

WESTERN FORESTS

Recommendations and Guidance for Addressing Climate Change



Ensuring our Forests Meet the Needs of Today and Tomorrow



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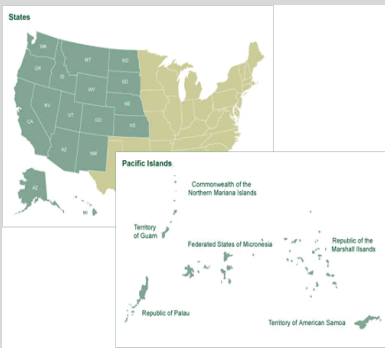
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About the Council of Western State Foresters

Established in 1967, the Council of Western State Foresters (CWSF) is a nonpartisan organization of state, territorial, and commonwealth foresters of the Western United States and Pacific Islands. The responsibilities of State Foresters vary across the west, being primarily charged with providing forest management assistance to landowners, managing state trust lands and supplying wildfire and forest health protection services.



States and Islands within the CWSF

EXECUTIVE SUMMARY

We cannot adequately address climate change in this county without looking at the role of forests. This report examines western forests –and how existing forestry programs can promote climate change adaptation and mitigation. We also look at the emerging policy on the role of forestry in addressing climate change and recommend policy principles that enhance resiliency of forests to the effects of climate change, and support their role in climate change mitigation.

This report was crafted with broad participation from the Council of Western State Foresters (CWSF) as well as affiliated foresters, landowners, and policy-makers. This allowed us to identify the most salient issues facing policy-makers as they work to maximize the potential for, and inclusion of, the forestry sector with the larger response to climate change. The recommendations provided generally fall into three categories: 1) the role for existing programs 2) adaptation strategies and 3) mitigation strategies. These recommendations can contribute to the formulation of productive, far-reaching, and meaningful climate change legislation.

The intent of this report is to arm national policy makers with the necessary information to address and include our western forests in the ever-changing climate policy debate, both in the formulation and approval of legislation and the subsequent rulemaking processes.




INTRODUCTION

Healthy forested ecosystems provide many valuable services including clean water, wildlife habitat, recreation, clean air, renewable energy and forest products. Forests sequester carbon as trees grow, and can help mitigate increasing levels of greenhouse GHG in the atmosphere. However, many of the values forests provide are at risk due to impacts from climate change. A fundamental challenge to maintaining the flow of valuable ecosystem services from forests is keeping forested lands as forest when faced with changing environmental and economic conditions.

Western forests are unique in their scope, diversity, ownership patterns, and values they provide. Despite the myriad of challenges, forests continue to function as net carbon sinks, sequestering an estimated 74 million metric tons of carbon each year.⁽¹⁾ If managed for maximum productivity, carbon sequestered in U.S. forests could account for 20-25% of the needed emissions reductions nation-wide.⁽²⁾ Yet, wildfire, pests, and other large-scale disturbances can shift forests from net sinks to net emitters of carbon in any given year. As we continue to lose forestland to other uses such as development, and our remaining forests are subject to an increasingly complex set of changing conditions, the future role for western forests and their management becomes ever more critical.

Most of the nation's forests are in private ownership. In the West, these private lands are an important part of a complex mosaic and are neighbors to the vast majority of the nation's public lands. Nestled into this forested landscape are homes for millions of westerners, creating the Wildland-Urban Interface (WUI). State, federal and local agencies must combine resources and policies to be attentive to cross-boundary management challenges, administrative realities, and the different objectives of forest landowners and managers.

Among the challenges facing society is the retention of existing forestland and the carbon stored there. In the U.S. 1.5 million acres of private forestland is lost annually.⁽³⁾ This pattern holds true in the West; for example, in the years 1988-2004 the state of Washington lost fully 13% of its non-federal forestland and California loses an estimated 35,000 acres of forest each year. The drivers of this trend are many and complex, due in part to the way those forests are valued and provide income. When converting and developing the land is worth more than the growing or retaining forests, incentives will continue to favor forest loss. As managers increasingly incorporate climate change



into the planning matrix for forestry, the ecosystem values associated with standing healthy forests can and will re-adjust those incentives.

Climate change policy is being discussed at all levels of government. The historic 1997 Kyoto Protocol has given way to new rounds of international climate change negotiations in December 2009 in Copenhagen, Denmark. President Obama has indicated his preference to have domestic legislation underway before those negotiations, and on June 26, 2009, the House of Representatives passed HR 2454, the American Energy and Security Act sponsored by Representatives Waxman (D-CA) and Markey (D-MA). In April of 2010 the U.S. Senate began deliberating an energy security bill that includes climate change policy. The Waxman-Markey bill has become the backbone of policy discussions on climate change at the national level. Congress has been considering climate and renewable energy legislation since the beginning of 2009 and is expected to continue throughout 2010 and beyond. Regionally, groups of states have begun to coalesce around climate change objectives; prominent examples include the Regional Greenhouse Gas Initiative (RGGI) in the northeast and the Western Climate Initiative (WCI) in the west. Individual states have begun to establish mandatory emissions targets, and many others are developing monitoring systems and markets for voluntary emission trading. At every level, a complex and important role for forests in both climate change adaptation and mitigation is emerging.

Forests are already facing impacts associated with the changing climate. Improving their resilience is necessary if forests are to adapt to climate change. The biomass growing within and removed from forests must be appropriately valued, and managers must be given both the resources and the tools to respond to changing ecosystem conditions. As mitigating agents, forests must maintain their net carbon sequestration role. Co-benefits of healthy forested ecosystems, including urban forests, include water filtration, wildlife habitat, recreation, renewable energy and valuable forest products. These assets need to be well connected to emerging carbon and energy markets, primarily through offsets and incentive-based programs.

The sheer amount and proximity of public lands in the western U.S. in relation to the private, state and trust lands leads the CWSF to engage in an “all lands” approach to forestry issues. Diverse perspectives from around the west have been considered in this report.

ROLE FOR EXISTING PROGRAMS

Many federal programs that are delivered by states already support active management of state and private forestlands for multiple values and purposes, including climate change adaptation and mitigation. In some cases, these programs serve to build adaptive capacity within agencies and resilience in forests; in other cases, the existing programs will need increased funding support and/or shifts in implementation strategies to maximize results. Many of these programs provide powerful incentives to maintain forest cover, a key component for mitigation. What follows is an overview of some of those programs. New and expanded authorities in the FY2008 Farm Bill,⁽⁴⁾ administered by the Natural Resources Conservation Service (NRCS) and the Farm Service Agency (FSA), also provide resources that forest managers can access to achieve climate change adaptation and mitigation goals.

