

Forest Sector Workgroup on Climate Change Mitigation Final Report

Co-conveners

Craig Partridge, Department of Natural Resources

Stephen Bernath, Department of Ecology

Facilitators

Jerry Boese, Ross and Associates Environmental Consulting, Ltd.

Andy Chinn, Ross and Associates Environmental Consulting, Ltd.

Membership

John Arum	Washington Environmental Council
Len Barson/Bill Robinson/Cathy Baker	The Nature Conservancy
Tim Boyd	Port Blakely Tree Farms, LP Vaagan Brothers Lumber, Inc. Boise Cascade, LLC Boise, Inc.
Clare Breidenich	Western Power Trading Forum
Nina Carter	Audubon Washington
Michelle Connor	Cascade Land Conservancy
Kyle Davis	PacifiCorp
Danielle Dixon	NW Energy Coalition
Llewellyn Matthews/Jay Gregory	Northwest Pulp and Paper Association
John Miller	Clallam County
Debora Munguia/Adrian Miller	Washington Forest Protection Association
Miguel Perez-Gibson	Climate Solutions
Phil Rigdon	Yakama Nation
Edie Sonne Hall	Weyerhaeuser
Steve Stinson	Family Forest Foundation Washington Farm Forestry Association
Paula Swedeen	The Pacific Forest Trust
Bettina von Hagen/George Schunk	Ecotrust

Table of Contents

Executive Summary	1
Introduction	3
Avoided Forest Conversion through On-Site Clustering and Transfer of Development Rights Program	7
On-Site Clustering	7
Transfer of Development Rights Program	8
Creating Urban Forests to Address Climate Change	11
Forest Management	15
Introduction.....	15
Additionality and Baseline	17
Leakage	18
Permanence/Enforceability	19
Measurement and Verification.....	21
All-Pool Accounting, Including the Harvested Wood Products Pool	22
Complementary Carbon Storage Incentive Program	24
Data Needs	29
Other Related Recommendations	31
Summary.....	31
1. Support Building Materials with Low Embodied Greenhouse Gas Emissions as Way to Keep Working Forests as Forests.....	31
2. Recommendation to convene stakeholder group to examine policy options for guiding growth in rural and resource lands	33
3. Ecosystem Services Districts Proposal	33
4. Forest Health and Avoided Forest Fires	34
Appendix A – Workgroup Charter	37
Appendix B - Building Material Embodied Greenhouse Gas Analysis	41

Members of the Forest Sector Workgroup on Climate Change Mitigation



John Arum,
Washington Environmental Council



John Miller,
Clallam County



Tim Boyd,
Port Blakely Tree Farms, LP
Vaagen Brothers Lumber, Inc.
Boise Cascade, LLC
Boise, Inc.



Adrian Miller,
Washington Forest Protection Assn.



Clare Breidenich,
Western Power Trading Forum



Miguel Perez-Gibson,
Climate Solutions



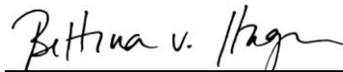
Nina Carter,
Audubon Washington



Bill Robinson,
The Nature Conservancy



Michelle Connor,
Cascade Land Conservancy



Bettina von Hagen,
Ecotrust



Kyle Davis,
PacifiCorp



Edie Sonne-Hall,
Weyerhaeuser



Danielle Dixon,
NW Energy Coalition



Steve Stinson,
Farm Forestry Assn.,
Family Forest Foundation



Lewellyn Matthews,
NW Pulp and Paper



Paula Swedeen,
The Pacific Forest Trust

Executive Summary

Introduction

The multi-stakeholder Forest Sector Workgroup on Climate Change Mitigation was chartered in April 2008 by the Director of the Department of Ecology and the Commissioner of Public Lands to make recommendations in response to direction from the Washington Legislature in E2SHB 2815. The Workgroup met intensively and collaboratively for six months and reached consensus on a series of recommendations for how Washington forest landowners can participate voluntarily in an offset or other credit mechanism under a regional greenhouse gas cap-and-trade system. While most Workgroup members have a variety of important reservations about some of the recommendations, all members agree this package of recommendations represents a significant step in encouraging Washington to lead in larger-scale efforts so as to appropriately recognize the forest sector's positive contributions to mitigate climate change. The members therefore agree to support these recommendations. The recommendations are expected to be forwarded to the Legislature for its deliberation and, if adopted, set the stage for more detailed design work later. Workgroup members are proud to have participated and look forward to future similar opportunities.

The Workgroup is recommending a mix of carbon offset proposals, other carbon incentive proposals, and several related recommendations. The offset and other credit recommendations address avoided and mitigation conversion of forest land to non-forest uses, urban reforestation, and forest management to increase carbon sequestration and storage.

Avoided Conversion

The Workgroup recommends two offset opportunities related to retaining forest lands while accommodating inevitable development on a smaller cleared "footprint."

1. In one opportunity, developers could create a marketable offset by clustering legally allowed development on a smaller portion of a developable parcel in the urban or rural zone, permanently protecting the remaining working or conservation forests as forest.
2. In the other opportunity, local governments, with the State, could create a marketable offset by creating and implementing a Transfer of Development Rights (TDR) program that succeeded in permanently conserving otherwise developable forest land by transferring development rights to lands within urban growth areas and compensating forest land owners for the transferred rights. The forest land would remain as working or conservation forest land. State start-up funding would be needed for local programs. Revenue from State sale of aggregated offsets would go to local governments to administer TDR programs and transactions.

Urban Forests

The Workgroup recommends that local governments be able to create marketable offsets by establishing and implementing urban tree-planting programs meeting specific requirements based on a new California protocol, but tailored to Washington State.

Forest Management

The Workgroup recommends a dual offset and non-offset approach to increasing and/or retaining carbon storage through forest management, including recognizing and incentivizing forest landowners for current significant contributions to carbon storage.

1. The offset approach would be based on a “business as usual” baseline, with marketable offsets created by forest management projects that ensure carbon storage above that baseline, persisting for at least 100 years. Contractual and regulatory safeguards would guarantee project performance against reverses. Administrative simplicity would also be a program goal. Workgroup agreement to this approach on baseline is contingent, as described in number 4 below.
2. Storage can be a combination of in-forest storage and storage in harvested wood products. All storage pools with significant change would be subject to accounting.
3. The non-offset approach is a recommended Complementary Carbon Storage Incentive Program. It would provide incentives for landowners whose forests meet a yet-to-be-developed eligibility criterion, who commit to maintaining a level of carbon storage. During periodic enrollment periods, State funding for incentives could come from revenues derived from operation of the cap-and-trade system, as described in Western Climate Initiative recommendations. Payback would be required for losses of credited carbon storage or landowner withdrawal from the program. This program recognizes a range of important ecological benefits accompanying carbon storage in forests. This program is also an attempt to help meet legislative direction to not disadvantage the state relative to states with lower forest practices regulations, an inherent part of a “business as usual” baseline.
4. If the Complementary Program is not created and appropriately funded, Workgroup members agree that another effort should be made to meet the goal of incentivizing broad forest landowner participation to meet State climate change goals. This may include using discounting for offsets created above an enrollment threshold.

Data Needs

The forest sector workgroup agreed that funding support for the Washington State Parcel and Forestland Database was a necessary component of tracking offsets or other carbon incentive proposals.

Other Related Recommendations

The Workgroup discussed several other topics that fell outside the Workgroup’s scope or about which consensus on detailed recommendations was not achieved, but which the Workgroup believes should be further developed in other venues due to their indirect forest carbon benefits. These include:

1. Improved lifecycle analysis of embodied greenhouse gasses in building materials, along with a labeling program and potential mitigation under the State Environmental Policy Act (SEPA).
2. Further discussion on guiding foreseeable growth in rural and resource lands.
3. Possible creation of ecosystem service districts to formalize mutually beneficial relationships between forest landowners providing ecosystem services and the beneficiaries of those services.
4. Incentives for landowners undertaking forest treatments that improve forest health and reduce the risk of uncharacteristic wildfires.

The Workgroup did not have sufficient time to develop recommendations on several other priority topics including indirect emission reductions through energy resource substitution and building material product substitution by forest-derived materials.

Introduction

The Forest Sector Workgroup (FSWG) on Climate Change Mitigation is pleased to present its consensus recommendations for how the forest sector can contribute to mitigating climate change while also helping to perpetuate the many ecological, economic, and social benefits of the Evergreen State's forests. The recommendations in this report describe how the forest sector can provide greenhouse gas emission offsets for use in voluntary or regulated carbon markets, such as within an emission cap-and-trade system, and can receive other credits and incentives for maintaining and enlarging the large carbon sink represented by Washington's forests while also reducing the cost of compliance for the capped sectors. The Workgroup developed these recommendations between April 2008, when it was appointed by Department of Ecology Director, Jay Manning and Commissioner of Public Lands, Doug Sutherland, and November 2008, when its designated period of work ended.

Legal and Institutional Context

The Workgroup arose out of legislative direction in 2008 omnibus climate change legislation (E2SHB 2815). The forestry section of that legislation directed in part the development of recommendations, "regarding how forestry...lands and practices may participate voluntarily as an offset or other credit program in the regional multi-sector market based system being designed...in association with the Western Climate Initiative. The recommendations must ensure that the baseline for this offset or credit program does not disadvantage this state in relation to another state or states."

The 2008 legislative action was in part an outgrowth of previous work in 2007 by the Governor's Climate Advisory Team (CAT) and its Forestry Technical Work Group (TWG). Based on the TWG's work, the 2007 CAT identified five "most promising" climate change mitigation strategies, including addressing forest health and fire issues, slowing conversion of forest lands to non-forest uses, increased use of wood products, development of wood-based biofuels and other products, and promotion of urban forests.

The 2008 legislation also occurred against the backdrop of the Western Climate Initiative (WCI), a multi-state/province regional effort to develop a proposal for a regional cap-and-trade program for green house gasses. WCI was ongoing during the life span of the Forest Sector Workgroup, issuing draft recommendations to its member jurisdictions in July and final design recommendations in late September. The features and parameters of a regional cap-and-trade program served as an important context for the Workgroup's recommendations, providing both opportunities and constraints. These features included:

1. Excluding the forest sector within the scope of the cap.
2. Embracing a robust offset opportunity for sectors outside the cap, such as forest management, to receive incentives for contributions to greenhouse gas reductions.
3. Reflecting standard national and international requirements for offsets, such as that they be real, additional, verifiable, permanent, and enforceable.
4. Use of revenue from auctioning of emission allowances under the cap for forestry carbon sequestration activities outside the cap.

During the Workgroup's deliberations, other forestry climate stakeholder groups were active in Oregon and California, and at the national level. The Workgroup monitored these efforts and explicitly coordinated with the Oregon stakeholder group, and made use of work products from both the Oregon and the California efforts. The Workgroup also became familiar with existing forestry offset protocols and guidelines from the California Climate Registry, the Chicago Climate Exchange, the Regional Greenhouse Gas Initiative, the Voluntary Carbon Standard, and the national inventory and reporting guidelines developed pursuant to section 1605(b) of the Energy Policy Act of 1992, as well as other

relevant work from scientific literature. The Workgroup also was assisted by a contracted study by the University of Washington's College of Forest Resources and heard presentations by experts from Oregon State University; the USDA Forest Service; Sierra Pacific Industries; The Climate Trust; and Washington Department of Community, Trade and Economic Development's Growth Management Program.

During its first two meetings, the Workgroup developed and adopted a Charter, a Statement of Common Interests (see box), and a prioritized work plan. The Charter described the purpose of the Workgroup as "to provide a forum for stakeholders and government representatives...to potentially develop recommendations to the Departments of Ecology and Natural Resources to meet the intent of the [E2SHB2815]."

