]

As the Parliament's conclusions demonstrate, many aspects of forest sustainability policy in relation to European bioenergy policy are unresolved. The EU is pursuing other ways in which to build and coordinate SFM policy at the Member State and EU levels, which the following sections detail.

B. The EU Forests Strategy

Europe developed a "Forest Strategy" in 1998 to emphasize and support SFM through better coordination and recognition of forest landscape multifunctionality for productivity and environmental and social benefits.[352] The strategy acknowledges the role of the 1993 Helsinki Ministerial Conference on the Protection of Forests in Europe in defining SFM, "Natura 2000" protection areas, and other "Special Conservation Areas" in protecting forest ecosystems.[353] The Forest Strategy further notes the importance of forests as carbon sinks and to that end considers policies developed pursuant to the EU's Kyoto obligations for the protection of carbon stocks.[354] Interestingly, the strategy encourages "the establishment of new carbon stocks" and "the use of biomass and wood-based products,"[355] which is in line with evolving research on sinking carbon in long-lived wood—versus, for example, energy-intensive cement—in construction and other materials.[356] This perhaps evidences future preference in carbon policy for

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349. *Id.* at annex V.

350. Report of the Committee on the Environment, Public Health and Food Safety on the Commission Green Paper on Forest Protection and Information in the EU: Preparing Forests for Climate Change, at 15, EUR. PARL. DOC. A7-0113 (Apr. 1, 2011), *available at* http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A7-2011-0113+0+DOC+PDF+V0//EN.

351. *Id.* at 15–16.

352. Council Resolution of 15 December 1998 on a Forestry Strategy for the European Union, 1999/C, 1999 O.J. (EC) 56/1.

353. *Id.* at 56/3.

354. *Id.*

355. *Id.*

356. *See, e.g.*, Christian Lauk et al., *Global Socioeconomic Carbon Stocks in Long-Lived Products 1900-2008*, 2012 ENVTL. RES. LETTERS 1 (2012) ("A so-far under-researched aspect of the global carbon budget is the accumulation of carbon in long-lived products such as buildings and furniture."); Andrew H. Buchanan & S. Bry Levine, *Wood-Based Building Materials and Atmospheric Carbon Emissions*, 2 ENVTL. SCI. & POL'Y 427–37 (Dec. 1999).

long-lived wood products from forest activities versus combustion for energy. Lastly, the strategy incorporates by reference[357] the Regulation on Protection of the Community's Forests Against Fire, which requires Member States to submit fire protection plans to the Commission.[358]

To implement the strategy, the Commission issued a Communication to the Council and Parliament in 2006 recommending a five-year EU Forest Action Plan.[359] One of the key action items is promoting the use of forest biomass for energy generation.[360] The Commission makes several recommendations and notes that the Standing Forestry Committee[361] supports implementing the Biomass Action Plan.[362] The Biomass Action Plan promises to finance an information campaign on the opportunities for energy biomass production and review the impact of increased forest biomass energy use on the forest products industry.[363] The Plan acknowledges that forest residues must be harvested in a manner that protects soil nutrient balance and prevents erosion, while at the same time it concludes that their harvest helps protect against forest fire.[364] The Forest Action Plan calls for Member State research, funded by the EU Research Framework Program, on the availability of forest-to-energy biomass.[365] Lastly, the Plan calls for further studies on the role of forests in carbon sequestration and how to stop biodiversity loss, including work toward a European Forest Monitoring System and increased Member State sustainability initiatives.[366]

Member States have primary responsibility for SFM regulation, although, in 2012, a workgroup of the Standing Forestry Committee concluded that objectives at the EU level should include devising a globally enforceable strategy and developing a coordinated and coherent energy

357. Council Resolution 1999/C, *supra* note 352, at 56/2.

358. Council Regulation 2158/92, Protection of the Community's Forests Against Fire, art. 3, 1992 O.J. (L 217) 3, 4 (EC).

359. *Communication from the Commission to the Council and the European Parliament on an EU Forest Action Plan*, at 2–3, COM (2006) 302 final (Jun. 15, 2006), *available at* http://ec.europa.eu/agriculture/fore/action_plan/com_en.pdf [hereinafter *EU Forest Action Plan*].

360. *Id.* at 5.

361. *See generally Standing Forestry Committee*, EUR. COMMISSION, http://ec.europa.eu/agriculture/fore/sfc_en.htm (last updated Jan. 1, 2010) (describing the history and role of the Standing Forestry Committee).

362. *Commission of the European Communities, Communication from the Commission, Biomass Action Plan*, at 37, 40–41, COM (2005) 628 final (Dec. 7, 2005).

363. *Id.* at 18.

364. *Id.* at 23.

365. *EU Forest Action Plan*, *supra* note 359, at 5.

366. *Id.* at 7–8.

policy that includes biomass sustainability.[367] To achieve these objectives, the group concluded that some basic principles of sustainable resource use need "firming up," so that sustainably-produced forest biomass can be encouraged.[368] A follow-up report on the success of the Forest Action Plan noted that most conflict has occurred in the triple bottom line approach (which the EU follows in pursuing sustainable development) to forest-based bioenergy because of the tradeoffs between bioenergy, biodiversity conservation, and forest management for climate change.[369]

Despite these difficulties, the European Commission to date has declined to introduce binding criteria for solid-fuel feedstocks.[370] As EU treaties do not support an EU Forestry Directive, it remains unclear whether the EU will take steps to bolster EU-wide standards for SFM. Short of a forestry directive, the EU could place SFM within the RED or future CAP reform in response to criticism that its Forest Strategy concepts are "fuzzy" and "very vague."[371]

C. The Ministerial Conference on the Protection of Forests in Europe

While not strictly an EU policy, EU Member States, the EU, and non-EU member states[372] cooperate on SFM policy through the Ministerial Conference on the Protection of Forests in Europe (MCPFE), otherwise known as Forest Europe.[373] Six Pan-European criteria exist for SFM:

- Maintenance and appropriate enhancement of forest resources and their contribution to global carbon cycles;

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367. STANDING FORESTRY COMM. AD HOC WORKING GRP. VII, CONTRIBUTING TO THE DEVELOPMENT OF A NEW EU FOREST STRATEGY 8 (2012), *available at* http://ec.europa.eu/agriculture/fore/publi/sfc_wg7_2012_full_en.pdf.

368. *Id.*

369. EUROPEAN COMM'N, EX-POST EVALUATION OF THE EU FOREST ACTION PLAN 99 (2012), *available at* http://ec.europa.eu/agriculture/evaluation/market-and-income-reports/2012/forest-action-plan/fulltext_en.pdf.

370. *See Report from the Commission to the Council and the European Parliament on Sustainability Requirements for the Use of Solid and Gaseous Biomass Sources in Electricity, Heating and Cooling*, at 8, COM (2010) 11 final (Feb. 25, 2010), *available at* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0011:FIN:EN:PDF (discussing appropriate action for addressing sustainability issues).

371. FERN, ENHANCING FOREST PROTECTION IS KEY IN FUTURE CAP 5 (2010), *available at* http://www.fern.org/sites/fern.org/files/Forests%20in%20the%20future%20CAP.pdf.

372. Non-EU member state participation in Forest Europe includes: Norway, Iceland, the Russian Federation, Iceland, Turkey, Georgia, Ukraine, Belarus, Cyprus, the Holy See, Andorra, Montenegro, Bosnia and Herzegovina, and Lichtenstein. *See List of Signatory Countries*, FOREST EUR., http://www.foresteurope.org/about_us/list_signatories (last visited May 4, 2013) (listing each signatory country to Forest Europe).

373. *What is Forest Europe?*, FOREST EUR., http://www.foresteurope.org/about_us/foresteurope (last visited May 4, 2013).

- Maintenance of forest ecosystems' health and vitality;
- Maintenance and encouragement of productive functions of forests (wood and non-wood);
- Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems;
- Maintenance, conservation and appropriate enhancement of protective functions in forest management (notably soil and water); and
- Maintenance of other socio-economic functions and conditions.[374]

Forest Europe has created a structure for assessment and monitoring through thirty-five quantitative indicators.[375] With regard to carbon, the indicators call for assessing or monitoring forest areas, their growing stock, the age structure and diameter distribution, and the carbon stock of woody biomass and forest soils.[376] Biodiversity indicators include classifications of tree species composition, deadwood, regeneration, and "naturalness" (undisturbed by man, semi-natural, or plantations). Also, the biodiversity indicators require assessing introduced tree species; genetic resources; landscape patterns; threatened forest species according to the International Union for Conservation of Nature Red List; and forest lands protected to conserve biodiversity, landscapes, and specific natural elements contained in the agreement among the parties.[377] Signatories must monitor forest ecosystem health and vitality, such as soil condition and forest damage;[378] how many forests are under management plans[379] that provide "protective functions" of soils, water resources, and natural hazard avoidance;[380] and the share of wood energy in total energy consumption.[381] Lastly, countries must

374. *SFM Criteria*, FOREST EUR., http://www.foresteurope.org/sfm_criteria/guidelines (last visited May 4, 2013).

375. *Id.*

376. *Forest Resources & Global Carbon Cycles*, FOREST EUR., http://www.foresteurope.org/en/sfm_criteria/criteria/carbon (last visited May 4, 2013).