Forest Stewardship Program

Already well positioned to support private landowners as they develop long-term stewardship plans for their forests, the USFS Forest Stewardship Program can also enhance the ability of those same landowners to anticipate and adapt to climate change. One way to capture this opportunity is to amend the program to also help landowners implement forest-climate adaptation management practices. These amendments would identify best management practices associated with climate change adaptation, guide landowners to include those practices in their stewardship plans, and allow for cost-share assistance for adaptation related practices.

Recommendations

- ***Coordinate with the NRCS to develop standards for Forest Stewardship Plans that will avoid duplication of effort and facilitate delivery of Environmental Quality Incentives Program (EQIP) funding for implementation.***
- ***Develop guidance to help forest landowners implement forest climate adaptation and mitigation management practices based on the best available science and proven best practices.***
- ***Increase program funding in accordance with new mandates and opportunities through traditional and new sources, including adaptation funding secured through receipts from auction allowances.***

State Fire Assistance Program

Manipulating hazardous fuels to decrease the risk from catastrophic fire has long been a forestry management strategy, and in the age of climate change this suite of management activities is necessary to build forest resilience. For this reason, the focus on fuels treatment in the State Fire Assistance (SFA) program is directly relevant to emerging climate change legislation. Increased funding for this line item, delivered through the USFS, will enhance the ability to implement the management needs as outlined in their Statewide Forest Resource Assessments and Strategies (required by the 2008 Farm Bill).

Recommendations

- ***Expand the target goals of the State Fire Assistance Program (SFA) to address climate change-related risks such as the release of carbon dioxide into the atmosphere and reversal of forest carbon sequestration benefits, in addition to human health and safety.***
- ***Increase funding for SFA to allow for progress on climate change adaptation and mitigation needs; increases in base funding should rely on data gathered through state assessments.***

Conservation Reserve Program

Under the NRCS-administered Conservation Reserve Program (CRP), landowners may sign a 10-15 year contract in which they agree to keep their land under vegetative cover in return for a rental payment. The program has been widely used in the agricultural sector, but it has a devoted clientele among private forest landowners as well. The FY2008 Farm Bill broadened inclusion of forestry activities and the program has been shown to increase carbon storage in soils, improve water quality, and contribute to co-benefits such as improved wildlife habitat and recreation.⁽⁵⁾

Recommendation

- ***Promote Conservation Reserve Program (CRP) to private forest landowners as a way to support management (e.g. thinning on enrolled lands). CRP lands should be eligible for federal offset programs to help ensure increased participation in this program so long as they meet emission reduction integrity requirements.***

Environmental Quality Incentives Program

Established to provide cost-sharing assistance as well as technical support, the Environmental Quality Incentives Program (EQIP) has been reauthorized in subsequent farm bills since its creation in 1996. The program effectively consolidated a host of related agricultural, water, and conservation programs. Optimizing environmental benefits for landowners is the underlying goal of EQIP and the support it offers is consistent with a number of climate change efforts. Recent amendments to the program have created specific links to climate change including matching grants for efforts that increase carbon sequestration in soils. Similar to CRP, above, EQIP participants enter into contracts of 1-10 years.

Recommendations

- ***Promote the use of EQIP funding to implement forestry projects identified in Forest Stewardship Plans as landowners increasingly manage for climate change.***
- ***Advocate for increase focus in forestry with EQIP staff at the federal and state level.***

Forest Legacy Program

The Forest Legacy Program (FLP) allows private landowners to conserve their working forests. It is a competitive conservation easement and fee acquisition program, administered as a partnership between the USFS and state agencies. This and other similar programs (housed within United States Department of Agriculture, the Department of the Interior, and the Department of Defense) are funded, in part, through the Land and Water Conservation Fund. With the increased urgency directed at maintaining forest cover across the country, conservation easements represent one of the most productive tools for long-term protection of forestlands, and may also be useful as part of a suite of tools to assure permanence of forest carbon offsets. Increased funding to support the FLP will extend its reach to landowners, and will result in a more cohesive landscape that provides maximum ecosystem benefits.

Recommendations

- ***Expand the goals of the Forest Legacy Program (FLP) to include climate change adaptation and mitigation as forest landowners increasingly manage for a suite of ecosystem services and benefits.***
- ***Promote the use of working forestland conservation easements for their climate change adaptation and mitigation value.***

Urban and Community Forestry Program

The Urban and Community Forestry (UCF) program focuses on the stewardship of urban natural resources. Urban forests broadly include urban parks, street trees, landscaped boulevards, public gardens, river and coastal promenades, greenways, river corridors, wetlands, nature preserves, natural areas, shelter belts of trees and working trees at industrial Brownfield sites. Urban forests are dynamic ecosystems that provide needed environmental services by cleaning air and water helping to control storm water, and conserving energy. They add form, structure, beauty and breathing room to urban design, reduce noise, separate incompatible uses, provide places to recreate, strengthen social cohesion, leverage community revitalization, and add economic value to our communities. Trees in urban areas sequester carbon as they grow, help avoid carbon emissions by conserving energy, and often provide renewable energy when they die.

Recommendations

- ***Expand the goals of the Urban and Community Forestry Program (UCF) to include climate change adaptation and mitigation as communities increasingly manage urban landscapes for climate change.***
- ***Support energy savings programs which take advantage of state foresters' experience in delivering tree planting programs which help reduce home heating and energy costs.***

Forest Health Protection Program

The Forest Health Protection program's mission is to protect and improve the health of America's rural, wildland, and urban forests through partnerships across lands of all ownerships. Forest Health Protection provides technical assistance on forest health-related matters, particularly those related to disturbance agents such as native and non-native insects, pathogens, and invasive plants. Assistance is provided through forest insect, disease and invasive plant survey and monitoring information, and through technical and financial assistance to prevent, suppress and control outbreaks threatening forest resources. Forest Health Protection helps to maintain, enhance, and restore healthy forest conditions and look for links between changing climate and pest conditions as well as providing specialized assistance to incorporate disturbance considerations in forest planning and decisions.