Statement of Common Interests

1. The forest sector workgroup supports the reduction of global GHG emissions.
2. Healthy and working forestlands play an important part in reducing GHG.
3. A comprehensive system needs to be designed to provide incentives to keep forest landowners in forestry and maintain the forest land base.
4. A well-designed system will produce the opportunity for the forest sector to bring high quality, low carbon products to the markets.
5. A system should not create unintended environmental or economic consequences.

The work plan listed the following six priorities in order for Workgroup attention:

1. Avoided conversion to non-forest cover.
2. Forest management and harvested wood products.
3. Afforestation and reforestation, especially in urban areas.
4. Substitution of wood for fossil fuel-intensive products.
5. Avoided emissions from fire and other natural disturbances.
6. Biomass energy.

Unfortunately, time constraints did not allow the Workgroup to address all of these priorities.

The work plan also included the cross-cutting design principles for offset projects and alternatives to offsets to achieve workgroup objectives.

The Workgroup method included educational sessions, subgroup work on issues, and full group deliberation and adoption of recommendations.

Workgroup Results

The Workgroup included a broad range of stakeholder interests including conservation organizations; land trusts; large and small forest landowners; timber and pulp and paper manufacturers; the power sector; climate and energy citizen groups; and state, local, and tribal government. The Workgroup was well aware of the realities of its legal and institutional context, such as all those described in the previous section. The group especially kept in mind the standard requirements for carbon offsets in established

markets and protocols, including requirements for additionality, permanence, and avoiding leakage. Some members of the group also expressed questions and skepticism about applying those acknowledged requirements to the forest sector offset situation, especially in Washington, given the explicit legislative direction in E2SHB 2815 not to disadvantage Washington. The group was also acutely aware of the time constraints on its work, as well as other venues concurrently working on the same issues or likely to convene in the near future, and the opportunity before the group to make timely and pertinent recommendations.

From its outset, the Workgroup adopted a consensus approach to deliberation and developing workgroup recommendations. This opened opportunities to learn and discover common interests while also empowering each group member and interest to be clear about individual priorities and concerns. The desire for consensus also may have guided workgroup recommendations away from the most bold and challenging ideas, but that tradeoff was acceptable to the group in light of the power of consensus to broaden ownership and support.

The overarching rationale for the Workgroup's consensus result can be found in its goals, its desire to provide leadership, and its broad range of topics. The Workgroup attempted to adapt the 2007 Climate Advisory Team's "most promising" forestry strategies to address the rigor demanded of offsets in a compliance market, where an offset must function like an actual reduction in greenhouse gas emissions. The Workgroup tried to do this in a way that provides incentives for retention of Washington's working forests, and doesn't penalize Washington forest landowners for the environmental benefits they already provide as a result of Washington's strong forest practices rules. The Workgroup chose to concentrate its work where other forest carbon protocols are lacking but where broad interest exists for innovation, such as avoided conversion and all-pool carbon accounting, to give Washington State opportunities for leadership.

In general, the Workgroup recommendations:

1. Provide offset-based incentives to at-risk working forests on which the footprint of development that does occur can be reduced, or development rights from forest lands can be transferred into Urban Growth Areas.
2. Concurrently increase permanent establishment of trees in urban areas.
3. Provide dual offset and non-offset incentives for carbon-sequestering forest management on productive forests, including accounting for in-forest and wood products carbon pools.

The Workgroup makes other related recommendations to be taken up in other venues, where land use guidance, green building practices, and development of financial incentives can have important indirect effects on forest sector carbon storage.

While all Workgroup members have confirmed that their signatures represent agreement on and support for the recommendations contained here, individual members retained specific cautions and concerns. For example, some Workgroup members are disappointed by the constraints imposed by established cap-and-trade offset requirements regarding strict "additionality," and believe this may impose limits on the ability of Washington forest landowners, especially family forest landowners, to participate in offset markets. These group members, primarily concerned about retention of Washington's forest land base, have greater expectations about how forest landowners should be able to benefit financially from already providing ecosystem services such as carbon storage. However, strict additionality requirements cannot credit carbon benefits of current business practices. Some members feel the Workgroup could have gone farther in critically examining this perspective. While all Workgroup members recommend that the proposed Complementary Carbon Storage Incentive Program be established to provide those broader incentives, there remains some concern as to whether even this program fully meets legislative intent. Other Workgroup members felt the consensus recommendations do cover new ground and contain

important innovations, such as all-pool accounting including carbon storage in long-lived wood products. Some members are sensitive to the perceived momentum of established carbon protocols, which could limit receptivity to the Workgroup's proposed innovations, and were therefore cautious about going too far. These members emphasize the advantages to Washington of using a business-as-usual baseline as helping to ensure forestry carbon offset projects from Washington will be readily accepted in national and international markets.

Other Workgroup members are primarily concerned about the role of offsets in proposed cap-and-trade systems, and the effect of offsets either to improve compliance cost and efficiency or to retard technology development for emission reductions by capped entities. The Workgroup therefore emphasizes that it is making recommendations to support bringing high *quality* forest sector offsets to the market, whereas it is making no statement about the *quantity* of offsets considered desirable in a cap-and-trade system. Finally, some Workgroup members urged caution in making specific assumptions about sources of revenue for the Complementary Carbon Storage Incentive Program and the linkage with State use of greenhouse gas emission allowances associated with particular business sectors. Therefore, the recommendations are more general in that regard.

Despite these cautions, disappointments, and concerns, workgroup members are unanimous in their commitment to reducing atmospheric greenhouse gasses and conserving Washington's working forests, and to linking these two objectives through their consensus recommendations. Workgroup members are proud of the work they've accomplished together in a very short time and recognize the significance of their recommendations in finding new voluntary ways of maintaining and enlarging the carbon sink represented by Washington forests and the long-lived products derived from them. If these recommendations are successfully implemented, the State will also see important benefits for water and air quality, forest habitat and biodiversity, and the amenities derived from forests. The workgroup members do see these recommendations as promoting a strong and innovative leadership position by Washington State as proposed regional and national cap-and-trade systems and other forestry carbon crediting opportunities are developed.

Workgroup members, by making these consensus recommendations, are also signaling their intent to collectively and individually support the recommendations in legislative and other decision-making venues, while not giving up their prerogative to individually promote additional outcomes that are not in direct conflict with these recommendations.

Next Steps

These Forest Sector Workgroup recommendations are presented to the Director of the Department of Ecology and the Commissioner of Public Lands, pursuant to the Workgroup Charter. Workgroup members understand their recommendations will be included in the report to the Legislature called for by E2SHB 2815. Workgroup members anticipate working during the 2009 legislative session in support of appropriate steps to authorize the Workgroup's recommendations. The Workgroup anticipates that more detailed technical work will be needed at the state, regional, and national levels for these recommendations to be implemented.

The Workgroup did not have sufficient time to complete work on all the priorities on the group's work plan, including work on forest health and fire emissions, and on indirectly reducing emissions by substituting woody materials for more greenhouse gas-intensive energy sources and building materials. These issues were both rated "most promising" by the 2007 CAT. The Workgroup calls attention to those additional priorities and recommends that a similar stakeholder workgroup be created as soon as possible to develop recommendations on those issues. Individual Workgroup members are willing to serve on such a future group.

Avoided Forest Conversion through On-Site Clustering and Transfer of Development Rights Program

Summary

The Workgroup recommends two offset opportunities related to retaining forest lands while accommodating inevitable development on a smaller cleared “footprint.”

1. In one opportunity, developers could create a marketable offset by clustering legally allowed development on a smaller portion of a developable parcel in the urban or rural zone, permanently protecting the remaining working or conservation forests as forest.
2. In the other opportunity, local governments, with the State, could create a marketable offset by creating and implementing a Transfer of Development Rights (TDR) program that succeeded in permanently conserving otherwise developable forest land by transferring development rights to lands within urban growth areas and compensating forest land owners for the transferred rights. The forest land would remain as working or conservation forest land. State start-up funding would be needed for local programs. Revenue from State sale of aggregated offsets would go to local governments to administer TDR programs and transactions.

Leakage

The Avoided Forest Conversion recommendations are strongly shaped by attention to the issue of “leakage.” Leakage, or displacement, refers to development being displaced from the project area to another forested location due to market demand, and to the carbon emissions from forest clearing at that other location. To avoid leakage questions, Avoided Forest Conversion offset projects are recommended to include development, though on a smaller footprint, either through clustering or transfer into urban areas.

Baseline and Additionality

For Avoided Forest Conversion, the “business as usual” baseline is the carbon storage in trees left, if any, following development clearing according to current legal provisions. Additional carbon storage, qualifying as an offset, would be the difference in storage between this baseline and the remaining forests resulting from clustering or transfer of development rights (TDR), to be managed at the landowner’s discretion under current forest practices rules. More detail is found in the specific recommendations.

Permanence

For Avoided Forest Conversion, assuming forest landowners fully realize the currently available real estate value of their land through clustering or TDR payments, permanence is assumed to mean perpetual retention of conservation or working forests, as explained in the specific recommendations.

On-Site Clustering

The Workgroup recommends that an avoided conversion offset or credit be created for on-site clustering that results in permanent protection of working or conservation forest land. The offset or credit would be available to forest landowners and would be based on the difference in the amount of forestland (carbon) lost per housing unit based on development under a business as usual (BAU) scenario allowable under

local zoning and development regulations and voluntary “clustered” development that would accommodate the same (or in the case of Urban Growth Areas (UGA) possibly greater) number of housing units on a smaller footprint. The offset or credit would be awarded based on the following conditions:

1. The offset or credit should be limited to forested tracts in areas other than those designated “resource lands” under the Growth Management Act (GMA). Clustered development proposals involving GMA-designated forest lands or other GMA-designated resource lands of long-term significance would not be eligible for an offset or credit.
2. Within rural areas, credit awarded for clustering would be based on the number of developable lots provided in local zoning and through the application of local development regulations and physical criteria. To the extent that the number of lots is increased in the clustered development, the carbon credit awarded will be reduced in proportion to the number of additional lots. (For example, if five developable lots are available without clustering, but six lots are developed under a clustered scenario, the credit awarded will be reduced by one-fifth. Likewise, if five lots are available and ten (or more) lots are developed, the credit will be reduced to zero.)
3. Forested tracts not developed as a result of the clustering will be permanently protected with a forest conservation easement or other legal instrument with similar third party enforceability and durability. Such other legal instrument shall have the same effect as a conservation easement, but will avoid the complexity and costs normally associated with such easements.
4. The state and local governments will advertise the availability of the opportunity for carbon offset payments for clustered development. Landowners contemplating clustered development may state their intention to the appropriate organization administering the carbon offset program in order to estimate the potential carbon offset payments that may be available for the intended clustered development.
5. Forested tracts become eligible for the clustered development offset or credit when a complete application is submitted under local development laws. Payment should occur after the clustered development has been completed and the forest conservation easement or other legal instrument is recorded.
6. The offset should be based on an estimate of the difference in the actual area likely to be converted between the business as usual scenario and the clustered development scenario, not on the total lot size. The offset credit will be adjusted as provided in item 2 above for bonus lots. Offset credits will also be based on amounts of stored carbon per acre using the appropriate forest management baseline as the presumed volume of stored carbon, applied to the difference in converted area (see recommendations on Forest Management).

Besides the legal instrument provided for in item 3 above, granting of carbon offsets or other credits for on-site clustering will entail no other restrictions on commercial forest management on the non-developed area result from this action. Further carbon offsets or other credits may be independently obtained for the non-developed area based on forest management which sequesters and stores additional carbon above forest management baseline conditions. (See recommendations for Forest Management.)