377. *Forests Biological Diversity*, FOREST EUR., http://www.foresteurope.org/sfm_criteria/criteria/biological-diversity (last visited Apr. 18, 2013); FOURTH MINISTERIAL CONFERENCE ON THE PROTECTION OF FORESTS IN EUROPE, VIENNA RESOLUTION 4, CONSERVING AND ENHANCING FOREST BIOLOGICAL DIVERSITY IN EUROPE 7 (2003), *available at* http://www.foresteurope.org/docs/MC/MC_vienna_resolution_v4.pdf.

378. *Forests Health and Vitality*, FOREST EUR., http://www.foresteurope.org/sfm_criteria/criteria/health (last visited May 4, 2013).

379. *Productive Functions of Forests*, FOREST EUR., http://www.foresteurope.org/sfm_criteria/criteria/functions-and-forests (last visited Apr. 18, 2013).

380. *Id.*

381. *Socioeconomic Functions*, FOREST EUR., http://www.foresteurope.org/sfm_criteria/criteria/socioeconomic-functions (last visited May 4, 2013).

assess the current landscape of policies, institutions, and instruments for SFM and any changes in those policies.[382]

Forest Europe, in cooperation with the European Commission and the United Nations Food and Agricultural Organization, issued guidance in 2010 directly in response to the RED's requirement that Member States put measures in place to promote energy from biomass.[383] In line with the subsidiarity of forest policy, the guidance is not presented in the form of binding BMPs that contain indicators, but instead is a set of project examples, some of which involve silviculture.[384]

Forest Europe reports yearly on the full state of Europe's forests in relation to the criteria and indicators.[385] The 300-plus page report issued in 2011 concludes that most forests in Europe have a management plan and that national SFM programs are being developed and applied increasingly.[386] In light of growing bioenergy demand, however, the report notes that problems with monitoring and measuring forest biodiversity must be solved and reconciled with energy biomass demand.[387]

D. Forest Focus and LIFE+

Europe began monitoring the impacts of air pollution and fire on forests as early as 1986.[388] In 2003, the Forest Focus Regulation established an EU-wide regime for coordinated monitoring of forest conditions for the years 2003–2006.[389] To avoid reporting overlap with Forest Europe, Forest Focus was replaced in 2007 with the Financial Instrument for the Environment (LIFE+), which is the main EU program for funding nature and biodiversity; environmental policy and governance; and information and communication relating to soils, carbon sequestration, biodiversity, climate change, and protective functions of forests.[390] With regard to forestry, priority areas of

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382. *Forest Policies, Institutions & Instruments*, FOREST EUR., http://www.foresteurope.org/sfm/forest-policies-institutions-instruments (last visited May 4, 2013).

383. FOREST EUR., GOOD PRACTICE GUIDANCE ON THE SUSTAINABLE MOBILISATION OF WOOD IN EUROPE 6 (2010), *available at* http://www.foresteurope.org/documentos/Wood_Mobilisation_Guidance_Report.pdf.

384. Directive 2011/92, art. 5, 2011 O.J. (L 26) 4 (EU).

385. FOREST EUR. ET AL., STATE OF EUROPE'S FORESTS 2011 6 (2011), *available at* http://www.foresteurope.org/docs/SoEF/reports/State_of_Europes_Forests_2011_Report_Revised_November_2011.pdf.

386. *Id.* at 7–8.

387. *Id.* at 11.

388. Commission Regulation 2152/2003 of the European Parliament and the Council of 17 November 2003 Concerning Monitoring of Forests and Environmental Interactions in the Community (Forest Focus), 2003 O.J. (L 324) 2.

389. *Id.* at 2, 6.

390. *Id.* at 2; Regulation (EC) No 614/2007 of the European Parliament and the Council of 23

action include collection of information and harmonizing monitoring activities; "stimulating synergies" between forest issues and other environmental initiatives, such as Natura 2000, soil protection, and the Water Framework Directive; and "contributing to sustainable forest management" by providing data to Forest Europe's indicator program.[391]

In 2010, the soil and biodiversity projects funded by the two regulations presented results, representing the first EU-level assessment of forest biodiversity components ever conducted.[392] Although touted as the "EU's financial instrument supporting environmental and nature conservation projects throughout the EU," and after having "co-financed some 3115 projects"[393] at a cost of €2 billion,[394] the Commission concluded in a 2010 report that the monitoring network established by Forest Focus "does not provide enough representative information on the state of EU forests and the resources and funds deployed in such a network are very high."[395] A Commission Green Paper published in 2010 also noted that only one-third of EU forest habitats are in a "favourable conservation status," strongly evidencing the need in Europe for both more research and more effective and coordinated policies to protect forest habitats.[396] This could include application of harmonized SFM metrics at the EU level through the RED or the CAP.

May 2007 Concerning the Financial Instrument for the Environment (LIFE+), art. 4, 2007 O.J. (L 149) 1, 4.

391. Regulation (EC) No 614/2007, *supra* note 390, at Annex II.

392. EUR. COMM'N, *Report from the Commission to the European Parliament and the Council on the Implementation of the Forest Focus Scheme According to Regulation (EC) No 2152/2003 of the European Parliament and of the Council of 17 November 2003 Concerning Monitoring of Forests and Environmental Interactions in the Community (Forest Focus)—Final Report* at 6, COM (2010) 430 final (Aug. 26, 2010) [hereinafter *Forest Focus Report*]; EUR.COMM'N, FOREST SOIL AND BIODIVERSITY MONITORING IN THE EU 5 (2010), *available at* http://ec.europa.eu/environment/forests/pdf/biosoil_brochure2010.pdf; *Forest Focus*, EUROPEAN COMMISSION, http://ec.europa.eu/environment/forests/ffocus.htm (last visited Apr. 18, 2013) (noting that the BioSoil project concerned "the monitoring of forest and environmental interactions" in the Community).

393. *Good Practices Promote Sustainable Forest LIFE*, SCI. FOR ENV'T POL'Y, Sept. 2010 at 9, 10, *available at* http://ec.europa.eu/environment/integration/research/newsalert/pdf/23si.pdf. For a list of forest-specific projects, see *Forest: Sustainable Management*, EUR. COMMISSION, LIFE PROGRAMME, http://ec.europa.eu/environment/life/themes/forest/lists/management.htm (last updated Nov. 20, 2012).

394. *Good Practices Promote Sustainable Forest LIFE*, *supra* note 393, at 9, 10.

395. *Forest Focus Report*, *supra* note 392, at 7.

396. *Commission Green Paper on Forest Protection and Information in the EU: Preparing Forests for Climate Change* at 8–9, COM (2010) 66 final, *available at* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0066:FIN:EN:PDF; *see also Report from the Commission to the Council and the European Parliament, Composite Report on the Conservation Status of Habitat Types and Species as Required Under Article 17 of the Habitats Directive*, at 16, COM (2009) final (July 13, 2009) [hereinafter *Habitats Directive Report*] (noting that more species and habitats are reaching favorable conservation status, although reports indicate not many have reached that status yet).

E. Common Agricultural Policy Rural Development Funding

Since 1964, the EU has provided financial support for forestry.[397] In 2000, Council Regulation No. 1257 integrated forestry support into the European Agricultural Guidance and Guarantee Fund,[398] which was later replaced in 2007 by the European Agricultural Fund for Rural Development (EAFRD).[399] This is known as the "second pillar" of the CAP; the first being direct support measures under Pillar One for agricultural commodities.[400] Rural development funding is divided into four axes, including Axis 2, which focuses on environmental improvement of the agricultural and forestry sector.[401] Within Axis 2, seven measures address the sustainable use of forestry land, including afforestration, agroforestry systems, Natura 2000 payments, and forest-environment payments.[402] Uptake of agroforestry under rural development has been low, however, primarily because farmers risk losing Pillar One support for the land.[403] Between 2007 and 2010, Measure 225 (forest-environment) funded 750 projects to enhance biodiversity covering almost 50,000 hectares, 274 projects to preserve high-value ecosystems on almost 10,000 hectares, 3,071 projects to address soil erosion

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397. *Special Report of the Court of Auditors on Forestry Measures Within Rural Development Policy, Together With the Commission's Replies*, 2005 O.J. (C 67) 1, 6 [hereinafter *Court of Auditors Report*].

398. Council Regulation 1257/1999, Support for Rural Development from the European Agricultural Guidance and Guarantee Fund (EAGGF), art. 54, 1999 O.J. (L 160) 80, 100 (EC) [hereinafter EAGGF Regulation].

399. Council Regulation 1698/2005, Support for Rural Development by the European Agricultural Fund for Rural Development (EAFRD), art. 39, 2005 O.J. (L 227) 1, 20 (EC) [hereinafter EAFRD Regulation].

400. *See* GAY S.H. ET AL., RECENT EVOLUTION OF THE EU COMMON AGRICULTURAL POLICY (CAP): STATE OF PLAY AND ENVIRONMENTAL POTENTIAL 3, 5 (2005), *available at* http://www.ieep.eu/assets/ 224/WP6D4B_CAP.pdf (explaining the 2003 CAP, recent reforms, and expected future changes).

401. *Axes and Measures*, EUR. COMMISSION, http://enrd.ec.europa.eu/policy-in-action/rural-development-policy-overview/axes-and-measures/en/axes-and-measures_en.cfm (last visited May 4, 2013).