Recommendations

- ***Expand survey and monitoring to address key indicators of climate change, and continue to update information on links between changing climate and pest conditions.***
- ***Provide support for practices that improve resilience of forested landscapes, and restore impacted landscapes to maintain ecological functions and critical ecosystem services.***


CLIMATE CHANGE ADAPTATION STRATEGIES

Adaptation strategies refer to actions that respond to inevitable or already occurring impacts from climate change. Western forests are expected to experience dramatic changes in precipitation, sea level rise, temperature, fire patterns, pest outbreaks, and other components of ecosystem stability that are likely to transform existing forest types. In some cases, the shifts may be so dramatic as to cause the eradication of previously common forest types and associated biodiversity.⁽⁶⁾ Wildlife habitats will change extensively, resulting in the migration of species to more suitable ecosystems where possible.⁽⁷⁾

Already, wildfire behavior and pest outbreaks across the West have become exceptional when compared to historical data. Pro-actively managing forests to increase their resilience is the best approach for confronting an uncertain future. Increased resilience will reduce the probability and severity of catastrophic disturbances such as wildfire and pest outbreaks; co-benefits associated with resilient, healthy forests are equally valuable. A number of management strategies and policy mechanisms can enhance the capacity of foresters, both public and private, and private landowners to respond to the anticipated (and un-anticipated) changes.

Allocation of Cap-and-Trade Allowances for Adaptation

National cap-and-trade regulations will create a market for carbon emissions allowances. This market will generate a revenue stream targeted at supporting climate change objectives. Some of this revenue will be devoted to adaptation across sectors, including forestry. As western states develop, update, and implement adaptation plans, existing funding will need to be augmented by task-oriented support. Most current versions of legislation include a provision for a “Natural Resources Adaptation Fund,” designed to deliver funding for carrying out natural resource adaptation activities. The allocation of those funds currently favors federal agencies, with a portion of the funds reserved specifically for the U.S. Forest Service (USFS).



Climate change legislation currently being considered by congress does not allocate enough auction proceeds to cover adaptation needs of our western forests, or the Nation's forests. Expansion of adaptation funding recipients is imperative and must include a direct allocation of funding for activities on state and private lands; benefiting all land ownerships. A portion of the auction proceeds should be made available to provide cost-share assistance to help family forest landowners cover the cost of implementing practices which better prepare their forests to respond and adapt to climate change.

Recommendation

- ***Ensure that any natural resource adaptation funding fully recognizes the role of the USDA Forest Service and State Forestry Agencies in helping the national forest system and state and private forests adapt to climate change.***

Statewide Forest Resource Assessments and Strategies

As mandated in the 2008 Farm Bill, each state will develop by June 2010 a statewide forest resource assessment and strategy that considers forest conditions, trends, threats, and benefits, and sets priorities for their conservation and management. Three themes guide the state level strategies: (1) conserve working forestlands; (2) protect forests from threats; and (3) enhance public benefits from private forests. Each theme has a connection to climate change, and the process of developing assessments/strategies has already granted states an opportunity to focus on anticipated resource impacts due to climate change. These assessments and strategies will help in the near term as states develop further management strategies for climate-adapted forests. State foresters can call upon their own assessments and strategies when making management decisions and prioritizing resource allocations within their state.

Recommendation

- ***Provide for maximum flexibility in the national guidance on state forest resource assessments and strategies to allow states to best develop and use the results to include the ways in which they apply data on climate change impacts, adaptation, and mitigation.***

CLIMATE CHANGE MITIGATION STRATEGIES

Mitigation strategies refer to actions taken to reduce or replace the emissions of greenhouse gases (GHG) or to increase carbon sequestration. Western forests have a unique role to play in this effort, as they include some of the most productive, and therefore carbon sequestering, biomass stands on earth. Reducing forest conversion, planting new forests, and managing existing forests to increase carbon sequestration and storage are all strategies for mitigation (see Figure 1). Mitigation also includes reducing emissions and replacing fossil fuels with renewable fuels that have a shorter carbon cycle. Using products from forests is part of the equation because wood products continue to sequester carbon for their lifetime while in use.⁽⁸⁾ Wood products can also replace fossil energy-intensive construction materials such as steel and concrete. Net emission reductions are documented through full life-cycle assessments. Use of woody biomass for heat, power and liquid fuels provides critical renewable energy that replaces fossil fuels and should be considered an integral part of any renewable energy portfolio.

Mitigation policies are developing simultaneously and at multiple levels. The Western Climate Initiative is a regional effort by seven western states and four Canadian provinces to reach an emissions target 15% below 2005 levels by 2020.¹ California and Oregon already have mandatory GHG reduction policies in place, and other states are in the process of developing similar legislation. Also, voluntary emission reductions and offsets are already happening nationally.

As states begin to implement forestry measures to contribute to these and other emissions reduction targets, they will have to consider the entire resource cycle including prior land use, forest type, management actions, harvest rotation length, wood products generated, ecosystem services provided, emissions produced or avoided, and waste produced. Integrated models show the trade-offs inherent in managing forests for resiliency, carbon sequestration, energy use, and wood products.

¹ Partner states: Oregon, Washington, California, Montana, New Mexico, Arizona, and Utah.

Most other western states have “observer” status. For details visit www.westernclimateinitiative.org