Transfer of Development Rights Program

The Workgroup also recommends that the State develop a program to provide incentives to local jurisdictions that implement a Transfer of Development Rights (TDR) program that reduces pressure for forest conversion within the state and thus statewide GHG emissions from forest conversion. The program would be funded initially through State seed grants to participating cities and counties and later through the issuance and sale by the State of emission reduction credits amassed based on the transfer of

development rights from forest land to land within Urban Growth Areas (UGAs) and the permanent conservation of working or conservation forest land through forest conservation easements or other legal instruments. Because the program would be targeted at the county and city level, it would match desired land use outcomes with emission reduction incentives. The State would propose development of this program to support local TDR efforts, in explicit reliance on the opportunity to receive carbon offset payments for project areas and carbon storage conserved, to ensure the project-level TDR transactions actually occur. The program would have the following features:

1. The State should establish a program that credits emission reductions due to avoided forest conversions achieved through Transfer of Development Rights policies, based on the transfer of development rights (TDR) into Urban Growth Areas (UGAs) where growth is already expected to occur, to ensure permanent forest conservation while accommodating displaced development in a smaller carbon footprint.
2. Emission reductions would be credited on a project-by-project basis based on the net carbon storage retained under the program and require: (a) a transfer of development rights from forest land¹ that is at substantial² risk of conversion, to land within a UGA; and (b) permanent conservation of the forest land through a forest conservation easement, or other legal instrument with similar third party enforceability and durability.³ Net carbon storage means net of BAU storage at both the sending and receiving sites combined.
3. Local jurisdictions would receive the credit only if they adopt and maintain a Transfer of Development Rights program that meets state standards (see item 6 below) and can show that the Transfer of Development Rights program is responsible for achieving measurable reductions in the conversion rate that are additional to what would have occurred under a business-as-usual (BAU) scenario. The demonstration of additionality will be made based on analysis of county-level data, and will be based on reduction in greenhouse gas emissions from business-as-usual conversion of the forest land area in the state or local area, to conversion occurring as a result of the TDR program. The State (agency to be determined) will ensure statewide consistency in the conduct of this analysis by performing the analysis or assisting the local jurisdiction in performing the analysis according to state standards. This county-level data analysis should:
 - a. Be based on the best available sources of information, such as Forest Inventory Analysis (FIA) data, forest zoning and Current Use Taxation (CUT) data, and parcel-level data currently being developed by UW College of Forest Resources⁴ in partnership with the Family Forest Foundation.
 - b. Include information about current zoning, issuance of rural and forest zone building permits or other proxies for establishing background rate of conversion at the county level.
 - c. Separate changes in conversion rates attributable to the TDR program from those attributable to market forces.

¹ The incentive for the landowner to avoid conversion would be the revenue received from the sale of the

²“Substantial” means that the conversion risk must be evident from legal and/or economic indicators and expected to occur in the foreseeable future. Within that limit, local government TDR programs are expected to determine desirable “sending” areas as well as the number of development units to be transferred.

³ Both the TDR and the conservation easement would be accomplished in the context of a single transaction. The easement would be a *forestry* conservation easement (allowing any forest practices consistent with other laws). The easement would be perpetual.

⁴ See Other Related Recommendations: and <http://depts.washington.edu/wagis/projects/parcels/>

4. The State would aggregate these reductions and sell them as emission reduction credits on the national or international offset market and distribute the revenues back to the participating jurisdictions based on actual development right transfers and associated conservation easements accomplished. The State would also provide seed money to participating jurisdictions, to encourage early adoption while avoiding issuance of credits that are not based on actual conversion avoidance. The source of this seed money would be determined by the state legislature.⁵
5. Participating local jurisdictions shall use program revenue for administration of the TDR program or addressing TDR receiving area needs.
6. Recommended features of Transfer of Development Rights program:
 - a. Program requirements and performance standards should promote permanent, verifiable reduction of emissions from forest conversion within participating local jurisdictions. Performance standards should address essential carbon relevant features of a qualified Transfer of Development Rights program and permanent forestry easement, including:
 - (1) Leakage: demonstration that the displaced development has been accommodated in a smaller carbon footprint.
 - (2) Permanence: standards for conservation easement language, monitoring and enforcement, and eligible holders.
 - (3) Additionality: demonstration that the jurisdictions' implementation of Transfer of Development Rights Program are above and beyond BAU, as discussed in item 3 above.
 - b. Data needs to meet the requirements of section 3 above.
7. The State should establish a statewide forest conversion baseline and conduct monitoring of forest conversions emissions that takes into account county-specific conversion rates and risks and continue to monitor forest emissions over time. If the statewide forest conversion monitoring does not indicate an overall reduction in forest conversion trends over a trial period (e.g., 10 to 15 years) as a result of this program the carbon offset/credit elements of the Transfer of Development Rights program may be terminated or modified and improved or other policy tools explored.
8. For the purposes of this TDR/offset program, participating jurisdictions will only receive carbon credit revenue for emissions reductions achieved as a result of voluntary, market-based transfers of development rights as described in this paper.
9. The Forest Sector Workgroup endorses other elements of the Transfer of Development Rights program being developed pursuant to RCW 43.362.020, that are consistent with the forestry carbon provisions of these recommendations.

⁵ The Workgroup considered a preliminary budget estimate of \$2 million, based on \$100k for 20 timber planning counties.

Creating Urban Forests to Address Climate Change

Summary

The Workgroup recommends that local governments be able to create marketable offsets by establishing and implementing urban tree-planting programs meeting specific requirements based on a new California protocol, but tailored to Washington State.

Background

Urban Forests reduce CO₂

Urban forests allow local jurisdictions to permanently increase carbon storage in trees. Urban forests reduce atmospheric carbon dioxide directly and indirectly. As long as trees are growing, they directly remove CO₂ from the air, sequestering it to build living matter—leaves, stems, trunk, roots. Urban forests have indirect effects on atmospheric CO₂ and other greenhouse gases. Trees around buildings can reduce heating and air conditioning use, thereby reducing emissions of GHGs associated with the consumption of electricity, natural gas, and fuel oil.

Urban trees also provide many co-benefits that are not necessarily climate-related, such as providing habitat for birds and other wildlife, providing aesthetic value, and increasing property values.

California's Urban Forest protocols

Through its Climate Action Reserve Program, the California Climate Action Registry supplies protocols to quantify GHG emission reductions (or offsets). In August 2008, the California Registry released two protocols⁶ (developed by the US Forest Service, Pacific Southwest Research Station, Center for Urban Forest Research) that describe in detail how to create, maintain, calculate, and verify urban forest projects. The protocols clearly define project sites and boundaries; ownership (municipality, educational institution, utility, and/or a person/organization working in partnership with any of the entities); issues regarding additionality, leakage, complying with existing regulation; GHG assessment boundaries and reduction calculation methods; quantifying CO₂ sequestration; permanence of a project for 100 years; and finally, on-going tree monitoring and maintenance plans. The registry oversees and accredits independent third-party verifiers. Meeting these protocol requirements allows the site to qualify as carbon offsets.

The California Registry supports projects that yield surplus GHG reductions. These reductions are additional to what might otherwise have occurred—the reductions are above and beyond business as usual. Projects satisfy the “additionality” eligibility rule by passing a Performance Standard Test. The test establishes a threshold where projects exceed business-as-usual practices and generate surplus/additional GHG reduction.

Washington State's Urban Forest Program

The 2008 Legislature established a statewide “Evergreen Communities” urban forest program (E2SHB 2844) to increase the environmental and social benefits from urban forests. The Legislature appropriated

⁶ California Climate Action Registry, August 2008. *Urban Forest Project Reporting Protocol*, Version 1.0.

California Climate Action Registry, August 2008. *Urban Forest Project Verification Protocol*, Version 1.0. See <http://www.climateregistry.org/tools/protocols/project-protocols.html>.

funds to the Department of Community Trade and Economic Development (CTED) and Department of Natural Resources (DNR) to:

- Research existing urban forests program.
- Develop a model ordinance for local government.
- Develop criteria that could qualify local governments for future funding.
- Assess and inventory two counties' urban forests.
- Create a model on how to conduct such inventories.

The Workgroup encourages CTED and DNR to include amended California Protocols as part of the new Urban Forest Program in Washington (see recommendations below).

For local governments to participate in an urban forestry program to address climate change, their staff will need to become expert in urban forests and carbon emission protocols. Local funding is limited for this purpose and must be supplemented with state or federal grant funds. Therefore, the Workgroup supports legislative funding for a grants program within CTED for local governments to create urban forest programs.

Terminology

The Workgroup recommends using the concept of “reforestation,” which is the planting of trees where they have been historically or traditionally found. Reforestation does not include tree planting required under Washington’s Forest Practices Board regulations. Rather, the Workgroup focused on reforestation in Urban Growth Areas⁷. Urban Forest Protocols, as referenced in this document, are used for tree planting programs within Urban Growth Areas, whereas Forest Management protocols are used to create forest stands. Projects intending to grow trees for carbon credit on agricultural lands should use the Forest Management Protocols.

Afforestation is a valid form of carbon sequestration, but there is a wide range of opinion about its applicability in Washington State, and the Workgroup believes there are limited applications of the concept in the state. Instead, the Workgroup used the term “reforestation” with reference to urban settings, as described above.

Recommendations

Therefore, based on the background information presented above, the Workgroup makes the following recommendations:

1. Washington State should establish policies and programs to give local jurisdictions incentives to inventory, increase, and maintain urban forests.
2. The Workgroup supports legislative funding for a grants program to build capacity for local governments to create urban forest programs.⁸

⁷ "Urban growth areas" means those areas designated by a county pursuant to RCW [36.70A.110](#).

⁸ The Workgroup estimates that roughly \$2 million would be needed for a grants program. The program would be a “needs-based grant and competitive awards program to provide financial assistance to cities, towns, and counties for the development, adoption, or implementation of appropriate management plans or ordinances developed” (E2SHB 2844, Section 9) by the Evergreen Communities Act. The goal is to “reward innovation by a successful evergreen community and provide resources and assistance to the applicants with the greatest financial need” (E2SHB 2844, Section 9). This is based on an assumption that 20 local governments could participate and receive as much as

3. Washington State should develop an Urban Forest Protocol that allows urban forest programs to qualify for carbon credits. The California Climate Action Registry's Urban Forest Project Reporting (and Verification) Protocols (as of August 2008) should be used as a starting point and should be amended to apply to Washington based on the following guidelines:
 - a. The local jurisdiction would not be required to account for carbon emissions during the creation and maintenance of the project. We recommend this because we anticipate that these emissions will be accounted for under the transportation sector of the Western Climate Initiative.
 - b. The California Protocol's appendix and equations should be reviewed by DNR's urban forest program for their applicability to Washington State. If DNR finds that the protocol's appendix and equations (e.g., tree growth tables) should be amended to meet Washington's ecosystems, then DNR should develop appropriate appendix and equations for Washington.
 - c. The amended California Protocols should be applied to urban forest lands as defined in RCW 76.15.010⁹ and the amended protocols would apply to public and private lands in Washington, as compared to municipalities, utilities, and educational institutions in California.
 - d. Once amended, the protocol should be used to account for and report greenhouse gas emission reduction offsets in Washington's urban forests.
4. Washington's Department of Community, Trade and Economic Development (CTED) and the Department of Natural Resources (DNR), should integrate the California Protocols, as amended to apply to Washington, into the design of their urban forest programs.

\$100,000 per local government. A modest percentage would need to be added for state administration and oversight. Offset credits would not be issued to finance tree planting and maintenance activities already financed by state fund sources.

⁹ "Urban forest lands" are defined in RCW 76.15.010:

"Community and urban forest" is that land in and around human settlements ranging from small communities to metropolitan areas, occupied or potentially occupied by trees and associated vegetation. Community and urban forest land may be planted or unplanted, used or unused, and includes public and private lands, lands along transportation and utility corridors, and forested watershed lands within populated areas.

Forest Management

Summary

The Workgroup recommends a dual offset and non-offset approach to increasing and/or retaining carbon storage through forest management, including recognizing and incentivizing forest landowners for current significant contributions to carbon storage.