402. *Menu of RDP Axis 2 Measures*, EUR. COMMISSION, http://enrd.ec.europa.eu/policy-in-action/rural-development-policy-overview/axes-and-measures/en/axis2_en.cfm (last visited May 4, 2013); *Measures Information* Sheets, EUR. COMMISSION, http://enrd.ec.europa.eu/policy-in-action/rural-development-policy-in-figures/measures-information-sheets/en/measures-information-sheets_en.cfm (last visited May 4, 2013) (detailing how many hectares enrolled and how many Euros were spent on each measure). *See also* EAGGF Regulation, *supra* note 398, at 29 (providing support for forestry programs).

403. EUROPEAN AGROFORESTRY FED'N, RECOMMENDATIONS FOR CHANGES TO CAP REFORM PROPOSALS TO INCREASE SUPPORT FOR AGROFORESTRY IN EUROPE 1 (Feb. 7, 2012), *available at* http://www.organicadvice.org.uk/agrforestry%20presentations/jo.EURAFF%20CAP%20reform%20working%20group%20recommendations.pdf.

on approximately 35,000 hectares, and thirty water quality projects on 815 hectares.[404]

A Court of Auditors report in 2005 concluded that Member States define "forests" differently and that leadership in implementing forest strategies between the EU and Member States is unclear.[405] Thus, "neither the Commission nor the Member States assumed responsibility for assessing whether a project contributed to the achievement of the EU forestry strategy."[406] Like with Forest Focus funding, the Auditors concluded that the European Commission must make its forestry policy more coherent.[407] The Auditors also found that the EU provides support under the assumption that national or subnational forestry programs are in place, which is "rarely" true and, where available, "quality is very varied."[408] The Auditors did not provide concrete evidence to support these conclusions, however, and thus each Member State program would have to be analyzed individually to determine specifics.

In the UK, for example, the England Forestry Commission has developed a Woodfuel Implementation Plan for 2011–2014.[409] Its first listed action indicates that sustainability criteria for power generation are being developed to "maximise carbon savings" and protect woodlands and forests while keeping administrative burdens at a minimum.[410] The UK Forestry Standard contains both legal requirements and good forestry practice requirements that take into account the Forest Europe criteria and indicators and EU Directives.[411] The standard also addresses carbon and short-rotation energy crops (e.g., chemical management in coppicing).[412] A scoping study reviewing options for future forestry policy instruments in the UK has recognized that forest carbon sequestration "would require careful consideration of the measurement, monitoring, verification, and reversibility criteria."[413] Therefore, it appears that at least the UK is taking steps to address

404. EUROPEAN NETWORK FOR RURAL DEVELOPMENT, OUTPUT INDICATORS: REALIZED 2007–2010, MEASURE 225: FOREST-ENVIRONMENT PAYMENTS 10, *available at* http://enrd.ec.europa.eu/app_templates/filedownload.cfm?id=D0F18B2B-0DAA-767C-4898-FC2456E7715A.

405. *Court of Auditors Report*, *supra* note 397, at 7.

406. *Id.* at 9.

407. *Id.* at 16.

408. *Id.*

409. FORESTRY COMM'N, WOODFUEL IMPLEMENTATION PLAN 2011–2014 1 (2011), *available at* http://www.forestry.gov.uk/pdf/FCE_WIP_Web.pdf/$FILE/FCE_WIP_Web.pdf.

410. *Id.* at 13.

411. FORESTRY COMM'N, THE UK FORESTRY STANDARD 3, 7, 12 (2011), *available at* http://www.forestry.gov.uk/pdf/FCFC001.pdf/$FILE/FCFC001.pdf.

412. *Id.* at 57, 64–65.

413. ANDREW MOXEY, PARETO CONSULTING, SCOPING STUDY TO REVIEW FORESTRY POLICY INSTRUMENTS IN THE UK 6 (2008), *available at* http://www.forestry.gov.uk/pdf/ForestryPolicyInstrumentsDocFinal.pdf/$FILE/ForestryPolicyInstrumentsDocFinal.pdf.

SFM generally and issues unique to bioenergy. While its rural development national strategy for EAFRD funding contains no detail on how funding for sustainable forestry relates to the Forestry Standard,[414] a mid-term review of EAFRD implementation in England used surveys of funding recipients to determine its success.[415] It concluded that "[t]here is an absence of on the ground evidence for environmental benefits" but that in the coming years more evidence will be available.[416]

EAFRD funding ultimately is contingent, however, on Member State assurance that projects comply with any acts adopted under the Treaty—in essence, cross-compliance with EU-level environmental and biodiversity directives such as the Water Framework Directive, Habitats Directive, and Wild Birds Directive.[417] For example, as of 2012, the Good Agricultural and Environmental Condition (GAEC) requirement includes establishing buffer strips along water courses.[418] In the end, the key to determining whether forests can be managed sustainably in a new bioenergy paradigm is whether existing EU and Member States' laws and incentives are being implemented effectively at the Member State and subnational level.

F. Biodiversity Protection

Member States' ratification of the Convention on Biological Diversity (CBD) and the EU's acceptance of the treaty require obligated parties to develop national strategies to conserve and use biodiversity sustainably.[419] The Habitats Directive requires Member States to maintain or restore protected habitats and species of "fauna and flora" listed in Annexes I and II of the Directive at a "favourable conservation status" through an ecological network of special areas of conservation (SACs).[420] As part of Natura 2000, Member States, in cooperation with the European Commission, propose sites and species of community importance for listing in the annexes, including priority habitats and species that are in danger of disappearing.[421] Species of

414. UK, DRAFT SUBMISSION TO THE EU, RURAL DEVELOPMENT NATIONAL STRATEGY PLAN (Dec. 21, 2006), *available at* http://archive.defra.gov.uk/rural/documents/rdpe/ukstrategy.pdf.

415. JOHN ELLIOTT, DEFRA RURAL DEVELOPMENT PROGRAM FOR ENGLAND 2007–2013, at 3–4 (2010), *available at* http://ec.europa.eu/agriculture/rurdev/countries/uk/mte-rep-uk-england_en.pdf.

416. *Id.* at 175.

417. EAFRD Regulation, *supra* note 399, at art. 5, 9.

418. *Habitats Directive Report*, *supra* note 396, at 3.

419. *See* Convention on Biological Diversity art. 6(a), *opened for signature* June 5, 1992, 1760 U.N.T.S. 79 (entered into force Dec. 29, 1993) (stating general measures for conservation and sustainable use).

420. Council Directive 92/42, Conservation of Natural Habitats and of Wild Fauna and Flora, art. 2, 3, 1992 O.J. (L 206) 7 (EC) [hereinafter Habitats Directive].

421. *Id.* at art. 4.

community interest are ranked as endangered, vulnerable, rare, or endemic.[422] Once listed, Member States must establish necessary conservation measures for SACs to avoid disturbance and degradation, including prohibitions against killing or destroying animal and plant species.[423] Member States may grant exceptions to these restrictions under certain circumstances, including those of "a social or economic nature."[424] Member States must "endeavor" in development planning to consider connectivity of habitats and those "essential for the migration, dispersal and genetic exchange of wild species."[425]

The EU co-finances Natura 2000 projects, but one study has found that Member States are not meeting their funding obligations, particularly for projects that require continued management.[426] This likely explains, at least in part, why the EU's 2010 biodiversity targets have not been met.[427] The Commission has issued a strategy, specifically including targets for SFM, that is in effect through 2020 for Member States to incorporate.[428] In particular, all publically owned forests and private forests that receive funding under the EAFRD and LIFE+ will have forest management plans in place to "bring about a measurable improvement in the conservation status of species and habitats."[429] This includes maintaining optimal levels of deadwood and "specific measures developed for Natura 2000 forest sites."[430]

The Wild Birds Directive provides companion protections for birds, eggs, nests, and their habitats.[431] Member States must take special conservation measures to maintain habitat for endangered and rare species, for those vulnerable to changes in their habitat, and for other species requiring particular attention because of the specific nature of their habitat.[432] Member States also must designate "special protection areas" to conserve bird species

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422. *Id.* at art. 1(g).

423. *Id.* at art. 12, 13.

424. *Id.* at art. 16(1)(c).

425. *Id.* at art. 10.

426. M. KETTUNEN ET AL., INST. FOR EUROPEAN ENVT'L POL'Y, ASSESSMENT OF THE NATURA 2000 CO-FINANCING ARRANGEMENTS OF THE EU FINANCING INSTRUMENT 6 (2011), *available at* http://ec.europa.eu/environment/enveco/biodiversity/pdf/assessment_natura2000.pdf.

427. *See Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions, Our Life Insurance, Our Natural Capital: An EU Biodiversity Strategy to 2020*, at 2, COM (2011) 244 final, (May 3, 2011), *available at* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0244:FIN:EN:PDF [hereinafter *2020 Biodiversity Action Plan*] (noting that "the 2020 biodiversity target would not be met").

428. *Id.* at 6.

429. *Id.* at 6, 13.

430. *Id.* at 14.

431. Directive 2009/147, of the European Parliament and of the Council of 30 November on the Conservation of Wild Birds, art. 1, 2010 O.J. (L. 20) 7, 9 (EC).