HOW CARBON DIOXIDE FLOWS IN FORESTS: STORES, EMISSIONS & REDUCTIONS

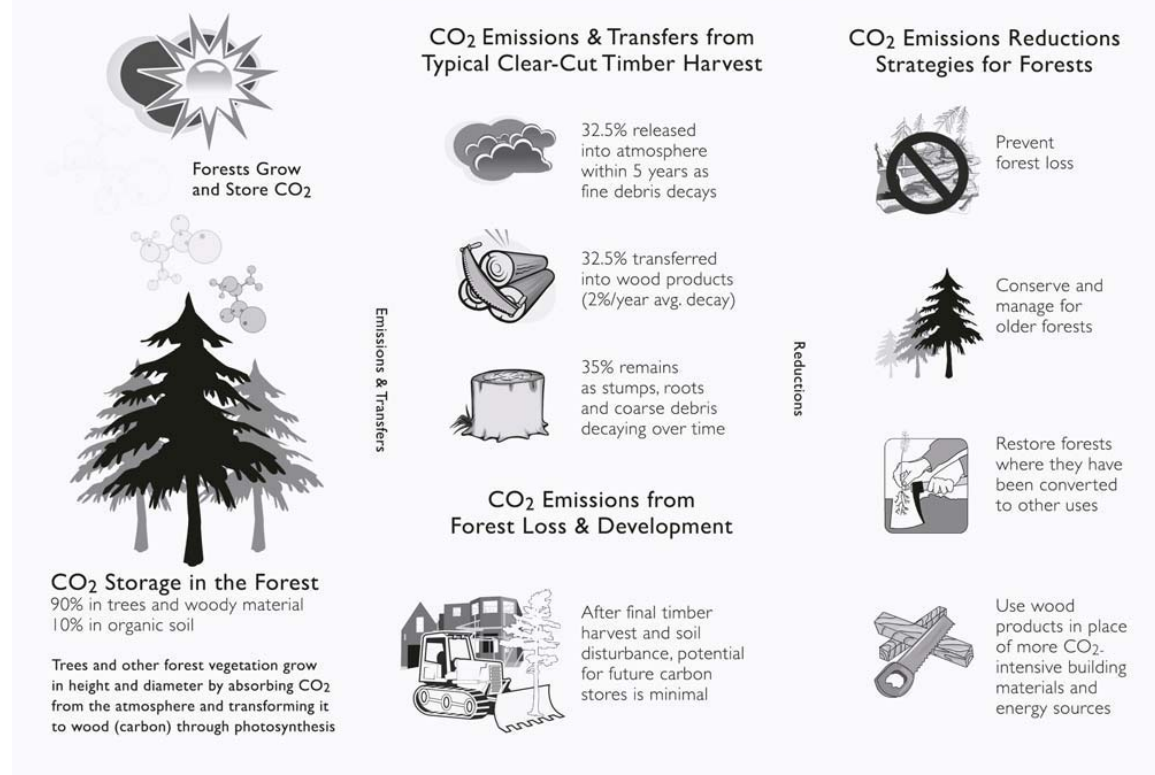



Figure 1. How Carbon Dioxide Flows in Forests⁽⁹⁾

Among Western states, California has perhaps the most well-developed and integrated process for standardizing its multi-sectoral GHG accounting system. Forestry protocols within that state integrate forests into the larger state strategy across multiple sectors.

Woody Biomass as an Energy Source

Using forest biomass for energy not only contributes to climate change adaptation and mitigation goals, it also provides new markets that can help reduce the cost of forest management activities used to achieve these and other goals. Expanding the use of biomass for heat, power and transportation fuels is the subject of state, regional and national policy. State Climate Action Plans and Renewable Portfolio Standards (RPS) for electricity generation often have specific targets for



a percentage of power to be produced from renewable sources by a specified date. For example, Colorado has adopted a RPS of 20 percent by 2020.ⁱⁱ

A national renewable electricity standard (RES) has been debated for several years and is currently under consideration. This standard is likely to be included in a comprehensive climate change bill. A national Renewable Fuels Standard (RFS) was passed in the 2007 Energy Independence and Security Act, setting a goal of producing 36 billion gallons of renewable fuels by 2022. While this bill was primarily focused on displacing petroleum use in the transportation sector, there is also a powerful connection to woody biomass as an energy source for and beyond liquid fuels. For example, using biomass to heat college campuses, community buildings and to replace natural gas for industrial heat is gaining momentum where producers can also ensure effective near-by disposal of residues. Federal-State partner-programs such as Fuels for Schools⁽¹⁰⁾ have created incentives for the use of thermal biomass in public buildings. This section explores the challenges and promise of incorporating woody biomass into energy and climate change policy.

Defining Renewable Biomass

The way biomass is defined in legislation can increase or shrink access to emerging energy markets. When the definition is inconsistent, restrictive, and difficult to implement, uncertainty can cause increased risk for the investment sector due to an inability to plan ahead, and the perception of insecure biomass supply. For example, the 2007 Energy Independence and Security Act⁽¹¹⁾ provided a Renewable Fuel Standard that excluded woody biomass from federal lands (with limited exceptions) from the eligible material that counts towards producing renewable biofuels. One year later, the FY2008 Farm Bill definition of renewable biomass was much broader and had fewer restrictions for eligible biomass sources. Some have proposed adding sidebars to this broader definition in emerging climate change legislation; for example, restrictions on diameter size and requirements for the amount of slash left on site after thinning or clearing. Regional vegetation differences make it exceedingly difficult to prescribe a uniform federal standard for silvicultural prescriptions that include guidelines for removal of biomass. Relying on

ⁱⁱ Colorado's RPS was passed through a successful ballot initiative, Amendment 37, in 2004. In 2007, [HB 1281](#) increased the RPS and extended the renewable-energy requirement to electric cooperatives, among other changes.

well-established best practicesⁱⁱⁱ used within each state is perhaps the best path to defining renewable biomass.

Of particular concern for western foresters is the broad exclusion of forest biomass types and forest land types. For example, definitions in current legislation define eligible biomass specifically exclude “mature trees,”^{iv} most hazardous fuels thinning on federal land (except near buildings), and thinning of naturally regenerating forests. These restrictions effectively exclude millions of acres of forestland and available biomass especially in the public lands-dominated Western U.S. Since a diverse and predictable supply of woody biomass is needed to support the emerging bioenergy infrastructure, these restrictions will likely preclude access to markets in many parts of the western U.S., markets that could help reduce the cost of forest management and restoration that achieve adaptation, mitigation, and numerous other goals.

Biomass Energy and Greenhouse Gas Emissions

When forest biomass is harvested from sustainably managed forests and efficiently converted to energy products, the carbon contained in the biomass is released to the atmosphere as part of the active carbon cycle. Biomass energy adds no new CO₂ to the atmosphere. The released carbon will be balanced with carbon sequestered in forests as they grow and replace what was harvested. In contrast, fossil fuels removed CO₂ that was sequestered millions of years ago, adding new CO₂ to the atmosphere. The fossil energy used to plant, harvest, transport and convert biomass to energy products must be considered in the full carbon life-cycle assessment when determining the net greenhouse gas benefits of biomass energy.

Recommendations

- ***Support the Farm Bill definition in order to maximize flexibility and opportunity. Biomass from forest management activities on public lands, including practices that increase resilience of late successional or mature forests must be included in these standards.***
- ***Provide a consistent definition of renewable biomass that applies to a federal Renewable Energy Standard and a Renewable Fuels Standard. This is needed so that investors can rely on biomass supply estimates.***

ⁱⁱⁱ For example Idaho’s Forest Products Commission Best Management Practices (BMP). at <http://www.idahoforests.org/bmp.htm>

^{iv} The definition of “mature trees” varies, but in general refers to late successional, old growth, and large diameter trees.

- ***Improve the effectiveness and utility of longer term stewardship contracts to support continuity of wood supply from federal lands, sustainability, and business planning necessary to attract investment.***
- ***Recognize greenhouse gas benefits of bioenergy through “carbon neutral” determination in the energy sector CO2 reporting because emissions from biomass are implicitly included in the forestry and land use sector accounting.***

Harvesting Guidelines, Monitoring and Verification


Some states already have the authority to monitor and verify woody biomass that is coming off of private lands. Others do not, and many state forestry offices lack the capacity to develop and implement a comprehensive verification system. A realistic, reliable, and consistent monitoring and verification system is essential, with some of these elements determined at a national level and others left to states. Harvesting guidelines should rely on forest practices established at the state level for state and private lands and relevant forest management laws and policies for federal lands.⁽¹²⁾ Strong, state deferred sustainability requirements will build support for the effort and will ensure long-term viability.