1. The offset approach would be based on a “business as usual” baseline, with marketable offsets created by forest management projects which ensure carbon storage above that baseline, persisting for at least 100 years. Contractual and regulatory safeguards would guarantee project performance against reverses. Administrative simplicity would also be a program goal. Workgroup agreement to this approach on baseline is contingent, as described in number 4 below.
2. Storage can be a combination of in-forest storage and storage in harvested wood products. All storage pools with significant change would be subject to accounting.
3. The non-offset approach is a recommended Complementary Carbon Storage Incentive Program. It would provide incentives for landowners whose forests meet a yet-to-be-developed eligibility criterion, who commit to maintaining a level of carbon storage. During periodic enrollment periods, State funding for incentives could come from revenues derived from operation of the cap-and-trade system, as described in Western Climate Initiative recommendations. Payback would be required for losses of credited carbon storage or landowner withdrawal from the program. This program recognizes a range of important ecological benefits accompanying carbon storage in forests. This program is also an attempt to help meet legislative direction to not disadvantage the state relative to states with lower forest practices regulations, an inherent part of a “business as usual” baseline.
4. If the Complementary Program is not created and appropriately funded, Workgroup members agree that another effort should be made to meet the goal of incentivizing broad forest landowner participation to meet State climate change goals. This may include using discounting for offsets created above an enrollment threshold.

Introduction

Goals

The Workgroup has the following goals in making recommendations for forest management:

- Allow forest landowners an opportunity to participate in carbon offset compliance markets to help provide innovation and efficiencies in achieving the objectives of cap-and-trade systems.
- Help achieve Washington State’s overall greenhouse gas emission reduction goals, by encouraging the retention over time of carbon currently stored on forest land, which might be at risk of reduction or loss. (The state’s current greenhouse gas inventory and projection assumes current levels of annual carbon sequestration will continue into the future.)
- Provide broad recognition of current contributions to climate change mitigation by multiple types of forest landowners and encourage landowners to maintain and increase those contributions over time.

The recommendations in this section attempt to meet all these goals, resolving the issues arising from the need to meet the standard principles for offsets in regional, national, and international compliance markets—that they be real, additional to what would occur without the offset payment, verifiable,

permanent, and enforceable—while at the same time incentivizing current but potentially at-risk levels of forest carbon storage in Washington. These recommendations, by allowing for incentives for levels of carbon storage currently provided by Washington landowners, also attempt to respond to the Washington legislature’s direction that recommendations not disadvantage Washington in relation to other states

General Approach

The Workgroup has reached consensus on a carefully linked, dual approach to forest management which includes a traditional offset approach and also a complementary, non-offset program, described below, that provides incentives for Washington State forest landowners who are willing to make commitments to maintaining or increasing current eligible levels of carbon storage on their forests. This complementary program may be particularly important for forest landowners who currently have above-average levels of carbon stored on their forests, and wish to participate in meeting the state’s greenhouse gas emission reduction goals. The Workgroup recommendations generally describe the complementary program, while leaving some important details for future development.

This dual approach attempts to provide the correct incentives to forest landowners, avoid double-counting of carbon, and allow adequate flexibility to achieve the goals. If the complementary program is not created, as a non-offset program, the Workgroup recommends further efforts to meet the goals stated above within an offset framework in a way that Washington State can promote in a regional context.

Relation to Other Project Categories

The Workgroup sees the Forest Management project category as complementing the offset opportunities described in the Avoided Conversion and Urban Reforestation project categories.

For Avoided Conversion, the business-as-usual baseline presumes some level of development which converts forest land to non-forest uses. The objective of the recommended on-site cluster and transfer-of-development-rights recommendations is to maintain more forest area than in the baseline conditions. No assumptions are made about the specific management of areas of forest retained by such projects (and thus serving as offsets), once development is accommodated on a smaller footprint. Because all Washington State forests store more carbon than non-forests, ongoing forest management could pursue a range of objectives from pure conservation to sustainable management by industrial owners. This Forest Management project category goes further and allows additional offset opportunities for managed forest lands for targeted carbon storage, whether or not the area is at high risk of conversion and whether or not an avoided conversion offset has been sold from the project area.

The Workgroup recognizes a range of views on the conversion threat to commercial forest areas not immediately slated for development. However, one Workgroup goal is to increase overall predictability of forest lands remaining in forest uses and continuing to store carbon.

The Urban Reforestation project category is distinct from the Forest Management category.

Reforestation in previously forested areas outside urban areas could also occur, although the Workgroup believes opportunities are limited in Washington State. Any offsets for reforestation projects outside of urban areas (e.g., agricultural buffers) should be credited based on the BBAU approach for forest management.

Other Principles

These recommendations for forest management offset projects are built on the concept of all-pool carbon accounting, with measurement required for all pools expected to be significantly affected by the project, including in-forest pools and harvested wood products pools. Details are provided below.

Projects may involve diverse strategies, recognizing diverse landowner objectives as to which pools to target for increased carbon storage, while not depleting other pools over time. These strategies, for example, may include but not be limited to longer rotations or more active management. Each project type or project will need to meet applicable design criteria.

The Workgroup acknowledges that these recommendations, such as the recommendation for all-pool accounting, are examples of an innovative new approach which many jurisdictions are interested in developing, and that limited existing examples are available. The Workgroup members, having considered these innovative features, are in consensus regarding all aspects of these recommendations

Additionality and Baseline

As discussed in the Introduction to the Forest Management topic, the Workgroup's consensus approach to carbon sequestration and storage through forest management is for dual tracks, including both participation in a carbon offset market and a complementary carbon storage incentive program. (The same forest carbon storage could not be simultaneously credited under both systems.) The Workgroup acknowledges the importance, in a compliance-based carbon offset market, of the general principle of additionality. Establishing an appropriate baseline is critical to demonstrating additionality. The Workgroup evaluated several approaches to establishing baselines for forest management offsets. All approaches have strengths and weaknesses when applied to forest management.

As an element of the dual approach, which achieved consensus by the Workgroup, the Workgroup recommends that a "business-as-usual" (BAU) baseline, and "beyond business as usual" (BBAU) additionality, as described below, is one option available to landowners wanting to participate as offset providers. While not perfect, this approach provides a market-based playing field for landowners, helps achieve the GHG emission reduction goals of cap-and-trade programs, and reduces compliance costs. Offset credits based on strict additionality will be perceived as quality, high-value products, fungible throughout the cap-and-trade market place—the proposed regional Western Climate Initiative, a future national program, and existing markets worldwide. The Workgroup is hopeful that the current costs of modeling past practices, future projections, and third-party verification will decline as landowners and project developers gain experience.

A BAU approach to baseline/additionality must include:

- An evaluation of the entity's historical and current practice of silviculture and market participation.
- A projection of the entity's potential future carbon stores, using growth and yield models and actual harvest data, based on assumptions reflecting its historical and current practices, including the current regulatory structure. In the absence of historical information regarding past practices, an entity could establish a baseline projection based on a combination of management practices from other entities in a similar forest type and from other properties the entity currently manages outside of that forest type.
- Additionality, measured as the difference between the projection of carbon stocks in the baseline scenario and predicted changes in carbon stocks over time, based on modeling of a new set of management practices. The prediction of the results of new practices would be verified by periodic measurement of actual conditions.

The main advantage of a BAU approach to baseline for forest management offsets is that it conforms to common practice for offsets in other sectors and holds the promise that the forest management offset is truly additional to what would have occurred without the offset payment. The main disadvantage of a BAU approach to baseline for forest management offsets is that it relies on potentially speculative

predictions about what will happen in a complex forest system subject to the influences of variable market, management, and natural influences over a long period of time.

The Workgroup recognizes that the BAU-as-baseline approach may not provide carbon storage incentives to some forest landowners who already maintain higher than average carbon stocks in forests of greater age, due to economic limitations on increasing carbon storage further. Likewise, a BAU approach also may not provide carbon storage incentives to those landowners who already manage their forests to achieve higher than average harvested wood product carbon stocks. For example, in the case of these landowners, it may be difficult from the standpoint of responsiveness to timber markets to accumulate greater in-forest carbon by letting the forest grow longer and thereby miss a competitive timber market window.

It is in recognition of difficulties such as these that the Workgroup consensus is for a dual approach, including a Complementary Carbon Storage Incentive Program, which is envisioned to provide greater participation opportunities, especially to landowners with above-average current stores of carbon, while also maintaining important co-benefits of these forests. While the Complementary Program will balance the impact of a BAU approach to baseline for forest landowners, the dual approach may mean that there are fewer forest offsets available to be utilized as a cost control mechanism in the cap-and-trade system.

In the event that the Complementary Carbon Storage Incentive Program is not implemented as recommended, the Workgroup's consensus position is that the goals for broad forest landowner contribution to the state's greenhouse gas emission reduction goals should still be met. Therefore, in that event, the Workgroup recommends that stakeholders explore all options, including the feasibility and legitimacy of issuing "discounted" offset credits for landowners above an enrollment threshold in addition to beyond business-as-usual compliance offsets.¹⁰ Further work that is needed for this approach includes information gathering (such as a study of the current carbon storage profile of all forest landowner types and scenarios for the future) evaluating sensitivity to assumptions about land conversion, and holding collaborative stakeholder discussions.

Leakage

Avoiding leakage, or displacement of carbon emissions to another location, is an important principle in designing carbon offset projects. Leakage is used here to mean market leakage. The Workgroup believes that activity-shifting leakage is addressed by setting project boundaries that are entity-wide (or encompass a geographically logical area such as a state or "wood basket").

In the all-pool carbon accounting context of forest management projects, evaluation of leakage needs to recognize that carbon changes in all pools are considered part of the project. In this context, appropriate leakage questions might be whether a project's increase in net carbon storage across all pools could lead to: (1) increased, and possibly unsustainable, harvesting elsewhere in ways that deplete in-forest carbon storage; or (2) reduced product demand, undercutting the economics of intensive management elsewhere in ways that deplete in-forest storage.

For purposes of these recommendations, the Workgroup believes that for most projects, their incremental effects on regional, national, and global timber commodity markets are likely to be minimal, and thus leakage can generally be left out of analysis for the following reasons:

¹⁰ For example, the Workgroup has evaluated the concept of a "regional mean" as one potentially valid method for establishing an enrollment threshold, if current data limitations can be overcome such that landowners can be disaggregated sufficiently to enable comparisons of their carbon storage with an appropriate average. Consideration should be given to disaggregation by site class, landowner type, and possibly age and other parameters.

1. All forest management projects are envisioned as including timber harvest. In the all-pool carbon accounting approach, increases in in-forest storage must occur in a way that avoids significant or prolonged losses of carbon to the harvested wood products pools as measured at state-wide or regional levels.
2. The wood products markets are flexible enough to absorb the incremental effects of carbon projects without causing significant market adjustments elsewhere.
3. Indirect market effects that increase or reduce demand for forest products elsewhere, if they do occur, may not have significant net carbon storage effects, when considering the multiple influences on forest management sustainability and in-forest carbon storage.

Permanence/Enforceability

Duration

To be creditable as offsets, forest management projects must be of sufficiently long duration to ensure permanence of carbon storage (at least 100 years).

Obligation in the event of reversal

In the event that a project is no longer reliable or is reversed, as described below under “project reliability,” the offset seller is required to secure the purchase of substitute allowances or offsets. The offset seller is also required to provide up-front financial assurances such as insurance or bonding.

In the event that the offset provider fails to meet this obligation, the State will secure a substitute allowance or offset and assess the offset seller the cost of the purchase while securing a lien on the property for the value of the allowance or offset and any assessed civil liabilities.

Basis for offset payments

Carbon dioxide emission offsets (achieved through sequestration and storage or through emissions avoided) will be registered based on modeling of the expected amounts of carbon stored at periodic intervals. Actual payments will be based on end-of-period self-monitoring by entities of actual implementation of modeled management prescriptions, with State or third party spot checking and penalties for false reporting.