432. *Id.* at art. 4.

listed in Annex I[433] and establish a system that prohibits killing listed birds or destroying their habitat.[434]

Unlike with agricultural subsidies paid through the CAP, and as demonstrated by critical evaluations of the EU Forest Strategy, the EU has no incentive mechanism to assure cross-compliance with biodiversity-related directives other than through EAFRD and LIFE+ project funding.[435] A review of tools and results available through agricultural subsidies to encourage implementation and compliance with EU biodiversity law demonstrates what is missing at the EU level for forestry as well as what may be possible in the future to improve forest habitats. For example, for the agricultural sector, the EU has put in place biodiversity action plans and cross-compliance requirements including Member State Statutory Management Requirements (SMRs).[436] It also has kept land in GAEC[437] and agri-environmental measures in the EAFRD.[438] The action plan through 2020 calls for marked improvements in assessments and species conservation in line with global improvements in protections,[439] including bringing more agricultural areas under biodiversity requirements contained in the CAP.[440]

Within the agricultural context, many of the protections required by the Habitats and Wild Birds Directives are achieved through SMRs and GAECs. Member States implement SMRs and GAECs, which include practices related to habitats and wildlife. For example, in the UK, SMR 1 incorporates prohibitions from the Wild Birds Directive with regard to wild birds,[441] and

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433. *Id.*

434. *Id.* at art. 5.

435. The EU may institute infringement proceedings against a Member State for failure to implement and apply EU law under Article 258 of the Treaty of the Functioning of the European Union. *Legal Enforcement*, EUR. COMMISSION, *available at* http://ec.europa.eu/environment/legal/law/procedure.htm (last visited May 4, 2013).

436. *Communication from the Commission to the Council and the European Parliament–Biodiversity Action Plan for Economic and Development Co-operation*, § 1.2, COM (2001) 162 final, (Mar. 27, 2001), *available at* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52001DC0162(05):EN:HTML; *2020 Biodiversity Action Plan*, *supra* note 427, at 6.

437. Council Regulation 73/2009, Establishing Common Rules for Direct Support Schemes for Farmers Under the Common Agricultural Policy and Establishing Certain Support Schemes for Farmers, art. 5, 6, Annex II, III, 2009 O.J. (L 30) 16, 24 (EC).

438. EAFRD Regulation, *supra* note 399, at art. 20, 39 (establishing cross-compliance as a baseline).

439. *See COP 10 Decision X/2, X/2 Strategic Plan for Biodiversity 2011-2020*, CONVENTION ON BIOLOGICAL DIVERSITY, http://www.cbd.int/decision/cop/?id=12268 (last visited Apr. 18, 2013) (noting the twenty new targets known as "Aichi targets" and commenting that parties to the CBD have agreed to produce national indicators to track progress toward these targets).

440. *2020 Biodiversity Action Plan*, *supra* note 427, at 6.

441. RURAL PAYMENTS AGENCY, DEP'T FOR ENV'T, FOOD & RURAL AFFAIRS, THE GUIDE TO CROSS COMPLIANCE IN ENGLAND 43 (2013), *available at* http://rpa.defra.gov.uk/rpa/index.nsf/

SMR 5 contains the prohibitions related to habitats and species under the Habitats Directive.[442] Under GAEC 5, producers must conduct an environmental assessment to protect uncultivated land and semi-natural areas from agricultural production damage and review potential environmental degradation from "restructuring" projects that increase inputs, drain land, or clear vegetation.[443] Other GAECs protect Sites of Special Scientific Interest (SSSI), prevent overgrazing, encourage controlled burning to foster wildlife habitat, and protect hedgerows.[444] Natural England provides maps of SSSIs and Biodiversity Action Plan Priority Habitats.[445]

Like other Member States, the UK periodically assesses its progress toward achieving its biodiversity goals and commitments under the CBD. In its latest assessment, the Department for Environment, Food and Rural Affairs concluded that although plant diversity on arable lands has improved, the population of breeding farmland birds over the long-term has declined.[446]

G. Green Procurement

The EU maintains voluntary Green Public Procurement (GPP) measures as a "complement" to Ecodesign and Ecolabelling Directives.[447] The EU has recommended that Member States adopt national action plans for GPP according to harmonized procurement procedures contained in a 2004

7801c6143933bb248025713f003702eb/C469AD87D7F02D5F80257AC5003B49BF/$FILE/cross%20compliance%20guidance%202013%20v1%200.pdf.

442. *Id. Compare Habitats and Species (SMR 5)*, RURAL PAYMENTS AGENCY (Jan. 11, 2013) http://rpa.defra.gov.uk/rpa/index.nsf/293a8949ec0ba26d80256f65003bc4f7/4842372e89122fef802573aa00550ea7!OpenDocument (prohibiting anyone from "deliberately pick[ing], collect[ing], cut[ting], uproot[ing] or destroy[ing]" wild plants protected in Europe), *with* Habitats Directive, *supra* note 420, at art. 13 (requiring Member States to adopt prohibitions against "deliberate picking, collecting, cutting, uprooting or destruction of [protected] plants in their natural range in the wild").

443. *See generally* RURAL PAYMENTS AGENCY, DEPT. FOR ENV'T., FOOD & RURAL AFFAIRS, GUIDANCE TO CROSS COMPLIANCE IN ENGLAND: MANAGEMENT OF HABITATS AND LANDSCAPE FEATURES, 10 (2011), *available at* http://rpa.defra.gov.uk/rpa/index.nsf/0/06839f56a79913a880257850004ed22f/$FILE/Cross%20compliance%20Habitats%20and%20Landscape%20Features%20v1.0.pdf (describing the importance of the environmental impact assessments in determining the environmental effects on agricultural development on uncultivated lands).

444. *Id.*; *Standards of Good Agricultural and Environmental Condition*, DEP'T FOR ENV'T, FOOD & RURAL AFFAIRS (Sept. 7, 2012), https://www.gov.uk/standards-of-good-agricultural-and-environmental-condition.

445. *Nature on the Map*, NATURAL ENGLAND, *available at* http://www.natureonthemap.naturalengland.org.uk/map.aspx (last visited May 4, 2013).

446. DEP'T FOR ENV'T, FOOD & RURAL AFFAIRS, UK BIODIVERSITY INDICATORS IN YOUR POCKET 2011 4, 5 (2011), *available at* http://jncc.defra.gov.uk/pdf/BIYP_2011.pdf.

447. *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan*, at 7, COM (2008) 397 (July 16, 2008), *available at* http://ec.europa.eu/environment/eussd/pdf/com_2008_397.pdf.

Directive.[448] For transport, additional points are awarded for use of alternative fuels.[449] Alternative fuels include biofuels,[450] such as biomass, that "[w]here possible . . . should be derived from renewable energy sources."[451] No additional specificity is provided concerning sustainability, including for forest-derived biofuels. For electricity, however, "renewability" is defined through incorporation by reference of the RED.[452] At the Member State level, the UK maintains government buying standards for transport, but provides no additional guidance on the meaning of "biofuels."[453]

H. The Timber Regulation

EU regulation of timber sourced from illegal logging will come into effect in 2013,[454] some five years after the U.S. enacted the Lacey Act logging provisions.[455] The Timber Act requires traceability of timber suppliers, and traders must exercise "due diligence" (similar to the U.S. "due care" standard) to ensure that timber from illegal logging is not sold in the EU.[456] One element of due diligence is a method for evaluating the risk of illegal harvest, including a mechanism to determine compliance with the source country's legislation.[457] The Timber Act states that this method "may include

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448. *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions—Public Procurement for a Better Environment*, at 2, COM (2003) 400 final (July 16, 2008), *available at* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0400:FIN:EN:PDF (citing Directive 2004/17, of the European Parliament and of the Council of 31 March 2004 Coordinating the Procurement Procedures of Entities Operating in the Water, Energy, Transport and Postal Services Sectors, 2004 O.J. (L 134) 1 (EC), *available at* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:134:0001:0113:en:PDF; Directive 2004/18 of the European Parliament and of the Council of 31 March 2004 on the Coordination of Procedures for the Award of Public Works Contracts, Public Supply Contracts and Public Service Contracts, 2004 O.J. (L 134) 114 (EC), *available at* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:134:0114:0240:EN:PDF).

449. EUROPEAN COMM'N, EU GPP CRITERIA FOR TRANSPORT 10 (2012), *available at* http://ec.europa.eu/environment/gpp/pdf/criteria/transport.pdf.

450. *Id.*

451. *Id.* at 12.

452. EUROPEAN COMM'N, EU GPP CRITERIA FOR ELECTRICITY 3 (2012), *available at* http://ec.europa.eu/environment/gpp/pdf/criteria/electricity.pdf.

453. *Transport Standards V4.0*, DEPT. FOR ENV'T, FOOD & RURAL AFFAIRS, http://sd.defra.gov.uk/advice/public/buying/products/transport/standards/ (last modified Mar. 30, 2011).

454. *See* Council Regulation 995/2010, of the European Parliament and of the Council of 20 October 2010 Laying Down the Obligations of Operators Who Place Timber and Timber Products on the Market, 2010 O.J. (L 295) 23, *available at* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:295:0023:0034:EN:PDF (entering into effect March 2013) [hereinafter Timber Regulation].

455. *See supra* Section I.B.1.e (Lacey Act).