Recommendations

- ***Encourage existing certification systems to undergo reviews and updating and of their standards to address the removal of biomass from forests. Engage renewable fuel producers, bioenergy facilities, biomass suppliers and other interested parties in the development of a flexible industry standard and credible verification programs.***
- ***The responsibility of verifying biomass should reside with the renewable fuel producer and should include built-in flexibility for producers and suppliers to choose among a variety of verification tools (e.g., third-party certification by qualified professionals or self certification from feedstock suppliers).***
- ***Provide greater support to the Forest Inventory and Analysis (FIA) Program to assure that information provided is based on adequate sample size for all federal, state and private forest lands. Incorporate metrics into the program that allow tracking of trends for biomass volume and carbon stocks.***

Forest Carbon Sequestration and Carbon Offsets

Most versions of climate change legislation at the national and state level include a robust carbon cap-and-trade system. In that formulation, covered entities such as industries could choose to meet their greenhouse gas (GHG) emissions requirements on site or purchase offset credits from an uncapped entity to compensate for its failure to reach a set target. Spatially, it doesn't matter




where the carbon reductions originate since the cap will be met in the aggregate and emissions are well-mixed in the atmosphere. Offsets are defined as “the measurable avoidance, reduction, or sequestration of CO₂ or other GHG emissions.”⁽¹³⁾

To date, forestry has played a limited role in international cap-and-trade programs, including carbon offset systems. The Kyoto Protocol has allowed forestry to participate in the Clean Development Mechanism (CDM) and Joint Implementation. Both tools allow countries held to an emissions cap to offset those emissions by purchasing emissions reduction activities in developing countries, including afforestation and reforestation. Despite the potential for forestry offsets under Kyoto, afforestation and reforestation have thus far accounted for only 0.3% of all CDM projects.⁽¹⁴⁾

Current international negotiations for the post-Kyoto round of climate agreements have devoted a great deal of attention to developing a more comprehensive program for the United Nation’s Program for Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD).⁽¹⁵⁾ With an international focus on the critical role of forestry, it is even more important that the U.S. develop well-rounded domestic legislation that maximizes the potential of forests to mitigate global climate change.

Although the majority of offset markets in the U.S. are still voluntary, a few mandatory emissions targets have emerged. Two western states, California and Oregon, have adopted mandatory emissions reduction targets. Ten Northeast states have also accepted some mandatory targets under the Regional Greenhouse Gas Initiative (RGGI).⁽¹⁶⁾ The Western Climate Initiative (WCI) envisions a comprehensive offset program as being an important tool for reducing compliance costs associated with an emerging cap-and-trade system. Already the members (and those with “observer” status) have begun to establish baselines from which they can enter a national carbon market.

In contrast to the limited role for forestry in CDM projects, forestry activities are in the spotlight for offsets, as they present high-volume, low cost opportunities for industries to achieve GHG reduction goals. As of 2007, 36% of transactions in voluntary domestic offset markets came from forest carbon sequestration.⁽¹⁷⁾ There are several well-developed forestry offset programs (domestically and internationally), including a number of forestry activities that are eligible for



third party verification. Some have suggested that a voluntary offsets market is the first step toward a more comprehensive pricing of ecosystem services. Water quality credits are already widely traded in the open marketplace, and linking the emerging carbon offset markets to these established trading channels will ease the transition.

The U.S. Forest Service, in partnership with the National Forest Foundation, has begun an experimental offset project called the Carbon Capitol Fund. The fledgling system, which does not yet generate tradable offsets, collects donations that then go toward reforestation on National Forest System lands with the explicit goal of increasing carbon sequestration. Measurement of carbon sequestration is conducted by the agency and an outside contractor; data are being collected on a small number of pilot projects in anticipation of a more fully-developed offset program.⁽¹⁸⁾

The EPA evaluated the opportunity for carbon sequestration based on different price level scenarios for CO₂/ton. They found that increasing the price of CO₂ from zero to \$5 and up to \$50/ton yields dramatically increased potential for forests of all ownerships.⁽¹⁹⁾ Until a price is established and the markets mandatory, this kind of early learning activity will continue.

Types of Forestry Offsets

Establishing standard criteria for measuring and pricing forestry offsets quickly becomes complex and technical. Here we begin with an overview of the types of forestry activities likely to be included in an offset regime. From there, we move on to describe and recommend policy components that will ultimately create the system.

Afforestation

Afforestation means adding new forest cover (planting trees) to land that has been un-forested for many years. In many cases, afforestation occurs on abandoned or fallow farmland. In the Chicago Climate Exchange, for example, a project qualifies as afforestation if it is planted on land that was not forested prior to 1990. Afforested sites will generally sequester relatively more carbon than reforestation, since there has been no carbon release from recent clearing. However, the amount of carbon sequestered in a newly forested site will vary depending on forest type and density. The EPA's 2005 study, described above, found afforestation to be the activity with the greatest potential for increasing carbon sequestration.

Reforestation

Similar to afforestation, reforestation refers to the planting of trees on recently cleared sites. These are not abandoned areas, but tend to be traditionally forested lands that have been harvested or disturbed. Thus, any measurement of carbon sequestered in reforested sites should also account for the carbon that was released in the initial clearing of the site. A full life-cycle system of accounting will be required to accurately measure the total carbon potential of any management choice.

Harvested Wood Products and Biomass Energy

Carbon storage in wood products tends to be greatest in “long-term” products such as lumber, wood panels, and wood furniture products. Short-lived products like paper release carbon over a much shorter lifetime. Measuring the carbon stored in wood products has been done using a complete life-cycle analysis, which can identify emissions at each stage of harvesting production, use and disposal.⁽²⁰⁾ Further complicating the measurement of benefits associated with the use of wood products, some have argued that substitution value must be considered; for example, using forest products to replace fossil-fuel intensive products like concrete, vinyl or steel will result in fewer production-related emissions. Wood products are often manufactured with renewable energy produced on-site, and the products themselves remain intact in landfills, reducing the overall GHG emissions profile of their life-cycle. The policy challenge is in providing the means to account for harvested wood products in forest carbon pools.⁽²¹⁾

Biomass used for energy has a shorter carbon cycle than fossil fuels, and the carbon offset value is associated with either direct displacement of fossil fuels, or indirect reduction of emissions (e.g. avoidance of emissions from decomposition or burning of slash following a harvest). Full life-cycle analysis must consider emissions at each stage including harvest, transport, and processing. Policy considerations primarily relate to eligibility definitions as discussed earlier, and potential for change in land use or forest type in order produce forest biomass. Transportation of forest biomass long distances can significantly reduce the positive effect of reduced emissions, so a combination of sustainable forestry practices, local biomass supply and proper facility type and size are critical considerations. Biomass energy is typically counted in the energy sector as a fossil fuel offset, rather than as forestry offsets.