Ten-year true-up

At ten-year intervals, sellers must perform re-inventory of forest and wood-product carbon, at which point sellers may adjust their prescriptions based on new information, may receive additional credits for carbon stored in excess of modeled amounts, or must pay back credits received, based on amounts of modeled carbon storage that were not achieved. The State or third party would have appropriate auditing authority to verify inventory results.

State protocols

The State will promulgate regulations establishing standardized sampling protocols for determining carbon inventories at project outset and for periodic true-ups.

Types of reversibility

Forest management projects eligible for offset credits must provide assurances against reversibility of the commitments in a management plan forming the basis for offset credit during the 100+ year project period. Two types of reversibility must be addressed:

1. Project reliability—relates to events attributable to the actions and omissions of the offset seller. This category would include the seller's inability to fulfill the commitments of the management plan or violations of the terms of a management plan.
2. Natural Reversibility—relates to events attributable to the actions of third parties or natural causes including unanticipated changes in forest growth rates and natural disasters

Remedies

For these two types of reversibility, there are two distinct sets of remedies.

1. Project reliability concerns must be addressed by the following:
 - Contractual Remedies
A legal instrument of sufficient durability and enforceability, between the offset provider and the state, regional, or national market institution, that allows enforcement of offset project commitments, as well as marketing beyond the state or regional boundaries. The legal instrument should include contractual terms defining the minimum time period that the sequestered and stored carbon (or avoided emissions) as a result of the project will be maintained and not reversed (100+ years). In addition, the contract should define the management actions that the seller is relying on to sequester and store the estimated amount of carbon.
 - State regulation
A system of State regulation, consistent with or delegated from a regional or national market institution, if one exists, that allows the State to approve and enforce the terms of forest management plans that are relied on as the basis for offset credits. The system should include submission of proposed management prescriptions and forest carbon modeling results based on those prescriptions to a State agency or accredited third party, State or third party approval of management prescriptions and model results including verification of estimates of additional carbon stored, and crediting, monitoring, and reporting as described above. The State should have authority to enforce management actions and payback provisions through State civil and criminal penalties.
 - Financial assurance
To qualify for offset credit, the offset seller must provide to the State regulator financial assurance that secures performance of offset commitments. This assurance must be of sufficient size to ensure performance of management actions approved by the State or accredited third party or secure the purchase of substitute allowances or offsets in the event that performance is economically impossible or is undesirable to the landowner. Acceptable financial assurance can include a demonstration that the entity in question will be financially capable of meeting the commitments, insurance, bonding, etc. Assurance(s) must be renewed every five years or upon a material change in the seller's financial circumstances or management actions. The State may promulgate rules for financial assurance mechanisms.
2. Natural reversibility concerns must be addressed by at least one of the following:
 - Insurance
The offset seller must provide some form of insurance against failures to achieve estimated carbon storage. This could come in the form of an agreement with a third party provider to purchase allowances or replacement offsets from other sources in the event the project does not meet performance expectations or when offsets are prematurely reversed.
 - State reserve pool
Alternatively, the State could establish a reserve pool system in which a percentage of the

reportable offsets from approved projects are not credited but are held by the State in reserve as a replacement pool for registered offsets that become reversed by natural disturbance or cessation of project activities that achieved the offsets.

Measurement and Verification

The Workgroup recognizes that the recommended forest management offset/credit system is complex and that a strong system of verification is critical to the viability of offsets from Washington forest land in regional, national, and international markets. At the same time, the Workgroup recognizes the need for administrative simplicity so as not to erect unnecessary barriers to otherwise qualifying offset projects. Adapting existing monitoring and sampling systems, where applicable, and paying careful attention to roles can help address this issue.

Variables to be verified

In general, the Workgroup recommends that verification be focused on:

- Methods of estimating business-as-usual baseline for participating entities
- Methods of designing and estimating the effects of carbon offset projects on all storage pools
- Actual achievement of additional carbon storage above baseline in all pools.

Methodological Standards

The Workgroup did not have time to adequately discuss this topic. However, there is general agreement on the following:

- Standards for methodology need to be established. For example, see the recommendations for “All-Pool Accounting” for methodology related to harvested wood products.
- Adapting existing systems familiar to Washington’s forest offset providers would increase administrative simplicity and reduce cost. These include standard forest inventory methods as a proxy or precursor to measurement of carbon.
- There is a need for liquidity within regional, national, and international markets, and harmonized measurement and verification methodologies can promote that liquidity.

Roles of various parties

The Workgroup recognizes a strong role for the state in establishing standards, in a transparent and open manner, for measurement and verification methodologies. Beyond standard-setting, implementation of measurement and verification requirements could be performed by the State directly, by independent third-party verifiers acting under State authorization, by offset providers themselves operating under State standards with spot-checking and penalties for false reporting, or some combination.

The Workgroup recommends that Washington work proactively with other WCI partners in development of verification requirements within the regional cap-and-trade system recommended by WCI.

Cost of verification

The Workgroup reached no conclusions regarding this topic, other than to recognize the desirability of keeping costs low while ensuring carbon offsets meet applicable standards. Aggregation of offsets provided from small forest land parcels is one method to control costs for the owners of such parcels.

Verification timing

See section on Permanence/Enforceability for Workgroup recommendations.

Overall system monitoring

The Workgroup recommends a state-sponsored system of overall monitoring of forestland in Washington to periodically evaluate the performance of the forestry carbon offset/credit measures recommended here. The State should coordinate with the Federal Forest Inventory and Analysis program.

All-Pool Accounting, Including the Harvested Wood Products Pool

The Workgroup recommends that “all-pool” accounting be the basis for estimating and measuring carbon storage for forest management offset projects and for the Complementary Carbon Storage Incentive Program. This will ensure that all in-forest and harvested wood product pools that are significantly affected by an entity’s forest management offset project are considered in establishing baseline, additionality, and permanence, and are subjected to appropriate measurement and verification.

The Workgroup spent considerable time discussing how long-term carbon storage in wood product pools could be reliably estimated and calculated at the entity level or project level, especially for forest management offset projects that emphasize increased storage in the wood product pools. The Workgroup recommends the approach described in this section be used for all forest management offset projects that entail significant changes in wood products pools.

In general, the Workgroup recommends the “100 year” method for accounting for long term carbon storage and additionality in wood products pools. The Workgroup also acknowledges some uncertainty and the need for further work on calculation and accounting methods, and therefore a need for measures to help ensure that estimates and crediting of additional storage are conservative. As one way of ensuring conservative estimates and crediting in the face of measurement uncertainty, and because of not-fully-discussed concerns over double-counting and the effects of methane emissions, the Workgroup recommends not considering carbon in wood products that continue to be stored in landfills.

The Workgroup also understands that uncertainty in estimates of carbon storage over 100-year time periods exists for all pools, and should be treated consistently.

The Workgroup acknowledges that forest landowners can demonstrate carbon offset additionality in the wood product pools based on changes to the estimated 100-year decay rate resulting from forest management, harvest, and marketing actions under the landowners’ control. The Workgroup has reviewed sample calculations that suggest the baseline 100-year residual carbon storage in wood products is likely to be less than 10 percent of harvested wood carbon from a forest site.

The Workgroup also recognizes that wood manufacturing facilities may also be able to claim further carbon offset additionality in wood product pools downstream from mills based on actions taken at the manufacturing facility.

Accounting Methodology for including HWP carbon in a forest management protocol

In this scenario, the baseline is an entity-defined business as usual (BAU). The BAU baseline includes the projected growth and harvesting scenarios for 100 years. For the harvesting scenario, the growing stock that is harvested is categorized as softwood/hardwood and sawlog/pulpwood. This is then converted to roundwood and products-in-use after 100 years using the methodology developed pursuant to Section

1605(b) of the Energy Policy Act of 1992¹¹. The beyond BAU scenario (BBAU) will also have a projected harvesting scenario. The same methodology is used to calculate carbon stored in products-in-use after 100 years. The difference in the harvested wood products (HWP) carbon pools between these two scenarios will be added to or subtracted from the overall carbon pool, depending on whether wood product pools increase or decrease over the life of the project.

Brief steps:

1. Model growth and harvest under BAU scenarios for next 100 years.
2. Calculate 100-year storage of products-in-use for harvest projections using proposed methodology.
3. Model projected changes in growth and harvest plans for BBAU carbon project.
4. Calculate 100-year storage of products-in-use associated with new harvest projections.
5. Calculate the difference in the 100-year product pools between the BAU and BBAU scenarios.
6. Calculate the changes in storage in the overall forest pool between the BAU scenario and the BBAU scenario, considering all pools with appreciable changes (See step 9).
7. Add or subtract the difference in 100-year product pools to/from the difference in the overall forest pool, depending on whether the wood product pool increases or decreases over the life of the project.
8. Use the monitoring and verification methods recommended elsewhere, including verification of implementation on three-year intervals and re-inventory and “true-up” at ten-year intervals.
9. As a matter of policy, and further hedge against measurement and calculation uncertainties for wood product pools over time, the Workgroup recommends including the constraint that there be no net reduction of in-forest carbon pools over the 100-year period. The Workgroup recognizes that this constraint may affect different types of landowners differently, but believes that for forest-industry-managed lands this no-net-long-term-reduction is likely to be approximately achieved in any case.

The Workgroup recognizes that detailed protocols need to be developed for forest management projects. In light of including the HWP pool, we recommend that these protocols address the following: (1) full integration of in-forest pools and HWP pools; (2) accurate measurement of in-forest pools sensitive to disturbance from harvest; and (3) consideration of how to account for and if necessary mitigate uncertainty in the accuracy of calculations use in the 1605(b) methodology.

Permanence

The methodology calculates a reasonable estimate of the amount of carbon that remains “in-use” for at least 100 years. This is based on current manufacturing and building efficiencies, and it is assumed, if anything, that these efficiencies should be increased over time. As such, the method is set up such that there is no need to monitor the individual fate of each product for 100 years because it accounts for *only* the average percentage that remains in use (by region and forest type) based on current conditions. The Workgroup assumes that as methodologies improve for estimating carbon life-cycle dynamics in harvested wood products and uncertainties are reduced, protocols will be updated to reflect these improvements.

¹¹ <http://www.eia.doe.gov/oiaf/1605/aboutcurrent.html>

Timing of credits

Under the BBAU project scenario, offset credits will be given as carbon sequestration accrues (based on models at three year intervals and true-up at ten years). The 100-year value of HWP carbon should be awarded at the time of harvest (or subtracted if the baseline scenario projected a harvest that did not occur).

Accounting Methodology for Improved Recovery at Manufacturing Sites:

The 100-year method subtracts business-as-usual carbon losses during the manufacturing process. For a Pacific Northwest Douglas-fir, west-side example considered by the Workgroup, the amount of carbon captured in a product leaving a mill accounted for only 53 percent of the total carbon that entered the mill in the form of roundwood. The remainder of the carbon is assumed to be emitted (either with or without energy capture). If a mill can show a business-as-usual recovery rate (based on an average of the prior three years) and demonstrate an improvement to this recovery rate, the 100-year carbon fraction for the increased wood product efficiency should be credited to the mill as an offset.

Brief Steps:

1. Calculate recovery rate per mill for prior three years by dividing fiber in produced products by total fiber coming into mill.
2. Calculate recovery rate for current year.
3. Convert difference in recovery rate to production (tons).
4. Calculate 100-year carbon storage of additional production.

Justification

Because this protocol gives credit only for an improvement upon business as usual, it does not rely on its positioning relative to the average recovery rates assumed in the 1605(b) protocol. The assumption is that if you are increasing above and beyond an individual mill's business as usual, you can only be increasing the overall regional recovery rates.

Permanence

Same as the forest management protocol.

Timing of Credits

Credits can be given each year with demonstration of improved recovery rates.

Accounting Methodology for Improved Efficiency of Building Construction (Reduction in Waste)

The 100-year method includes assumptions on material waste in the construction of end-use materials (e.g., homes, remodeling, furniture, railroad ties, pallets). Although the Workgroup understands that, in concept, additional carbon storage could be added by the end-user, the Workgroup didn't discuss this in detail and in any case such additionality would not accrue to forest landowners.