456. Timber Regulation, *supra* note 454, art. 5–6.

457. *Id.* at art. 6(1)(b).

certification or other third-party-verified schemes."[458] The regulation applies to "fuel wood," and thus arguably the Act will provide an additional overlay of forest protection for imported, bioenergy feedstocks destined for RED-qualifying energy generation.[459]

III. INTERNATIONAL SFM REGIMES

The sustainability of forest practices, particularly deforestation, has been the focus of several international efforts over the past twenty years. Deforestation continues to be the focus in light of forests' role in mitigating climate change. The various processes fall into three basic categories: (1) UN efforts emanating from the 1992 Rio Summit primarily dealing with deforestation, (2) regionally based SFM intergovernmental organizations, and (3) bioenergy-specific international entities primarily focused on climate change mitigation.[460]

In addition to the Forest Principles statement,[461] the parties to the Rio "Declaration of Environment and Development" issued Chapter 11 of Agenda 21 to combat deforestation.[462] While recognizing the multiple uses of forests, the document emphasizes the need for sustainable management practices including cataloging and classifying forests to protect ecosystem values and developing nonindustrial and industrial planted forests to relieve development pressure on native forests, which include interplanting.[463] The document further recognizes the need to assess the "full value" of goods and services that forests provide and the effect of policies, including incentives, on better sustainable management.[464] Chapter 11 also implores countries to implement planning procedures that will improve forest resources continuously.[465]

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458. *Id.*

459. *Id.* at annex.

460. *See infra* notes 477, 483–90, 493 and accompanying text.

461. *See supra* note 28. *See generally* Matthew B. Royer, *Halting Neotropical Deforestation: Do the Forest Principles Have What it Takes?* 6 DUKE ENVTL. L. & POL'Y F. 105, 107 (1996) (discussing the efficacy of the Forest Principles).

462. David Hodas, *The Climate Change Convention and Evolving Legal Models of Sustainable Development*, 13 PACE ENVTL. L. REV. 75, 77, 83 (1995); Edith Brown Weiss, *United Nations Conference on Environment and Development: Introductory Note*, 31 I.L.M. 814, 814 (1992); *Combating Deforestation*, UN ENV'T PROGRAMME, http://www.unep.org/documents.multilingual/default.asp?DocumentID=52&ArticleID=59&l=en (last visited May 4, 2013).

463. *Combating Deforestation*, *supra* note 462, § 11.13 (management-related activities).

464. *Id.* § 11.22.

465. *Id.* § 11.31.

Subsequently, various bodies were formed to implement Agenda 21's forest provisions, with over 270 proposals for SFM considered.[466] The work culminated in 2008 in a nonbinding agreement, approved by the UN General Assembly, strengthening and enhancing commitments to SFM and establishing a framework for national implementation by 2015.[467] Among other provisions, the agreement calls upon Member States to: (1) "reverse the loss of forest cover," (2) enhance ESE benefits, (3) increase protected areas and the proportion of forest products from sustainably managed forests, and (4) increase development assistance for sustainable forest management.[468] To achieve these goals, the agreement recommends several actions, including developing criteria and indicators consistent with the seven mentioned in this Article's introduction, and use of voluntary standards.[469] Unfortunately, while all of these efforts appear to be a step in the right direction, one recurrent theme throughout the past twenty years of UN consensus building has been the failure to enact a binding international code of sustainable forest practices.[470] In addition to the ramifications for combatting deforestation and providing a framework for future forest bioenergy standards at the international level, failure to arrive at an international agreement has negative trade implications.[471]

Contemporaneously with the UN's efforts to implement the environmental and development provisions of Agenda 21, other international groups began forming to promote SFM. These groups include Forest Europe (formerly the MCPFE),[472] the Intergovernmental Panel on Forests (IPF) and Intergovernmental Forum on Forests (IFF),[473] the Committee on Forestry of the UN Food and Agriculture Organization,[474] the Montréal Process,[475] the

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466. *See About UNFF: History and Milestones of International Forests Policy*, UN FORUM ON FORESTS, http://www.un.org/esa/forests/about-history.html (last visited Apr. 18, 2013) (detailing the implementation history, including the Intergovernmental Panel on Forests, the Intergovernmental Forum on Forests, the Interagency Task Force on Forests, the UN Forum on Forests, and the Collaborative Partnership on Forests).

467. *Id.* (citing Non-Legally Binding Instrument on All Types of Forests, G.A. Res. 62, at 3, U.N. Doc. A/RES/62/98 (Jan. 31, 2008)).

468. G.A. Res. 62, *supra* note 467, at 4–5.

469. *Id.* at 4, 6.

470. Long, *supra* note 2, at 5–6.

471. *See generally* Nathalie Chalifour, *Global Trade Rules and the World's Forests: Taking Stock of the World Trade Organization's Implications for Forests*, 12 GEO. INT'L ENVTL. L. REV. 575 (2000) (exploring relationship between and implications of trade liberalization under the WTO for forests).

472. *See supra* Section II.C.

473. *About UNFF, IPF/IFF Process (1995–2000)*, UN FORUM ON FORESTS, http://www.un.org/esa/forests/ipf_iff.html (last visited Apr. 18, 2013).

474. *Forests: A Green Pathway for Human Development*, COMM. ON FORESTRY, FOOD & AGRIC. ORG. OF THE UN, http://www.fao.org/forestry/cofo/en/ (last visited Apr. 18, 2013).

475. THE MONTRÉAL PROCESS, *supra* note 28.

International Tropical Timber Organization,[476] and the Convention on Biological Diversity.[477] These organizations are at the forefront of the sustainable forestry movement and have been instrumental in crafting guidance for sustainable management of world forests.[478]

Although they have not agreed to binding GHG emissions limitations post-Kyoto, parties to the United Nations Framework Convention on Climate Change (UNFCCC) and the CBD have expressed their continued support for combatting carbon emissions through the United Nations' Reducing Emissions from Deforestation and Forest Degradation (REDD+) program.[479] Developed countries provide financial incentives through REDD+ to developing and underdeveloped countries to combat deforestation not only for carbon reduction, but also for SFM.[480] The framework policy is aimed more at natural forests.[481] However, the monitoring that is being set up for biodiversity and carbon accounting could contribute valuably to any international effort to address bioenergy accounting or, in the case of California, Cap-and-Trade programs that seek to qualify international offset projects.

The Global Bioenergy Partnership (GBEP), consisting of "23 Partner countries and 13 Partner international organizations, along with 23 countries and 11 international organizations that participate as Observers," formed in 2006 to support "biomass and biofuels deployment, particularly in developing countries where biomass use is prevalent."[482] In 2011, it issued

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476. *See About ITTO*, INT'L TROPICAL TIMBER ORG., http://www.itto.int/about_itto/ (last visited Apr. 18, 2013) (explaining ITTO's history, purpose, and organizational structure).

477. *History of the Convention*, CONVENTION ON BIOLOGICAL DIVERSITY, http://www.cbd.int/history/ (last visited Apr. 18, 2013).

478. *See, e.g.*, MONTRÉAL PROCESS WORKING GROUP, TECHNICAL NOTES ON IMPLEMENTATION OF THE MONTREAL PROCESS CRITERIA AND INDICATORS 38–39 (3d ed. Jun. 2009), *available at* http://www.montrealprocess.org/documents/publications/techreports/2009p_2.pdf (including a criterion for measuring carbon fluxes following IPCC guidelines); INT'L TROPICAL TIMBER ORG., MANUAL FOR PROJECT FORMULATION app. 82 (2009), *available at* http://www.itto.int/direct/topics/topics_pdf_download/topics_id=2192&no=0&disp=inline (providing guidelines "to prevent, control, or mitigate any negative environmental impacts that may arise" from implementing a project); SECRETARIAT OF THE CONVENTION ON BIOLOGICAL DIVERSITY, SUSTAINABLE FOREST MANAGEMENT, BIODIVERSITY AND LIVELIHOODS: A GOOD PRACTICE GUIDE (2009), *available at* http://www.cbd.int/development/doc/cbd-good-practice-guide-forestry-booklet-web-en.pdf (explaining that the purpose of the Secretariat is "to support the goals of the Convention").

479. *About the UN-REDD Programme*, UN-REDD PROGRAMME, http://www.un-redd.org/AboutUN-REDDProgramme/tabid/102613/Default.aspx (last visited Apr. 18, 2013).

480. Barney Dickson & Valerie Kapos, *Biodiversity Monitoring for REDD+*, 4 CURRENT OPINION IN ENVTL. SUSTAINABILITY 717, 717 (2012).

481. *Id.* at 718.

482. GLOBAL BIOENERGY P'SHIP, THE GLOBAL BIOENERGY PARTNERSHIP SUSTAINABILITY INDICATORS FOR BIOENERGY FIRST EDITION vi (2011), *available at* http://www.globalbioenergy.org/

over 220 pages of indicators for sustainable bioenergy production that include considerations for forestry.[483] For example, with regard to soil quality, the indicator "aims to monitor the influence of bioenergy production on soil quality," including consideration of how extracting forestry residues could contribute to declines of organic carbon levels in soil.[484] The indicator even references the international forestry standards like the Montréal Process.[485] Indicator 3 directly addresses harvest levels of wood resources.[486] It acknowledges overlap with other indicators such as GHG emissions, soil quality, water use and efficiency, and water quality, as well as social considerations related to depriving developing countries' populaces of wood for cooking and heating.[487] The indicator stresses management for sustained yields, which requires monitoring how much wood is removed annually.[488] In countries that conduct inventories, which the U.S. and EU do to varying degrees,[489] this can be achieved; however, where illegal logging occurs, meeting the indicator would be limited.[490] The biodiversity indicator also relies on spatial information and monitoring, but it recognizes that forest conversion can be "much more difficult to detect and also has different implications for biodiversity."[491]

The group encourages establishing national databases of high biodiversity areas, common definitions of biodiversity (with reference to many international standards' methods), and surveys of practices on the ground to establish causal links between bioenergy production and its effect on biodiversity.[492] The GBEP also developed a common methodological framework for lifecycle calculation of GHG emissions in the form of a checklist that addresses questions commonly identified with carbon accounting.[493] The methodology, however, neither seeks answers to these questions, nor addresses the complexity of forest carbon accounting.