Improved Forest Management

In many forest types, healthy multi-aged stands sequester more carbon than un-managed stands.⁽²²⁾ Each forest type demands a different management strategy and some scientists have found a pattern of diminishing returns for carbon sequestration in heavily managed forests.⁽²³⁾ To address these uncertainties, a federal cap-and-trade program is likely to define specific project types or practices, recommended for particular forest types, which will “count” toward increased carbon sequestration and be eligible for an offset credit. Most of the practice-based activities are more likely to fit into a “beyond offsets” system described below. Offsets for forest management were not included in RGGI, but are being discussed in new federal legislation and are included in the California protocol.

Avoided Deforestation or Conversion of Forests to Non-Forested Land Use

At the international level, avoided deforestation is a key piece of the United Nation’s Program on Reducing Emissions from Deforestation and Degradation in Developing Countries (REDD). Even in high-demand tropical forests, there is a challenge to measure cause and effect for specific projects, because it is especially prone to leakage (see p. 21). At the domestic level, avoided deforestation is not likely to be a strong component of legislation; however, avoided conversion of forestland to non-forest uses is a powerful threat to U.S. forests and should be eligible for offsets credit. Maintenance of urban forests is another way to avoid forest conversion and retain benefits. Domestic markets are likely to account for this type of activity. For example, the Chicago Climate Exchange (CCX) allows landowners to earn extra offset credits when an afforestation project is conducted with forest conservation principles, since the latter also suggests avoided deforestation in the future.

Urban and Community Forestry

Trees in cities and towns sequester and store carbon in vegetation while reducing fossil-fuel consumption by conserving energy used to heat and cool buildings (e.g., trees planted strategically for shade and windbreaks). The urban forestry carbon offset protocol was recently adopted by the California Air Resources Board and the California Climate Action Registry (CCAR)⁽²⁴⁾ for urban forest projects anywhere in the U.S.

Recommendation

- ***Eligible activities for forest offsets should include, at a minimum, afforestation, reforestation, improved forest management, avoided deforestation or conversion of forests to non-forested land uses and deforestation, urban forestry, and harvested wood products.***

Carbon Offset Eligibility Challenges

A range of forest carbon activities could be eligible for participation in offset markets established by federal and regional climate legislation, provided that they can deliver real, additional and permanent emissions reductions equivalent to the emissions being offset. Forest carbon markets would need to be carefully structured to minimize compliance and transaction costs in order to encourage broad participation by forest landowners, managers and project developers.

Real


The necessity of assuring that an offset is “real” in order to be counted encompasses a number of challenges. That is, credible offsets will need to be quantified with a reliable verification system, and cause a measurable net reduction in GHG emissions. Assuring a rigorous accounting system is essential, and the legitimacy of the system may rest on the extent to which credits are reliably assigned to reduction activities. Double-counting must be avoided, especially in the early phases of an offsets program when multiple entities may be tallying activities.

Recommendations

- ***Include robust accounting methodology in legislation and rulemaking that defines forestry offsets. Systems employed by different registries should be linked to reduce the possibility of double-counting, and to facilitate validation.***
- ***Design a consistent approach to monitoring and verification of carbon offsets with the role of state and federal entities in the verification process clearly defined. Ensure that a “ton is a ton” of carbon regardless of the source.***
- ***Assign third-party verification of forestry carbon credits to those who have professional forestry skills.***

Permanence

For a forestry activity to count as an offset there has to be some guarantee of permanence to prevent short-term activities from being granted unduly generous credits. A rigorous permanence requirement will help to ensure equivalency across sectors and project types and facilitate trading. Some reversal of sequestration efforts may be beyond the control of the land manager; for



example, a wildfire could rapidly reverse sequestration benefits. Furthermore, since different forest types grow and mature at different rates, establishing one blanket rule for permanence will be unworkable. Some internationally based offset standards use a “buffer” and “discount” concepts to address permanence, thereby allowing for a percentage of the credited activity to be sold or altered. Within the U.S., permanence has often been defined as either 50 or 100 years, and the number continues to generate debate. The use of shorter term renewable contracts may provide a workable mechanism for achieving the longer duration target for carbon sequestration.

Recommendations

- ***Establish a consistent standard for permanence to facilitate confident trading.***
- ***Create registries to develop buffer pools or insurance mechanisms that will address the risk of reversal, and mechanisms for renewal of shorter term contracts to achieve the necessary full project duration.***

Additionality and Stacking

For a forestry activity to be counted as an offset it must represent a departure from “business-as-usual,” a baseline scenario projecting no policy or management changes. Any activity that is legally required, or is considered to be an “industry standard” is not likely to be considered additional. For example, reforestation following harvest is expected or required in many circumstances and would not count toward an offset credit. Another criteria being discussed is financial additionality, where the project is considered additional if it would not have occurred without the offset program’s funding.

Since the carbon benefits of certain forestry practices are often matched by other ecosystem benefits, any offset system will have to be set up to allow “stacking” of different types of credits, where a landowner would get paid for producing all of the ecosystem services a given activity generates. For example, if trees are planted, the landowner might get credit for not only creating new carbon sinks, but also for co-benefits like improved water quality and enhanced wildlife habitat. Careful monitoring and verification by a third party will maintain the integrity of the entire process.

Recommendations

- ***Create clear and rigorous standards for third-party verification to determine additionality.***
- ***Allow broad stacking of different types of credits (such as carbon and biodiversity) to provide incentives to maximize ecosystem service values when making forest management decisions.***

Leakage

Leakage occurs when the reduction of emissions in one location or sector results in increased emissions elsewhere. More than almost any other sector, forestry activities are prone to leakage. Two kinds of leakage are relevant here: (1) emissions leakage, where carbon sequestration in one location leads to increased carbon release in another area; and (2) product leakage, if forestry practices that keep trees standing in an effort to sequester carbon lead to an increased reliance on more carbon-intensive products. Accounting for leakage can be subjective and error-prone, and there will be significant challenges to developing a methodology that will fully address the problem. Utilizing life-cycle analysis and integrated measurement and monitoring techniques can help to reduce leakage, but eliminating it entirely will be challenging if not impossible.