Complementary Carbon Storage Incentive Program

The Workgroup consensus position is that this recommended program is an essential complement to a forest management offset program based on a BAU baseline, in order to achieve the goals listed in the

Introduction. The Workgroup had lengthy and detailed deliberations on the necessary elements of this program. However, the limits of the timeline available to the Workgroup prevented full discussion of all aspects. As a result, the Workgroup expresses consensus on the need for the program and the features presented in this section, but acknowledges the need for continuing stakeholder-based work to flesh out program details sufficient to guide implementation. Nevertheless, the Workgroup believes the Legislature could authorize development of the program based on these recommendations.

Summary of Features

In general, the features of the Complementary Carbon Storage Incentive Program (Program) are as follows:

- Funding for the Program would come from the State and may be linked to the cap-and-trade system recommended by the Western Climate Initiative (WCI).
- Participating landowners would need to meet eligibility criteria.
- Landowners would make commitments to long-term storage of baseline levels of forest and wood product carbon in return for financial incentives proportional to the amount of carbon storage committed to.
- Landowners could receive additional incentives for commitments to increased carbon storage above initial levels, at periodic enrollment windows.
- Landowners would be liable for any loss of carbon storage below commitment levels and would be required to purchase carbon allowances or credits to pay back to the State.
- Landowners could choose to participate in the carbon offset market, if otherwise qualified, as an alternative to making carbon storage increase commitments within the Program.

Source of Funds

The viability of the Program in meeting the goals of the Workgroup is highly dependent on a credible source of adequate funds. The Workgroup recommends that funds come from or through the State. Although there is not complete consensus on the most appropriate source of funds, the Workgroup recognizes that one source could be from within the cap-and-trade system proposed by WCI. The final WCI recommendations (September 23, 2008), Section 8.2, state that jurisdictions (such as Washington State) will dedicate a portion of the value from carbon emission allowances to one or more of four specific programs, including promoting sequestration in forestry.

The Workgroup acknowledges that there may be a variety of incentive approaches that do not involve revenue or allowances from the cap-and-trade system, however the Workgroup did not have time to discuss these.

Eligible Entities

Forest landowners could apply for participation in the Program for all or a portion of their land within Washington State.

Eligibility Threshold

In order to meet the goals of the Program to provide incentives to those who commit to significant carbon storage on their forest lands, but also acknowledge limited funds, the Workgroup recommends that eligibility thresholds be established for Program participation. However, after significant discussions, the Workgroup ran out of time before being able to agree on what the eligibility threshold should be. One difficulty seems to be a lack of reliable statewide data on forest inventory, broken down by region, forest

type, and landowner type. The Workgroup recommends that an immediate objective is to improve the usefulness of federal forest inventory data for use in forest carbon management.

Two general approaches were discussed, one using an entity's current or averaged-over-time situation as a reference point, another using a broader "regional mean" or "local standard practice" as a reference point. However, without reliable data as to how application of these concepts would affect the eligibility of specific types of forest landowner, the Workgroup was unable to determine a best method.¹²

Timing and Distribution of Incentives

The workgroup recommends periodic enrollment windows for eligible landowners to apply for and receive incentives under the Program. These windows could correspond in some way with periods in the cap-and-trade system, if that were the source of funds. Eligible landowners could newly enroll in successive windows, or if already enrolled, could enroll additional land or register increased commitments to higher levels of carbon storage.

The Workgroup recommends that incentive payments be awarded to landowners in a manner proportional to the volume of carbon per acre each landowner commits to under the Program, and that the proportional relationship of incentives to commitments be stable over time. The Workgroup was undecided about whether, if incentives are derived from the cap-and-trade system, there should be a "ton-for-ton" correspondence between cap-and-trade emission allowance and stored carbon under the Program, or some other formula, not knowing the quantity of available incentives or eligible forest carbon storage. However, the Workgroup recognized the balance that needs to be struck between objectives of broad participation, on the one hand, and ensuring the incentives are large enough to affect behavior, on the other. In general, the Workgroup recommends that priority attention should be given to landowners who are committing to the highest carbon storage volumes and who aren't able to participate in offset markets.

Payback Provisions

The Workgroup recommends that landowners whose inventory shows a decrease, for whatever reason, from the initial or subsequent commitment amount for which the landowner received incentives, that landowner would be required to purchase carbon allowances or credits corresponding to their degree of shortfall below their commitment level, and surrender them to the State.

Relation to Offset Market

If a landowner who is participating in the Program can, in addition to his or her Program commitment, also show an increase in carbon storage above the baseline in use for a carbon offset market, and that landowner has not already received incentives within the Program for that additional carbon storage, that landowner has the option of selling that additional carbon storage into the offset market, assuming it otherwise qualifies as an offset. However, that landowner would then be barred from seeking Program incentives for that additional storage.

¹²In evaluating the concept of a "regional mean" as one potentially valid method for establishing an enrollment threshold, the Workgroup was aware of current data limitations that need to be overcome such that landowners can be disaggregated sufficiently to enable comparisons of their carbon storage with an appropriate average. Consideration should be given to disaggregation by site class, landowner type, and possibly age and other parameters.

Monitoring, Verification, and Enforcement

Monitoring and verification of landowner commitments under the Program would be conducted in a manner with similar rigor as for forestry carbon offsets. Similar enforcement provisions would also be put in place.

Data Needs

Summary

The Workgroup agreed that funding support for the Washington State Parcel and Forestland Database was a necessary component of tracking offsets or other carbon incentive proposals.

Goals

The short-term goals of the Washington State Parcel Database project are to provide a single, statewide, regularly updated, well documented Geographic Information System (GIS) parcel data resource for government and to educate government about the use and value of GIS parcel data. The Washington State Forestland Database project seeks to map and describe forestland ownership in the state and how it is changing, and to quantify physical and political features common to forested parcels.

The Washington State Parcel Database

The Washington State Parcel Database is housed at the University of Washington's College of Forest Resources (CFR), maintained by staff of the Rural Technology Initiative (RTI). RTI Staff have developed relationships with Washington's thirty-nine counties and land management agencies to collect and normalize their parcel GIS data into a single dataset in a common statewide format. Based on a survey of over 160 government users, this common format is designed to meet the needs of as many users as possible and includes information on land ownership, land use, taxable and market values, site addresses, and legal descriptions.

Each August, staff at the Rural Technology Initiative collect GIS parcel data from around the state. The data is then normalized through a series of data transformations into a common statewide format and extensively documented. The Statewide Parcel Database is then made available for use by members of the Parcels Working Group which is currently made up of local, state, and federal agencies.

The Washington State Forestland Database

Using the Statewide Parcel Database as a foundation, staff will also construct the Washington State Forestland Database. By generating forest land cover from satellite imagery and using land use information and assessed land values from the database, forested lands can be identified and categorized into ownership categories such as public, conservation, tribal, industrial, and non-industrial private. In addition, the Forestland Database will contain information about relevant physical and political features such as parcel, contiguous tract, owner and forest acres, regulatory buffer acres, slope information, stream and road density/length, and a conversion potential metric calculated as the difference between current use and highest-and-best use land values.

The Forestland Database will be updated annually (in tandem with the Statewide Parcel Database) with land cover information generated every other year. The Forestland Database will enable a new understanding of forestland change in Washington State by quantifying conversion, trends in fragmentation, shifting ownership (i.e., industrial > REIT > family forest), generalized forestland cover change, and various other metrics.

Products

The Washington State Parcel Database and the Forestland Database will be produced each year approximately six months apart (February and July). Every other spring a coarse forest land cover assessment will be done to identify forested and non-forested areas of the state using satellite imagery.

Budget

Washington State Parcel Database (2 Year Budget)	
July1, 2009 - June 30, 2011	
Description	Total
Salaries and Wages (FY `09: 2.85 FTE / FY `10: 2.55 FTE)	\$376,150
Contract Personal Services	\$ -
Other Contractual Services	\$ 2,400
Travel	\$ 12,000
Supplies and Materials	\$ 25,816
Equipment	\$ 20,000
Retirement and Benefits	\$109,083
Student Aid	\$ -
Indirect	\$136,616
Total	\$682,065

Other Related Recommendations

Summary

The Workgroup discussed several other topics that fell outside the Workgroup's scope or about which consensus on detailed recommendations was not achieved, but which the Workgroup believes should be further developed in other venues due to their indirect forest carbon benefits. These include:

1. Improved lifecycle analysis of embodied greenhouse gasses in building materials, along with a labeling program and potential mitigation under SEPA.
2. Further discussion on guiding foreseeable growth in rural and resource lands.
3. Possible creation of ecosystem service districts to formalize mutually beneficial relationships between forest landowners providing ecosystem services and the beneficiaries of those services.
4. Incentives for landowners undertaking forest treatments that improve forest health and reduce the risk of uncharacteristic wildfires.

The Workgroup did not have sufficient time to develop recommendations on several other priority topics including indirect emission reductions through energy resource substitution and building material product substitution by forest-derived materials.

1. Support Building Materials with Low Embodied Greenhouse Gas Emissions as Way to Keep Working Forests as Forests

Background

Embodied Greenhouse Gas Emissions are the emissions associated with the extraction, processing, transportation, construction, and disposal of materials. It is very closely associated with embodied energy, which aggregates the total amount of energy used in the above-mentioned stages. Until fairly recently it was assumed that embodied energy/embodied GHG emissions of building materials were minimal compared to the energy used during the operational life of a building. However, numerous studies have concluded that embodied energy of building materials is equivalent to many years' worth of operating energy. For example, Perez-Garcia et al (2005) found that embodied energy accounted for over 10 percent of the total energy consumed during the life of a house. Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO) found that embodied energy is equivalent to roughly 15 years of operating energy (Reardon et al 2005). This impact becomes more significant as efficiency increases in operating energy.

Proposals for encouraging use of building materials with low embodied greenhouse gas emissions:

1. Incorporation of LCA into USGBC's LEED Standard

There are a number of life cycle assessment (LCA) tools that can look at the embodied energy, along with other environmental impacts of materials used during building construction, such as solid waste, toxic releases to air, and toxic releases to water. These tools have been incorporated into some green building rating systems¹³, but not all.

¹³ Building Research Establishment (BRE) Green Guide to Specification (<http://www.thegreenguide.org.uk/>) has been using a life cycle assessment (LCA) environmental profile tool for over a decade. The Green Globes environmental assessment and rating system for commercial building launched an LCA environmental profile tool in 2007.

Currently Washington State has a number of legislative requirements for exclusive use of Leadership in Energy and Environmental Design (LEED) Green Building Rating System in public buildings.¹⁴ The LEED system does not include embodied greenhouse gas emissions, but a proposal, “LCA into LEED” is being worked through the U.S. Green Building Council’s (USGBC) Material Resources group. There are plans to start a pilot program in the fall of 2008 and submit for balloting after the USGBC is confident the program can work (expectation this will be at least 12 months).

Recommendation 1a: Washington State (Governor or appropriate agency) should strongly urge USGBC to adopt LCA into their standards.

Recommendation 1b: As the state’s environmentally preferable products (EPP) initiative further develops, low embodied greenhouse gas emissions should be included. The Department of General Administration should revise its existing procurement rules to allow for use of EPP in state funded building projects where the use of these products is consistent with promoting the health, safety and welfare of building occupants and users and the public generally. Such revision is consistent with the Governor’s Executive Order on Sustainability that says that the public sector shall purchase environmentally preferable products (EPP). The Department of General Administration will work with Department of Ecology to identify what products or system of product evaluation will be effective to ensure EEP implementation.

2. Incorporation of LCA into all green building standards.

The Workgroup acknowledges there are a number of different green building standards but does not have consensus on allowing the option of more than one standard’s use in public buildings as currently mandated by Chapter 39.35 RCW High-performance public buildings. In as much as the State intends to encourage the adoption of green building standards for all buildings (commercial/residential, new/renovated), the Workgroup encourages the following action.