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fileadmin/user_upload/gbep/docs/Indicators/The_GBEP_Sustainability_Indicators_for_Bioenergy_FINAL.pdf.

483. *Id.*

484. *Id.* at 40.

485. *Id.* at 44.

486. *Id.* at 48.

487. *Id.*

488. *Id.* at 49.

489. *See supra* notes 43 (US), 375 (EU).

490. GLOBAL BIOENERGY P'SHIP, *supra* note 482, at 50.

491. *Id.* at 88.

492. *Id.*

493. *Id.* at 33–38; GLOBAL BIOENERGY P'SHIP, THE GLOBAL BIOENERGY PARTNERSHIP COMMON METHODOLOGICAL FRAMEWORK FOR GHG LIFECYCLE ANALYSIS OF BIOENERGY, VERSION ONE 1 (2010), *available at* http://www.globalbioenergy.org/fileadmin/user_upload/gbep/docs/GHG_clearing_house/GBEP_Meth_Framework_V_1.pdf.

IV. PRIVATE SFM STANDARDS

At least thirty national and international forest certification schemes exist,[494] and legal scholarship abounds discussing how these various voluntary certification regimes generally operate.[495] Their components address legal compliance, harvesting rates, soil fertility, sustainable harvesting levels, and water quality, and they also may refer to state-level BMPs.[496] The Forest Stewardship Council (FSC)[497] and Sustainable Forestry Initiative (SFI)[498] are among the leading international certification programs.[499] While certification schemes have a number of driving principles, criteria, and indicators in common, the two competing regimes often are compared and distinguished in light of the fact that FSC is advocated by environmental groups, and SFI by industry.[500]

For example, FSC and SFI take different approaches to the prohibitions against conversion of certain lands or forests and biodiversity protections contained in U.S. and EU bioenergy policies. Under the FSC standard, converting natural forests to plantations or any other land use is prohibited unless it requires very limited forestry management; does not occur on a forest area labeled with a High Conservation Value (HCV); and the

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494. *About Forest Certification*, YALE, http://www.yale.edu/forestcertification/links.html (last visited May 4, 2013).

495. *See, e.g.*, Long, *supra* note 2, at 6 (discussing the role of auditing in forest certification and sustainability regimes); Kristine Forstbauer & John Parker, Comment, *The Role of Ecolabeling in Sustainable Forest Management*, 11 J. ENVTL. L. & LITIG. 165, 165 (1996); Kristen M. Kloven, *Eco-Labeling of Sustainably Harvested Wood Under the Forest Stewardship Council: Seeing the Forest for the Trees*, 1998 COLO. J. INT'L ENVTL. L. & POL'Y 48, 53 (1999) (discussing the benefits of voluntary timber certification); Errol E. Meidinger, *The New Environmental Law: Forest Certification*, 10 BUFF. ENVTL. L.J. 211 (2003); Xavier Pons Rafols & Luke Brander, *The Stewardship Council Model: A Comparison of the FSC and MSC*, 11 ILSA J. INT'L. & COMP. L. 637 (2005); RUTH NUSSBAUM & MARKUU SIMULA, THE FOREST CERTIFICATION HANDBOOK 1 (2d ed. 2006).

496. Stupak et al., *supra* note 312, at 3293, 3295, 3299.

497. *Who We Are*, FOREST STEWARDSHIP COUNCIL, https://ic.fsc.org/about-us.1.htm (last visited May 4, 2013).

498. *Basics of SFI*, SUSTAINABLE FORESTRY INITIATIVE, http://www.sfiprogram.org/ sustainable-forestry-initiative/basics-of-sfi.php (last visited May 4, 2013).

499. CAROLYN FISCHER ET AL., FOREST CERTIFICATION: TOWARD COMMON STANDARDS? 3 (Apr. 2005), *available at* http://rff.org/RFF/Documents/RFF-DP-05-10.pdf. The Programme for the Endorsement of Forest Certification (PEFC) is the "world's largest forest certification system" and endorses various countries' standards, such as SFI and the American Tree Farm System. *About PEFC*, PEFC, http://www.pefc.org/about-pefc/overview (last visited May 4, 2013).

500. *See, e.g.*, Michael Rawson Clark & Joelyn Sarrah Kozar, *Comparing Sustainable Forest Management Certification Standards: A Meta Analysis*, 16 ECOLOGY & SOC'Y. 3, 3 (2011) (comparing the standards between the Forest Stewardship Council and Sustainable Forestry Initiative); NAT'L WILDLIFE FEDERATION ET AL., A COMPARISON OF THE AMERICAN FOREST AND PAPER ASSOCIATION'S SUSTAINABLE FORESTRY INITIATIVE AND THE FOREST STEWARDSHIP COUNCIL'S CERTIFICATION SYSTEM (June 2001), *available at* http://www.yale.edu/forestcertification/pdfs/auditprograms.pdf.

conversion promotes "clear, substantial, additional, secure, and long term conservation benefits throughout the forest."[501] U.S. environmental or forest-specific laws, however, do not use HCV as a term of art. The FSC defines HCV through species diversity at all levels (global, regional, or national); landscape-level ecosystems that contain sustainable populations of naturally occurring species; protection of endangered, threatened, and rare species; and maintenance of ecosystem services.[502]

SFI, on the other hand, places primary responsibility on program participants to devise their own plans for the operation that reach certain performance levels, while complying with all applicable laws.[503] The standard requires—as a performance measure—protecting "Forests with Exceptional Conservation Values" with plants, animals, or communities that are globally extremely rare or vulnerable to extinction and referred to as either critically imperiled (G1) or imperiled (G2) species according to Nature Serve.[504] Participants must also identify sites with ecologically or geographically significant features at less than thirty percent of historic range and protect them.[505] Whether SFI would qualify as a certification for bioenergy production, at least in the eyes of environmental groups, thus depends on the extent to which underlying policies require enhanced species protection beyond globally imperiled species and other landscape ecosystems.

The debate in certification circles in the U.S. centers on these proscriptions against land conversion to plantations. Definitions of "conversion" and "plantation" will be necessary moving forward. One proposed definition for conversion to plantation is that conversion has occurred if modifications to the structure and function of a forest, due to management activities, significantly reduce the complexity of the forest system or when natural or semi-natural forest (excluding significantly degraded semi-natural stands) transforms into permanently non-forested areas or plantations.[506] This definition will require bioenergy statutes, however, to provide specific guidance on what constitutes the "complexity of the forested ecosystem." FSC determines this on a case-by-case basis,

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501. FOREST STEWARDSHIP COUNCIL, FSC-US FOREST MANAGEMENT STANDARD (V1.0) § C6.10 (July 8, 2010), *available at* us.fsc.org/download.fsc-us-forest-management-standard-v1-0.95.pdf.

502. *Id.* at princ. 9.

503. *See* SUSTAINABLE FORESTRY INITIATIVE, REQUIREMENTS FOR THE SFI 2010–2014 PROGRAM: STANDARDS, RULES FOR LABEL USE, PROCEDURES AND GUIDANCE sec. 1, p. 2/4 (2010), *available at* http://www.sfiprogram.org/files/pdf/sfi_requirements_2010-2014.pdf (introducing the SFI program).

504. *Id.* at sec. 6, p. 2/15.

505. *Id.* at sec., 6 p. 6 5/15–10/15,13 1/8 (defining biodiversity hotspots).

506. Author's participation in the U.S. Council for Sustainable Biomass Production, May 2012.

while SFI ultimately relates conversion to the participants' operation plans, protection of certain species that likely are protected under the ESA already, and mitigation activities both on- and off-site. Ecosystem analysis, including connectivity, is not practiced widely. The ESA requires examining critical habitat, but even then the determination is species-based and not ecosystem-based, and debate has arisen regarding what constitutes a species' "range."[507]

The definition of "plantation" relates to this concept of ecosystem complexity (or lack thereof) and therefore also presents a challenge to bioenergy policymakers when proscribing conversion to plantations. FSC's baseline classification of plantation is cultivating exotic species or recognized exotic subspecies and any tree species in areas that were naturally non-forested ecosystems.[508] Other key elements that may be considered include the effect on native ecosystems from human activities like planting, sowing, and subsequent intensive silvicultural treatments carried out at high frequencies. Again, this will require bioenergy policies to guide assessments of ecological conditions and management practices at the stand level to determine "naturalness" in relation to the region's baseline. Particularity, this question is relevant to establishing pine plantations in the southeastern U.S. and whether they will be considered as semi-natural rather than plantations.

FSC maintains a specific standard for the U.S. and its regions in addition to an international standard. At the international level, FSC formed a Forest Carbon Working Group in 2009 in an effort to harmonize FSC standards with developing climate change carbon crediting systems.[509] The group issued a proposed carbon strategy in late 2011, with implementation results due in 2014,[510] but it was not without controversy.[511] In mid-2009, the first wood

507. *See* Draft Policy on Interpretation of the Phrase "significant portion of its range" in the Endangered Species Act's Definitions of "Endangered Species" and "Threatened Species," 76 Fed. Reg. 76,987, 76,996 (Dec. 9, 2011) (noting that the Services only recognize a species' current range, but that some would also include the species' "lost historical range").

508. FOREST STEWARDSHIP COUNCIL, FSC'S ENGAGEMENT WITH PLANTATIONS 4 (Dec. 2012), *available at* https://ic.fsc.org/certification-of-plantations.146.htm.