Recommendations

- ***Require leakage accounting in all offset projects so that participants, backed by a third party, track and report on the potential for leakage. Develop a clear and consistent methodology to guide this requirement.***

Early Action

As both public and private forest managers scramble to anticipate new regulations, many are adopting practices that may eventually become valuable as offsets. But will those activities be considered invalid when the market finally arrives because they don't pass the additionality test? Legislation should include specific language whereby early adopters can earn at least some credit for projects started before the enactment of legislation and continue to provide GHG reduction or carbon sequestration benefits for many years. Allowing offset credits under existing credible voluntary and mandatory programs will help generate a supply of offsets in the early years of a cap-and-trade program.

Recommendation

- ***Reward entities for taking early action and develop a standardized formula to account for timing adjustments.***

Reporting and Registry

Any offset system will have to include robust reporting and registry protocols. Voluntary registration facilities have started operating around the country.⁽²⁵⁾ Participating entities submit emissions data and establish a baseline, largely in anticipation of mandatory emissions tracking in the future. The Climate Action Registry in California⁽²⁶⁾ is one prominent example. Federal signals have come, for example, through the FY2008 Farm Bill, which directs the USDA to develop guidelines for measuring, and ultimately pricing, ecosystem services from the forestry and agriculture sectors. These guidelines will be the basis for reporting as mandatory emissions reductions and offsets become law.


Recommendations

- ***Require consistent reporting for all components of the offsets trading market. Draw upon existing registries at the state, regional, and federal levels to develop a single, consistent database for record-keeping.***
- ***Develop a process for aggregating small projects to allow for economies of scale to insure consistency of offset application and carbon credits being offered for trade.***
- ***Develop guidance regarding title to offset credits, particularly as it relates to project activities that are funded with public dollars or for projects undertaken on public lands with private funding.***

Beyond Offsets

Even the most robust carbon offset program is likely to be of limited use to smaller non-industrial private forest landowners due to the cost and complexity of offset program compliance. Providing incentives for forest landowners to voluntarily manage their lands for increased carbon sequestration and storage outside of formal offsets can be a cost effective way to achieve additional GHG reduction outside of the cap. The Waxman-Markey bill as passed by the House does not include any “beyond offsets” provisions tailored for forest landowners.

Final legislation, however, is likely to include them. Strategic and voluntary incentive programs would encourage private landowners to keep their land forested, and to maximize sequestering carbon. Research suggests that some forest types can significantly increase the amount of carbon stored there through a series of active management strategies including thinning, longer rotations and reduced harvest rates.



Many versions of a beyond offsets program have been proposed including stand alone programs supported by auction allowances. Most begin with the creation of a menu of regionally-specific land management practices and a dollar value attached to each practice. Other components of a beyond offsets program could include value-added provisions such as additional payments that reward practices that increase resilience of forests to adapt to climate change impacts or maintain working forests on the landscape. Administration of the program should be housed within the USDA, and delivered by state forestry agencies. Incentives for landowners and support for program administration would come from a portion of the revenue from allowances sold within a cap-and-trade system.


Role for Existing Federal Programs

Just as many existing forestry programs will prove useful in an adaptation context, many of these same programs are likely to play a strong role in mitigating climate change as part of a beyond offsets regime. These incentive programs should not only be continued but could be infused with additional funding from cap-and-trade allowances. Forest Stewardship Plans would likely form the basis for private landowner participation in any revenue-generating activity, thereby increasing participation, expanding the reach of that program, and creating climate change adaptation and mitigation benefits. Programs that reward landowners for keeping forests as forests (and therefore reduce emissions through avoided deforestation) include the USFS Forest Legacy Program and others making use of the Land and Water Conservation Fund.

Programs that incentivize good landowner practices do not require complex verification to avoid leakage, measure permanence, or account for possible additionality. Many of the practices that will be valued in such programs will also have ancillary ecosystem benefits and the incentives would be available to small landowners who are unlikely to be able to participate in a formal offsets program. Thus, there are low transaction costs associated with this approach, and disproportionately high benefits.

Recommendations

- ***Support natural resource adaptation funding that is delivered through State and Private Forestry and other USDA programs. Integrate those programs with efforts being made by states, local governments, tribes and non-governmental organizations.***
- ***Focus new programming on non-industrial private landowners that have a forest management plan in place (such as a Forest Stewardship Plan).***

- 
- *Maximize landowner participation in conservation and management supporting climate adaptation and mitigation by, for example, offering short-term contracts.*
 - *Assign prices regionally based on known market values, and provide State Forestry agencies with guidance that allows them to effectively administer the new suite of incentives. Funding from allowances should support this effort, including new specialized expertise.*



CONCLUSION

We enjoy the myriad of benefits provided by healthy forested ecosystems such as clean water, wildlife habitat, recreation, clean air, and forest products. In addition to these, forests sequester carbon as they grow, and can help mitigate increasing levels of greenhouse gases in the atmosphere. However, in the case of climate change, legislation can and will determine the potential of forests to aid on our attempts to mitigate and adapt to climate change. Carbon sequestered in U.S. forests could account for up to 25% of the needed emissions reductions nationwide. However, forests that are unhealthy and at risk for large-scale disturbances such as insect infestations, disease outbreaks, or wildfire can serve as emission sources. Forests that are converted to other land uses will no longer sequester carbon to reduce build-up of greenhouse gases in the atmosphere.

Our western forests are subject to an increasingly complex set of changing conditions and the future role for western forests and their management is becoming ever more critical. The ability of forests to be an essential part of climate change adaptation and mitigation will only happen with carefully crafted legislation and guidance. With a new farm bill, energy bill, and a renewed emphasis on seeing the nation's forests as a vital part of our future, the time is now to ensure forestry's place at the climate change policy-making table. Pursuing the recommendations in this report will not only support climate change adaptation and mitigation goals, but will continue to support the health and resilience of our nation's forests into the future.

The CWSF wishes to acknowledge the significant contributions to this document by Lisa Dale, Professor at the University of Denver.