Recommendation 2: The State should actively encourage all green building standards to recognize embodied emissions/LCA in the materials sections of the standards.

3. Allowance for the use of low embodied greenhouse gas building materials as a potential mitigation measure under SEPA

Recommendation 3: Legislation or regulations should be adopted providing that the impacts from embodied greenhouse gases should be considered in environmental reviews of construction projects conducted under the State Environmental Policy Act (SEPA) and that substitution of low embodied greenhouse gas materials for construction materials with higher embodied greenhouse gas emissions should be considered under SEPA as a potential mitigation measure for adverse climate impacts. To implement this recommendation, tools could be developed or adopted to determine and quantify the emissions savings from using low embodied emissions materials. (see “LCA tools” in Appendix B for more information).

¹⁴ Executive Order 05-01 requires LEED silver standards for public buildings in Washington. The state’s High-Performance Public Buildings law (Chapter 39.35D RCW) requires all new state-funded facilities over 5,000 sq. ft. to meet green building standards, with specific requirements that major office and higher education facility projects achieve LEED Silver certification. In addition, all new K-12 schools are required to meet either the Washington Sustainable Schools Protocol (WSSP) or LEED certification.

4. Carbon labeling of building materials

Currently a consumer has no way of knowing the relative greenhouse gas emissions associated with the material, manufacturing, and transportation of the products they buy.

Recommendation 4: The state should support environmental labeling systems for building materials, and these systems should include embodied greenhouse gas emissions. Building product environmental labeling systems that incorporate embodied greenhouse gas emissions are in the formative stages. As the State implements its greenhouse gas emissions reduction plan, relevant state agencies should explore how to further the use of such building product labeling programs in Washington.

2. Recommendation to convene stakeholder group to examine policy options for guiding growth in rural and resource lands

The Workgroup agrees that conversion of rural and resource zoned forestland will have a detrimental impact to achieving the state's goals for greenhouse gas emissions and restoration of fish and wildlife habitat and water quality. The Workgroup also recognizes that while reduction of emissions may be an important outcome of conservation of forestland, carbon is not the driver behind the state's rural and resource land use policies. Due to these complexities, the Workgroup concluded that it is beyond the time and scope of the committee to fully address this topic and that other stakeholders need to be involved through another venue. Therefore, the Workgroup would like to call attention to the rapid conversion of rural and resource zoned forestland. The Workgroup agrees that it would be worthwhile to examine policy options for guiding growth in rural and resource lands to better achieve the state's goals. Accordingly, the Workgroup urges a team be convened as quickly as possible to begin work on this issue.

3. Ecosystem Services Districts Proposal

Background

The Workgroup wishes to call attention to promising policy ideas that could have significant carbon sequestration and storage benefits, even though undertaken primarily for other parallel purposes and not solely driven by carbon considerations. One such policy idea relates to potential ecosystem service districts.

This proposal addresses the risk of working forestland currently sequestering and storing carbon converting to non-forest land uses including development. Avoiding such conversion is a broadly supported policy objective having numerous benefits to society.

Ecosystem services are the functions of ecological systems that directly or indirectly benefit people. In addition to carbon sequestration, other forest-based ecosystem services include water flow regulation, water quality protection, air quality protection, local climate regulation, soil erosion control, habitat provision for threatened and endangered species, general biodiversity support, aesthetics, and recreation.

People living downstream or in close proximity to forests benefit especially from water flow regulation, water quality, air quality, local climate regulation, and soil erosion control services. People from all over the state and from further away benefit from habitat and biodiversity protection, and aesthetic and recreation services.

The Workgroup is recommending specific policy tools directly related to greenhouse gas emission mitigation that, if implemented, can provide incentives to avoid working forest land conversion. However, because in some cases the non-forest real estate values of working forest lands are so substantial, combinations of incentives may be needed to achieve avoided conversion objectives and

secure societal benefits. To provide financial incentives, revenue from sources related to all or most of the resulting societal benefits are most desirable. The ideas presented here are designed to be in addition to carbon offsets (or related crediting tools) as a source of income to forest landowners.

Proposal

The Workgroup recommends attention be given by interested parties in appropriate policy venues to the concept of ecosystem service districts. In an ecosystem service district, beneficiaries of specific ecosystem services, or their proxies, would be assessed a fee based on the value of ecosystem services. A district entity would assess and collect the fees on behalf of those landowners contractually agreeing to continue to supply such services. Examples may include water and water quality, erosion control, and biodiversity. Such programs could be undertaken by local and state government, or could be encouraged through the voluntary formation of neighborhood associations or other logical groupings of beneficiaries and providers.

Source of Revenue

The participants in an ecosystem services district, and thus the assessed or voluntarily contributing parties providing the revenue, would depend on the geographic extent of particular services. For example, watershed boundaries may be appropriate for water quality or flood control services, while broader jurisdictions would be involved with more broadly beneficial services such as biodiversity. A variety of models should be explored for the precise nature of the assessed or voluntary payment. Broad ecosystem service payment programs have been implemented in a number of other countries. A forest-based program in Costa Rica has been successful in increasing income to local farmers and reversing trends in forest loss. Research is also needed as to the amount of funding required.

Recipients of Payments

The qualifications of landowners eligible to receive payments for ecosystem services would need to be determined. Presumably, the degree of risk of forest land conversion could be a major factor.

Services Provided

Considerable additional work is needed to specify more precisely the nature of the services to be provided and the terms of any contract. For example, in a pilot project, responsibilities and limitations of liability regarding the delivery of ecosystem services being provided need to be clearly articulated in a contractual manner between parties receiving the service and those delivering the service. In the case that the concept is implemented at a programmatic scale, the responsibilities and limitations of liability need to be adequately addressed in statute.

Institutional Mechanisms

Attention should be paid to the identity or identities of institutional entities that form the ecosystem service districts. Examples of involved entities may include conservation districts or other public utility districts, counties, state agencies, or other entities.

4. Forest Health and Avoided Forest Fires

As noted in the introduction, the Workgroup identified forest health and avoided forest fires as a priority topic but did not have sufficient time to adequately address the potential for forest health management activities to participate as a credit in a cap-and-trade, market-based system. As noted in the 2007 Climate Advisory Team (CAT) report, improved forest health through restoration thinning has the potential to achieve significant greenhouse gas reductions in a cost-effective manner. The CAT therefore identified

improved forest health as a ‘most promising’ strategy for achieving the state’s climate goals. Among the recommended implementation mechanisms in the 2007 CAT report is to stimulate markets for forest health management activities and position forest health treatments as an eligible activity for carbon credits that could be sold in anticipated carbon cap-and-trade markets. The Workgroup therefore recommends that future stakeholder discussions should explore how forest health activities could be promoted through market-based credits and through other incentive programs. This would be consistent with and in furtherance of the 2004 recommendations of the Forest Health Strategies Workgroup, 2007 legislative direction in SB 6141 (RCW 76.06), as well as the 2007 Climate Advisory Team and its forestry technical workgroup.

Specifically, such an effort should consider: (1) the feasibility of forest health management activities to qualify as marketable credits or offset projects; (2) identification of an appropriate baseline for this type of offset project and a discussion of the carbon benefits derived from forest health treatments; (3) the appropriate scale of necessary forest health management; (4) forest ecological benefits and limits; (5) benefits to local forest product manufacturing and bioenergy facilities; (6) the possibility of using Forest Excise Tax incentives, especially in consideration of comparable tax treatment in neighboring jurisdictions; and (7) avoiding unintended environmental or economic consequences.

Four types of forest products resulting from forest health treatments should be considered for possible tax incentives mentioned in item 6 above. These are: (1) biomass; (2) pulpwood; (3) small logs; and (4) products from Forest Improvement practices on State-owned lands.

Appendix A – Workgroup Charter

Forest Sector Workgroup on Climate Change Mitigation Group Charter (April, 2008)

I. Authority

E2SHB 2815 Section 4(3)(g) directed the Department of Ecology to develop recommendations in consultation with the department of natural resources and the department of agriculture with the climate advisory team, the college of forest resources at the University of Washington, Washington state University, and a nonprofit consortium involved in research on renewable industrial materials regarding how forestry and agricultural lands and practices may participate voluntarily as an offset or other credit program in the regional multi-sector market-based system being designed by the departments in association with the Western Climate Initiative. The recommendations must ensure that the baseline for this offset or credit program does not disadvantage this state in relation to another state or states. These recommendations shall address:

- (i) Commercial and other working forests, including accounting for site-class specific forest management practices;
- (ii) Agricultural and forest products, including accounting for substitution of wood for fossil intensive substitutes;
- (iii) Agricultural land and practices;
- (iv) Forest and agricultural lands set aside or managed for conservation as of, or after, the effective date of this section; and
- (v) Reforestation and afforestation projects.

II. Sponsorship, Purpose and Coordination

The forestry working group is being jointly sponsored by the Washington State Departments of Ecology and Natural Resources.

The purpose of the forestry working group is to provide the forum for stakeholders and government representatives, with the assistance of the entities named above, to potentially develop recommendations to the Departments of Ecology and Natural Resources to meet the intent of the legislation. In so doing, this group may also serve to discuss, develop, and make potential recommendations concerning “most promising” proposals in the forestry sector as found in the February, 2008 report of the Governor’s Climate Advisory Team, entitled “Leading the Way on Climate Change: The Challenge of Our Time.”

To the extent the forestry working group develops plans for quantified emission reductions for any of the most promising recommendations of the Climate Advisory Team, the CAT will have shared responsibility as to the scope and status of those recommendations.

To the greatest extent feasible, the sponsors desire that the recommendations on the market-based system be consensus recommendations developed by this group. To the extent consensus is not achieved, the recommendations may go forward to Ecology and DNR as majority/minority recommendations for which the full group explanation of minority positions and their rationale is provided.

This will be the only Washington State multi-stakeholder group established by the Sponsors for this topic. Sponsors understand that there are or may be similar multi-stakeholder groups regarding forest

sector participation in multi-sector market-based systems in other western States and Canadian Provinces. It is the intention of the Sponsors that this group's work be coordinated with the work of those related groups in a way that is feasible, timely, efficient, transparent, and productive.

III. Scope of the Group's Work

The scope of this group's work may include the following elements:

- General principles regarding the role of Washington forests in achieving Washington greenhouse gas goals, consistent with E2SHB 2815.
- Specific design elements appropriate to one or more regional or other multi-sector, market-based systems, including robust measurement, accounting, and verification systems.
- A diverse range of potential project types that may be suitable for consideration within one or more market-based systems.
- Specific consideration of "most promising" CAT strategies, including improved forest health, reduced conversion to non-forest cover, expanded urban and community forests, expanded use of wood products for building materials, and improved commercialization of advanced lignocellulosic processes.
- If this group chooses to consider the role of production of woody biomass for energy, it shall be appropriately guided by Section 3(3) of E2SHB 2815, which says "Except for purposes of reporting, emissions of carbon dioxide from industrial combustion of biomass in the form of fuel wood, wood waste, wood byproducts, and wood residuals shall not be considered a greenhouse gas as long as the region's silvicultural sequestration capacity is maintained or increased."

IV. Responsibilities of Participants

Invitees are expected to represent the interests of their organizations, and bring a strategic, policy-oriented perspective to benefit the group. Invitees are expected to make every effort to participate in all group meetings and activities, including participating electronically. Designees may be explicitly named to the group as substitutes for the invitees. Invitees and designees will make every possible effort to ensure that designees are well prepared to participate in the group's ongoing work processes, so that progress is maintained. Other organization representatives are welcome to attend meetings as observers in the absence of the organization's invited member (See below.)