509. SUMMARY REPORT, 1ST MEETING OF THE FSC CARBON WORKING GROUP, FOREST STEWARDSHIP COUNCIL 1 (Sept. 2009), *available at* http://www.fsc.org/fileadmin/web-data/public/document_center/News/FSC_Report_FCWG_Meeting_1_Final_2009-11-17_Summary.pdf.

510. FOREST STEWARDSHIP COUNCIL, STRATEGY PAPER, STRATEGIC FRAMEWORK FOR AN FSC CLIMATE CHANGE ENGAGEMENT 4 (Nov. 2011), *available at* http://ic.fsc.org/download.strategic-framework-for-an-fsc-climate-change-engagement.47.pdf.

511. FERN, FERN STATEMENT TO THE FOREST STEWARDSHIP COUNCIL, WHY FERN IS WITHDRAWING ITS FSC MEMBERSHIP (2011), *available at* http://www.fern.org/sites/fern.org/files/FERN%20leaving%20FSC_0.pdf (objecting to FSC participation in carbon markets).

pellet mill for bioenergy in the U.S. became certified under FSC standards, but it was certified without a carbon accounting.[512]

The EU recently approved the Roundtable on Sustainable Palm Oil (RSPO) standard to certify RED-qualifying biomass.[513] While not a forestry standard per se, the scheme does contain measures aimed at meeting the forest conversion prohibitions in the RED.[514] Although RSPO recently gained ISEAL membership[515]—a precursor to achieving legitimacy among some environmental groups as a standard-setting body—the more left-leaning environmental groups such as Greenpeace and Friends of the Earth condemned the EU's stance as "hypocrisy" in light of its recent studies that found that palm oil use for biofuels induces large amounts of ILUC.[516]

For purposes of any SFM regime, and particularly bioenergy policy moving forward, verification through auditing of written forest certification standards will be key.[517] Measuring results, however, can be difficult because, as one commentator states, "we know very little about why or under what conditions" certification standards actually achieve sustainability goals.[518] Environmentalists echoed this claim in recent litigation.[519] Where private standards incorporate by reference public laws, however, it cannot be assumed that such laws are sufficient to address sustainability concerns associated with increased demand for energy biomass.

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512. *First Biomass Pellet Mill in United States to Receive FSC/Rainforest Alliance Certification*, RAINFOREST ALLIANCE (June 18, 2009), http://www.rainforest-alliance.org/news.cfm?id=certified_biomass_pellets.

513. *EU Commission Backs Controversial Sustainable Palm Oil Scheme*, REUTERS.CO.UK (Nov. 27, 2012), http://uk.reuters.com/article/2012/11/27/us-eu-palmoil-idUKBRE8AQ17J20121127.

514. ROUNDTABLE ON SUSTAINABLE PALM OIL, RSPO PRINCIPLES AND CRITERIA FOR SUSTAINABLE PALM OIL PRODUCTION, criterion 7.3 (2012), *available at* http://www.rspo.org/files/resource_centre/keydoc/2%20en_RSPO%20Principles%20and%20Criteria%20for%20Sustainable%20Palm%20Oil%20Production%20%282007%29.pdf.

515. *Roundtable on Sustainable Palm Oil and Aquaculture Stewardship Council Approved as ISEAL Members*, ISEAL ALLIANCE (Dec. 20, 2012), http://www.isealalliance.org/online-community/news/RSPO-and-ASC-approved-as-iseal-members.

516. *Controversial Biofuel Labelled 'Sustainable'*, FRIENDS OF THE EARTH EUR. (Nov. 27, 2012), http://www.foeeurope.org/controversial-biofuel-labelled-sustainable-271112; *Commission Staff Working Document, Impact Assessment Accompanying the Document Proposal for a Directive of the European Parliament and of the Council*, at 26, COM (2012) 595 final (Oct. 17, 2012), *available at* http://ec.europa.eu/energy/renewables/biofuels/doc/ biofuels/swd_2012_0343_ia_en.pdf.

517. Ewald Rametsteiner & Markku Simula, *Forest Certification—An Instrument to Promote Sustainable Forest Management?* 67 J. ENVTL. MGMT. 87, 94 (2003).

518. ERROL E. MEIDINGER, *Forest Certification as Environmental Law Making by Global Civil Society*, *in* SOCIAL AND POLITICAL DIMENSIONS OF FOREST CERTIFICATION 293, 310 (Chris Elliott & Gerhard Oesten eds., 2002).

519. *See* Klein v. U.S. Dep't of Energy, No. 2:11-cv-514, 32–33 (W.D. Mich. Dec. 11, 2012) (addressing plaintiffs' argument that "mitigation measure concerning the use of sustainably certified wood" may not be enforceable, because it "has no legal basis").

Whether private SFM certification could stand in as a proxy for carbon accounting remains unanswered, but perhaps it is a good first step toward encouraging practices that sequester carbon. Indirect land-use change that leads to deforestation, however, cannot be dealt with effectively through certification and, instead, must be addressed through stronger land-use controls in developing countries. Some environmental groups insist that bioenergy policies exclude feedstocks with high ILUC scores in lieu of focusing their efforts on fundamental changes in SFM on the ground in countries like Indonesia or Brazil.[520]

CONCLUSION

Gifford Pinchot, the first chief of the U.S. Forest Service, once said that "we have gained out of the vast destruction of our natural resources a degree of vigor and power and efficiency of which every man of us ought to be proud."[521] In today's world, plagued by natural system collapse, burgeoning resource scarcity, and climate change, governments must recognize that they cannot generate power, nor gain strategic power, from unsustainable harvests of the world's remaining, but vulnerable, forests. Bioenergy now carries the burden, whether justified or not, to address perceived shortfalls in SFM. It is simply not enough in policy design to assume that existing SFM policies provide the assurances necessary for stakeholders, particularly environmental and wildlife organizations, to support forest-based bioenergy initiatives.

Widespread deforestation in Southeast Asia for palm oil production has provided ample fodder for biofuels' opponents' distrust.[522] Even before palm oil plantations became the issue *du jour*, human needs for agricultural land, energy, construction, and consumer products damaged and destroyed forest ecosystems.[523] As demonstrated throughout this Article, industrialized countries such as the U.S. and EU Member States have designed forest

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520. *See* TRANS. & ENV'T, BRIEFING: THE SCIENCE OF BIOFUELS AND INDIRECT LAND USE 1 (Sept. 2010), *available at* http://www.transportenvironment.org/sites/te/files/media/2010_08_24_briefing_science_biofuels_iluc.pdf (describing how "emissions resulting from indirect land use changes" are unaccounted for in calculating emissions).

521. GIFFORD PINCHOT, THE FIGHT FOR CONSERVATION 75 (1910).

522. Nina Chestney, *Growing Palm Oil Trees For Biofuels Could Accelerate Climate Change, Study Finds*, HUFFINGTON POST (Jan. 30, 2013), http://www.huffingtonpost.com/2013/01/30/palm-oil-biofuels_n_2583106.html (noting that palm oil biodiesel might pollute more than conventional gasoline when the effects of deforestation are taken into account).

523. *See generally* FOOD & AGRIC. ORG. OF THE UN, STATE OF THE WORLD'S FORESTS ix–xii, 5 (2011), *available at* http://www.fao.org/docrep/013/i2000e/i2000e.pdf [hereinafter FAO STATE OF THE WORLD'S FORESTS] (summarizing the state of the world's forests and concluding that the rate of deforestation in the 2000s slowed over 1990 rates but is still "alarmingly high").

policies on the fundamental premise that forests should be accessible for human use, but with the caveat that forests must retain their ability to produce sustained yields. Just as forests have played a critical role in human development, however, we are realizing now that forests are essential to the health of the planet and humankind also, and that we must shift from the human-centric concept of "sustained yield."[524] Management for forest stand "productivity," in human use terms, can easily deemphasize biodiversity absent a scientific understanding of how ecosystem function contributes to forest health. At a baseline, we know generally that biodiversity "clearly affects the way ecosystems function,"[525] but much more work is needed.[526] Although forest productivity for wood production depends greatly on soil nutrients and water, the understanding of that relationship at the landscape level remains inadequate.[527]

Also, the science of forest GHG accounting[528] is evolving and involves much "uncertainty and discrepancies because of methods used."[529] Indeed, as

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524. *Id.* at v.

525. D.U. Hooper et al., *Effect of Biodiversity on Ecosystem Functioning: A Consensus of Current Knowledge*, 75 ECOLOGICAL MONOGRAPHS 3, 21 (2005).

526. *See, e.g.*, Jake Verschuyl et al., *Biodiversity Response to Intensive Biomass Production from Forest Thinning in North American Forests—A Meta-Analysis*, 261 FOREST ECOLOGY & MGMT. 221, 230 (2011) (noting that unavailability of data, particularly across different species, "may or may not provide an accurate picture of biodiversity response"); Joseph M. Northrup & George Wittemyer, *Characterising the Impacts of Emerging Energy Development on Wildlife, with an Eye Towards Mitigation*, ECOL. LETTERS 2012, at 1, 11 ("[T]he current literature is not broad enough to provide mitigation strategies for the breadth of species and ecosystems being affected by the expansion of . . . renewable energy development."); WILLIAM STEWART ET AL., POTENTIAL POSITIVE AND NEGATIVE ENVIRONMENTAL IMPACTS OF INCREASED WOODY BIOMASS USE FOR CALIFORNIA: DRAFT 17–18, 83 (2010), *available at* http://forestry-dev.berkeley.edu/lectures/env_imp_woody_bio.pdf (concluding that "[m]ore work is needed to identify critical threshold levels and response relationships" and that "[f]ew studies have attempted the difficult task of quantifying the amount of dead and downed wood/biological legacies necessary to maintain wildlife populations").