SUMMARY RECOMMENDATIONS

ROLE FOR EXISTING PROGRAMS

Forest Stewardship Program

- ***Coordinate with the NRCS to develop standards for Forest Stewardship Plans that will avoid duplication of effort and facilitate delivery of Environmental Quality Incentives Program (EQIP) funding for implementation.***
- ***Develop guidance to help forest landowners implement forest climate adaptation and mitigation management practices based on the best available science and proven best practices.***
- ***Increase program funding in accordance with new mandates and opportunities through traditional and new sources, including adaptation funding secured through receipts from auction allowances.***

State Fire Assistance

- ***Expand the target goals of the State Fire Assistance Program (SFA) to address climate change-related risks such as the release of carbon dioxide into the atmosphere and reversal of forest carbon sequestration benefits, in addition to human health and safety.***
- ***Increase funding for SFA to allow for progress on climate change adaptation and mitigation needs; increases in base funding should rely on data gathered through state assessments.***

Conservation Reserve Program

- ***Promote Conservation Reserve Program (CRP) to private forest landowners as a way to support management (e.g. thinning on enrolled lands). CRP lands should be eligible for federal offset programs to help ensure increased participation in this program so long as they meet emission reduction integrity requirements.***

Environmental Quality Incentives Program

- ***Promote the use of EQIP funding to implement forestry projects identified in Forest Stewardship Plans as landowners increasingly manage for climate change.***
- ***Advocate for increase focus in forestry with EQIP staff at the state level.***

Forest Legacy

- ***Expand the goals of the Forest Legacy Program to include climate change adaptation and mitigation as forest landowners increasingly manage for a suite of ecosystem services and benefits.***
- ***Promote the use of working forestland conservation easements for their climate change adaptation and mitigation value.***

Urban and Community Forestry

- **Expand the goals of the Urban and Community Forestry Program (UCF) to include climate change adaptation and mitigation as communities increasingly manage urban landscapes for climate change.**
- **Support energy savings programs which take advantage of state foresters' experience in delivering tree planting programs which help reduce home heating and energy costs.**

Forest Health Protection

- **Expand survey and monitoring to address key indicators of climate change, and continue to update information on links between changing climate and pest conditions.**
- **Provide support for practices that improve resilience of forested landscapes, and restore impacted landscapes to maintain ecological functions and critical ecosystem services.**

CLIMATE CHANGE ADAPTATION STRATEGIES

Allocation of Cap-and-Trade Allowances for Adaptation

- **Ensure that any natural resource adaptation funding fully recognizes the role of the USDA Forest Service and State Forestry Agencies in helping the national forest system and state and private forests adapt to climate change.**

Statewide Forest Resource Assessments and Strategies

- **Provide for maximum flexibility in the national guidance on state forest resource assessments and strategies to allow states to best develop and use the results to include the ways in which they apply data on climate change impacts, adaptation, and mitigation.**

CLIMATE CHANGE MITIGATION STRATEGIES

Woody Biomass as an Energy Source

Defining Renewable Biomass

- **Support the Farm Bill definition in order to maximize flexibility and opportunity. Biomass from forest management activities on public lands, including practices that increase resilience of late successional or mature forests must be included in these standards.**
- **Provide a consistent definition of renewable biomass that applies to a federal Renewable Energy Standard and a Renewable Fuels Standard. This is needed so that investors can rely on biomass supply estimates.**
- **Improve the effectiveness and utility of longer term stewardship contracts to support continuity of wood supply from federal lands, sustainability, and business planning necessary to attract investment.**
- **Recognize greenhouse gas benefits of bioenergy through "carbon neutral" determination in the energy sector CO₂ reporting because emissions from biomass are implicitly included in the forestry and land use sector accounting.**

Harvesting Guidelines, Monitoring and Verification

- ***Encourage existing certification systems to undergo reviews and updating and of their standards to address the removal of biomass from forests. Engage renewable fuel producers, bioenergy facilities, biomass suppliers and other interested parties in the development of a flexible industry standard and credible verification programs.***
- ***The responsibility of verifying biomass should reside with the renewable fuel producer and should include built-in flexibility for producers and suppliers to choose among a variety of verification tools (e.g., third-party certification by qualified professionals or self certification from feedstock suppliers).***
- ***Provide greater support to the Forest Inventory and Analysis (FIA) Program to assure that information provided is based on adequate sample size for all federal and private forest lands. Incorporate metrics into the program that allow tracking of trends for biomass volume and carbon stocks.***

FOREST CARBON SEQUESTRATION AND CARBON OFFSETS

Types of Forestry Offsets

- ***Eligible activities for forest offsets should include, at a minimum, afforestation, reforestation, improved forest management, avoided deforestation or conversion of forests to non-forested land uses and deforestation, urban forestry, and harvested wood products.***

Carbon Offset Eligibility Challenges: Real

- ***Include robust accounting methodology in legislation and rulemaking that defines forestry offsets. Systems employed by different registries should be linked to reduce the possibility of double-counting, and to facilitate validation.***
- ***Design a consistent approach to monitoring and verification of carbon offsets with the role of state and federal entities in the verification process clearly defined. Ensure that a “ton is a ton” of carbon regardless of the source.***
- ***Assign third-party verification of forestry carbon credits to those who have professional forestry skills.***

Carbon Offset Eligibility Challenges: Permanence

- ***Establish a consistent standard for permanence to facilitate confident trading.***
- ***Create registries to develop buffer pools or insurance mechanisms that will address the risk of reversal, and mechanisms for renewal of shorter term contracts to achieve the necessary full project duration.***

Carbon Offset Eligibility Challenges: Additionality and Stacking

- **Create clear and rigorous standards for third-party verification to determine additionality.**
- **Allow broad stacking of different types of credits (such as carbon and biodiversity) to provide incentives to maximize ecosystem service values when making forest management decisions.**

Carbon Offset Eligibility Challenges: Leakage

- **Require leakage accounting in all offset projects so that participants, backed by a third party, track and report on the potential for leakage. Develop a clear and consistent methodology to guide this requirement.**

Carbon Offset Eligibility Challenges: Early Action

- **Credit entities for taking early action and develop a standardized formula to account for timing adjustments.**

Carbon Offset Eligibility Challenges: Reporting and Registry

- **Require consistent reporting for all components of the offsets trading market. Draw upon existing registries at the state, regional, and federal levels to develop a single, consistent database for record-keeping.**
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- **Develop guidance regarding title to offset credits, particularly as it relates to project activities that are funded with public dollars or for projects undertaken on public lands with private funding.**

Beyond Offsets

- **Support natural resource adaptation funding that is delivered through State and Private Forestry and other USDA programs. Integrate those programs with efforts being made by states, local governments, tribes and non-governmental organizations.**
- **Focus new programming on non-industrial private landowners that have a forest management plan in place (such as a Forest Stewardship Plan).**
- **Maximize landowner participation in conservation and management supporting climate adaptation and mitigation by, for example, offering short-term contracts.**
- **Assign prices regionally based on known market values, and provide State Forestry agencies with guidance that allows them to effectively administer the new suite of incentives. Funding from allowances should support this effort, including new specialized expertise.**

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