Meetings will be open to the public. Observers will not participate in the deliberation of the group unless invited by the group. Meetings will be announced on the Department of Ecology Climate Website. Work products of the group will also be posted to this site. The sponsors will assure that at each meeting a time will be allowed for public comment. The groups recommendations will be made available for public comment.

V. General Approach

The general strategy the group will use to meet its objectives will be as follows:

- Agency-assisted collaborative discussions among all participants at a series of regularly-scheduled meetings, as well as between-meeting homework, sub-group work, and research, and drafting of group documents, indicating degree of consensus and nature of any significant disagreements. An objective is to provide in-depth, nuanced input to decision-makers on the most important matters for group participants.

The Sponsors expect the group and its individual members to consider the following guidelines in communications, including communications among group members, with Sponsors and their designees, and with external parties:

- Be mutually respectful;
- Be honest about one's own or one's group's core values, interests, and goals;
- Avoid attributing positions or motives to other parties in communicating externally;
- Communicate externally as a group as much as possible, for example through periodic agreed-on statements of progress;
- Use commonly used collaborative communication guidelines.

The process the group uses should serve to bring out group members' important and relevant values, interests, and objectives, and those of the organizations they represent, so that shared values, interests, and objectives can be identified, and so that principled disagreements can surface clearly and be explicitly discussed by the group, with the purpose of achieving the greatest possible group agreement on objectives related to the work of the group, and so that remaining interest-based disagreements can be fully understood by all group members.

This working group is expected to attempt to make group decisions by consensus where feasible, including decisions on group recommendations. However, non-consensus decisions are acceptable providing the group as a whole explains the nature of any disagreements and their rationale.

VI. Approach to Technical/Scientific/Market Information

The Sponsors intend that group members avail themselves of technical and scientific information pertinent to the work of the group, in a way that is agreeable to all group members, meets the purpose of the group as outlined in this charter, is efficient, and promotes the greatest possible group agreement on technical and scientific matters. As part of the group's dialog, critical areas of technical and scientific agreement should be documented and any major technical/scientific disagreements should also be explicitly identified, with an explanation of the disagreement and what was done to resolve it. The implications of any technical or scientific disagreement for the group's recommendations, consensus or otherwise, should be explained in the groups' recommendations.

VII. Time Schedule

Major Milestones

There may be some interim milestones the forestry work group may need to focus on providing input to the state as WCI proceeds in developing a multi-sectored market-based system for reducing green house gases.

November 1, 2008 – Final recommendations to the Departments of Ecology & Natural Resources, including recommendations for legislation, if needed.

Meeting frequency

April through August –Monthly (with additional sub-group work between meetings)

September to November – Twice-monthly, if possible and necessary (with additional sub-group work as needed).

Meetings will generally be 10:00 AM to 3:00 PM with the option of a working lunch.

Meetings will initially be planned in the Olympia, Seattle, or elsewhere in the central Puget Sound area.

Meetings will be in-person, with a call-in option.

Meeting co-conveners – Craig Partridge (DNR) & Stephen Bernath (Ecology)

Appendix B - Building Material Embodied Greenhouse Gas Analysis

Additional background:

Selected studies that compare embodied greenhouse gas emissions of various building materials.

<i>Study</i>	<i>Wood</i> <i>(kg CO₂/m²living space)</i>	<i>Concrete</i> <i>(kg CO₂/m²living space)</i>	<i>Concrete vs. Wood</i> <i>(% Change)</i>
Noren, J. 2001.	30	400	1233%
Trusty, Meil 1999			
Meil et al 2002	280	420	50%
Glover 2001	290	510	76%
Buchanan and Levine 1999	220	345	57%
Borjesson and Gustavsson 2000 ¹⁵	~40	~60	~50%

<i>Study</i>	<i>Wood</i> <i>(kg CO₂/m²living space)</i>	<i>Steel</i> <i>(kg CO₂/m²living space)</i>	<i>Steel vs. Wood (% Change)</i>
Trusty, Meil 1999	280	340	21%
Meil et al 2002	207	309	49%
Glover 2001	290	690	137%
Buchanan and Levine 1999	220	352	60%

On a large scale, the selection of building material makes a significant difference. For example:

- If 1.5 million housing starts in the U.S. used wood-framed houses rather than non-wood building systems, 9.6 million metric tons (mt) CO₂e per year would be kept out of the atmosphere. This savings is equivalent to keeping roughly two million cars off the road for one year (Miner et al, 2006)

¹⁵ Converted from whole building (apartment building with 1040 m² living space) to per m² living space

- Using wood-framed housing in the 1.7 million housing starts in Europe¹⁶ would save 35-50 million mt CO₂e, which would be enough to contribute 11-16 percent of the emissions reduction needed for Europe to meet the Kyoto requirement (Eriksson 2003).
- A 17 percent increase in wood usage in the New Zealand building industry could result in a reduction of 484,000 mt CO₂e. This reduction is equivalent to a 20 percent reduction in carbon emissions from the New Zealand building industry and roughly 2 percent of New Zealand's total GHG emissions (Buchanon and Levine 1999).
- Goverse et al (2001) concluded that an increase in the use of wood could cut CO₂ emissions from construction by almost 50 percent compared to Dutch traditional construction.

LCA Tools

*ATHENA EcoCalculator*¹⁷ - The ATHENA EcoCalculator for Assemblies compiles greenhouse gas emissions for different material building assemblies (e.g., exterior walls, roofs, windows, floors, interior walls) based on detailed life cycle assessments using the ATHENA Impact Estimator for Buildings. The ATHENA Impact Estimator, in turn, uses data from the US Life Cycle Inventory Database and ATHENA's own datasets (see <http://www.athenasmi.ca/tools/docs/EcoCalculatorFactSheet.pdf> for more detail). The EcoCalculator is used by architect firms and universities and can be used for new construction, retrofits, and major renovations in industrial, office, or residential design.

ATHENA is used to determine average embodied emissions in the King County SEPA GHG Emissions Worksheet Version 1.7 (12/26/07)¹⁸.

The ATHENA EcoCalculator calculates the average embodied greenhouse gas emissions, *per square foot (square meter)*, for each building assembly¹⁹. This then can be scaled up to the square footage of an average house. A builder can then enter the square footage of a particular material assembly type that will be used in the building. The embodied greenhouse gas emissions will be automatically calculated in ATHENA and summed across all assemblies (e.g., floor, interior wall, exterior wall, roof, windows).

The difference in embodied greenhouse gas emissions between the average building assembly and the builder's assembly can be readily quantified.

¹⁶ Currently only 5 percent of new construction in Europe uses wood framing.

¹⁷ Available free of charge at :<http://www.athenasmi.org/>

¹⁸ Available at: www.metrokc.gov/ddes/forms/SEPA-GHG-EmissionsWorksheet-Bulletin26.pdf

¹⁹ Note: this average should not be a weighted average based on current market share but rather the physical average of different options of assembly types. It is important to recognize that current market share today does not lock in current market share in the future, and the benefits should actually accrue to the lowest carbon footprint materials.

Here is what the ATHENA EcoCalculator looks like:

The screenshot shows the ATHENA EcoCalculator software interface. The main window title is "EcoCalc_Vancouver_CAN_Low-Rise_v2(1).3". The spreadsheet displays the following data:

	A	B	C	D	E	F	G	H	I
1	 ATHENA® EcoCalculator for assemblies		TOTAL IMPACTS BY BUILDING COMPONENT		Primary Energy (MJ) TOTAL	GWP (tonnes) TOTAL	Weighted Resource Use (tonnes) TOTAL	Air Pollution Index TOTAL	H2O Pollution Index TOTAL
2			COLUMNS & BEAMS	0	0	0	0	0.00	
3			INTERMEDIATE FLOORS	0	0	0	0	0.00	
4			EXTERIOR WALLS	0	0	0	0	0.00	
5			WINDOWS	0	0	0	0	0.00	
6			INTERIOR WALLS	0	0	0	0	0.00	
7			ROOF	0	0	0	0	0.00	
8			WHOLE BUILDING	0	0	0	0	0.00	
9	E. INTERIOR WALLS								
10	ATHENA ASSEMBLY EVALUATION TOOL v2.3—Vancouver Low-Rise Building								
11	IN THE YELLOW CELLS BELOW, ENTER THE AREA (in m ²) THAT EACH ASSEMBLY IS USED IN YOUR BUILDING								
12		ASSEMBLY TYPE	m ²	Percentage of total	Primary Energy per m ² (MJ)	GWP per m ² (kg)	Weighted Resource Use per m ² (kg)	Air Pollution Index per m ²	H2O Pollution Index per m ²
13	Average:								
14	1	Wood stud (16" OC) gypsum board + latex paint each side	0		629.42	27.78	111.63	8.02	0.0136
15	2	Wood stud (24" OC) gypsum board + latex paint each side	0		316.13	8.74	90.12	3.83	0.0000
16	3	Wood stud (24" OC) gypsum board x2 + latex paint each	0		309.41	8.58	86.01	3.79	0.0000
17	4	Steel stud (16" OC) gypsum board + latex paint each side	0		500.21	15.11	134.39	6.58	0.0000
18	5	Steel stud (24" OC) gypsum board + latex paint each side	0		377.09	14.23	87.12	4.47	0.0426
19	6	Steel stud (24" OC) gypsum board x2 + latex paint each	0		354.54	12.68	83.41	4.27	0.0325
20	7	6" Concrete block; gypsum board + latex paint each side	0		545.34	19.21	131.79	7.06	0.0325
21	8	6" Concrete block; latex paint each side	0		975.29	53.42	163.10	11.96	0.0135
22	9	Clay brick (4") unpainted	0		784.49	46.88	114.73	9.17	0.0000
23		TOTAL m²	0.00						
24									
25	COLUMNS AND BEAMS / INTERMEDIATE FLOORS / EXTERIOR WALLS / WINDOWS / INTERIOR WALLS / ROOFS /								

References

- Borjesson, P. and L. Gustavsson. 2000. Greenhouse gas balances in building construction: wood versus concrete from life-cycle and forest land-use perspectives. *Energy Policy* 28:575-588.
- Buchanan, A.H. and S.B. Levine. 1999. Wood-based building materials and atmospheric carbon emissions. *Environmental Science and Policy*. 2: 427-437.
- Eriksson, P.E. 2003. *Comparative LCAs for wood construction and other construction methods- Energy use and GHG emissions*. A study compile on behalf of the Swedish Wood Association, now part of Swedish Forest Industries Federation, Stockholm. <http://www.Svensktra.org/pub/lca.pdf> (accessed Feb 28, 2007).
- Glover, J. 2001. Which is better? Steel, concrete or wood. A comparison of assessments on three building materials in the housing sector. Fourth year thesis, Department of Chemical Engineering, University of Sydney.
- Goverse, T, M. Hekkert, P. Groenewegen, E. Worrell, R. Smits. 2001. Wood innovation in the residential construction sector; opportunities and constraints resources. *Conservation and Recycling* 34: 53-74.
- Miner, R. 2006. The 100-year method for forecasting carbon sequestration in forest products in use. *Mitigation and Adaptation Strategies for Global Change*. Published online 20 May 2006. Springerlink.
- Noren, Jarne-hammar. 2001. Environmental Assesment of Trahus. Report No P0101002. Swedish Institute of Wood Technology Research.

- Perez-Garcia, J., B. Lippke, D. Briggs, J. Wilson, J. Bowyer, and J. Meil. 2005. The environmental performance of renewable building materials in the context of residential construction. *Wood and Fiber Science* 37 CORRIM Special Issue: 3-17.
- Reardon, C., S. White, C. McGee, S. Shackel, B. Slapp. 2005. *Your Home*. Produced for the Australian Government by the Institute for Sustainable Futures, University of Technology, Sydney.
- Thormark, C. 2006. The effect of material choice on the total energy need and recycling potential of a building. *Building and Environment* 41:1019-1026.
- Trusty and J. Meil. 1999. Building Life Cycle Assessment: Residential Case Study. Athena Sustainable Material Institute.