527. *See, e.g.*, Evelyne Thiffault, *Effects of Forest Biomass Harvesting on Soil Productivity in Boreal and Temporal Forests—A Review*, 19 ENVTL. REV. 278, 278, 280 (2011) (calling for "[r]igorous, long-term experiments" to understand the complex factors behind the effects of biomass harvests on forest conditions); Hjalmar Laudon et al., *Consequences of More Intensive Forestry for the Sustainable Management of Forest Soils and Waters*, 2 FORESTS 243, 253 (2011) ("While we are beginning to better understand how forestry affects forest soils and waters, the synergistic effects of climate change and land management are almost entirely unknown").

528. *See* Beverly Elizabeth Law & Mark E. Harmon, *Forest Sector Carbon Management, Measurement and Verification, and Discussion of Policy Related to Climate Change*, 2 CARBON MGMT. 73, 73 (2011) *available at* http://terraweb.forestry.oregonstate.edu/pubs/lawharmon2011.pdf (providing a basic overview of the ways in which carbon is accounted for in the contexts of forests, such as "carbon sequestration," measuring "net ecosystem carbon balance," and "life cycle analysis").

529. Ashi Qureshi et al., *A Review of Protocols Used for Assessment of Carbon Stock in Forested Landscapes*, 16 ENVTL. SCI. & POL'Y 81, 81 (2012); *see also* Gregory P. Asner, *Painting the World REDD: Addressing Scientific Barriers to Monitoring Emissions from Tropical Forests*, 6 ENVTL. RES. LETTERS 1, 2 (2011) (describing the uncertainties in measuring carbon fluxes due to spatial variations in

this Article demonstrates, how to account for the carbon emissions of forest biomass accurately has posed the greatest challenge to its utilization for energy. Bioenergy policy is confronted with the fundamental conundrum of how to proceed without the benefit of a complete scientific picture of causality between increased harvests, ecosystem degradation, and climate change. Biomass energy advocates argue that, when compared to the climate and environmental impacts of fossil-based energy or to the negative effects on water supplies and air pollution caused by natural gas extraction, forest-based energy is the more sustainable choice. The argument highlights the need for environmental accounting applied consistently across energy sectors, not just to biomass-based energy. In this regard, bioenergy policy has already spawned improvements in lifecycle analysis and other modeling that can improve our understanding of not only the broader energy sector's carbon footprint, but also its constraints on water and biological resource use.

In addition to this foundational scientific challenge, existing scientific understanding still must be translated into policy through effective "knowledge systems."[530] Key components of such a system include not only the strength of underlying science, but also societal legitimization of scientific knowledge[531] and the "boundary management" that occurs between the scientific community and broader society.[532] Such management encompasses effective communication, translation, and mediation that often appears lacking in highly charged SFM debates.[533] Communication must be multidirectional and include key stakeholders whose exclusion will result in conflict, even if the underlying science may be sound.[534] Translation facilitates "[m]utual understanding between experts and decision makers [that can be] hindered by jargon, language, experiences, and presumptions about what constitutes persuasive argument."[535] Communication and translation alone do not guarantee effective decision-making when

aboveground carbon stocks and inadequate mapping of these variations, as well as the need for the scientific community to develop accurate monitoring methods); D. James Baker et al., *Achieving Forest Carbon Information with Higher Certainty: A Five-Part Plan*, 13 ENVTL. SCI. & POL'Y 249, 251 (2010) (noting the "infrequency of national forest surveys and the lack of operational global forest monitoring systems").

530. David W. Cash et al., *Knowledge Systems for Sustainable Development*, 100 PROC. NAT'L ACAD. SCI. 8086, 8086 (2003).

531. *Id.* ("[T]hat scientific information is likely to be effective in influencing the evolution of social responses to public issues to the extent that the information is perceived by relevant stakeholders to be not only *credible*, but also *salient* and *legitimate*." (emphasis in original)); Endres, *supra* note 35, at 13–16 (explaining the critical nature of social norms, institutions, and corresponding legitimacy in operationalizing biofuels sustainability standards).

532. Cash et al, *supra* note 530, at 8087–88.

533. *See id.* at 8088.

534. *See id.*

535. *Id.*

fundamental differences exist between stakeholders. Mediation increases transparency as all stakeholders have a voice.[536] Mediation also creates an atmosphere of fairness through decision-making rules and by establishing criteria for decisions.[537]

One explanation for the many references to the potential of private certification in bioenergy policies could be that policymakers see it as a way to both generate knowledge and establish knowledge systems in a sector historically plagued by controversy. Private certification, if designed to effectuate actual outcomes versus focusing on process, functions like the pilot studies of forest-to-energy currently being pursued by governments in their quest to fortify bioenergy policies. With the decrease in public staffing in forest institutions, communication between those on the ground and policymakers must be targeted even more, and private certification can facilitate more succinct translation of current conditions.[538] On the other hand, private forest certification has become divided into ideological camps plagued by lack of inclusiveness of broad stakeholder groups, calling into question whether existing groups can find middle ground despite their philosophical differences.[539] Indeed, applying private certification standards, some of which environmental groups themselves have been central in developing, have not proved enough to garner their support for a forest-based bioenergy facility in the U.S.[540] Private certification of individual entities cannot facilitate shed- or ecosystem-level sustainability without coordinating scientific and governance frameworks that do not yet exist.

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536. *Id.*

537. *See id.*

538. FAO STATE OF THE WORLD'S FORESTS, *supra* note 523, at xi.

539. Philosophical divides exist within the environmental lobby regarding conservation in forest landscapes. Groups like The Nature Conservancy (TNC), which has participated in SFI, view the environment as more resilient to changes and thus some smaller tracts of land conceivably could be deforested if mitigation elsewhere would result in a net overall gain. *See, e.g.*, Peter Kareiva, *Conservation Science: Trade-In to Trade-Up*, 466 NATURE 322–23 (Jul. 15, 2010) (writing, as the chief scientist for TNC, that the conservation movement should consider return on investment from not only a biodiversity standpoint, but also an economic one in terms of the other services a preserved piece of property would provide). Groups like the Natural Resources Defense Council and the National Wildlife Federation, on the other hand, take a more site-by-site approach, advocating for protection of conservation values as a core ethic regardless of the size or positioning of the project or parcel in question. NATURAL RES. DEF. COUNCIL, 2011 ANNUAL REPORT 10 (2011), *available at* http://www.nrdc.org/about/annual/nrdc_annual_report2011.pdf; *Conserving U.S. Forest*, NAT'L WILDLIFE FED'N, http://www.nwf.org/What-We-Do/Protect-Habitat/Healthy-Forests-and-Farms/Conserving-US-Forests.aspx (last visited Apr. 18, 2013).

540. *See* Klein v. U.S. Dep't of Energy, No. 2:11-cv-514, 32–33 (W.D. Mich. Dec. 11, 2012) (noting plaintiffs' objection to a "mitigation measure concerning the use of sustainably certified wood" because it "has no legal basis" and it might fail to mitigate).

In this regard, the government-led inventories and assessments that have emerged in SFM policy and have been discussed throughout this Article are critical to establishing baseline environmental conditions. It is this knowledge that can assist in better environmental assessments of landscape level impacts, which in turn can be used as a guide to prioritizing actions taken under certification programs. These inventories must translate, however, into policies that aim for ecosystem-level achievements and not merely form the basis for funding pilot-scale achievements on individual sites, as is occurring in the EU.

Although governments are actively conducting inventories, governance problems stand in the way of translating results into more effective SFM. For example, while many countries formed international organizations over the past twenty years to conduct assessments and develop SFM policy, implementation still depends on individual jurisdictions too often, which in turn causes a patchwork of varying results that do not necessarily address cross-jurisdictional shed or ecosystem problems. The problem lies, at least in part, with vague criteria and indicators and the lack of any mechanism to enforce attainment of baseline expectations for SFM improvement, even if inventories otherwise exist. Both the EU and the U.S. suffer from the inability to establish EU- and national-level SFM programs due to treaty and constitutional constraints that require subsidiarity (EU) and federalism (U.S.), which would lead to greater consistency and coordination.

Thus, the EU will not achieve the level of coordination of action in the forestry sector that it has in agriculture, which through CAP has added another layer of verification through cross-compliance with general environmental laws in return for funding, unless it attempts to do so through RED. The U.S. could achieve more consistency and coordination of SFM policy through programs that require forest stewardship planning such as the Federal Cooperative Forestry Assistance Act, national level forest planning for water quality, and BCAP. But ultimately, consistency and coordination is only as good as the verification of the outcomes achieved through SFM planning and practices. The U.S .suffers, too, from the lack of a national energy policy such as a low carbon fuel standard or renewable portfolio standard, which could be used as a means to construct a common SFM policy. States are attempting to fill in the gaps, but as discussed above, each state may take a different approach to defining SFM in the bioenergy context, calling into question what SFM should achieve. In the end, failure to agree on baseline sustainability outcomes for forestry—some common to all of bioenergy, not just forest-based energy—ultimately may have broader ramifications for the entire biomass-to-energy sector in the court of public opinion.