



February 25-26, 2009
Cloquet Forestry Center

A Conference of the Vital Forests/Vital Communities Initiative

Official Conference Proceedings

Executive Summary

In 2006 and 2007, the Blandin Foundation convened conferences at St. John's University with the purpose of introducing forestry professionals and woodland owners to tools for fostering sustainable forestry practices, and to advance a shared strategic vision and action plan to increase the number of acres of family forest land with Forest Stewardship Management Plans from the current 1.3 million to 2.3 million by 2015. The resulting action plan included recommendations addressing the *ad valorem* tax, forest stewardship capacity building, social marketing research and initiatives, and certification. The most significant accomplishment to date has been the creation of the new 2c Managed Forest Land tax classification.

In 2009, the Blandin Foundation and its partners hosted a forest stewardship conference that offered the opportunity to reflect on accomplishments and further refine the action plan. This third event had the added element of focusing on the role of forests in global climate change. More than 150 people participated in the *Forest Values and Carbon Markets* conference.

The 2009 event was organized in collaboration with the Minnesota Society of American Foresters and a steering committee that included the Blandin Foundation, Extension, University of Minnesota, Center for Integrated Natural Resource and Agricultural Management (CINRAM), Dovetail Partners, Minnesota Department of Natural Resources, Minnesota Forestry Association, and the Minnesota Association of Soil and Water Conservation Districts.

The opening event for the conference was a tour of forest management strategies at the Cloquet Forestry Center and a discussion of the carbon storage implications. About 75 foresters, researchers, and others participated in the field tour.

The tour included visits to red pine; aspen, and mixed aspen-spruce stands with a variety of management histories, including no active management in some areas to a century of intensive management in others. At each stop, the presenters discussed with the group the stand history, rates of carbon sequestration and accumulation, and the carbon impact of past and possible future silviculture treatments.

Following the tour, the conference opened with an evening program that included comments from Chuck Leavell, a presentation by Will Steger and musical entertainment. Mr. Leavell is best known as the keyboardist for bands that include the Rolling Stones; he is also an accomplished solo artist. His comments included sharing his personal commitment to forest stewardship and tree farming while emphasizing the important role all family forest owners play in providing forest products and services as the owners of more than 60% of the nation's forests. Will Steger is best known for his legendary polar explorations. Will's presentation provided information about the impact of global warming, the change that he has observed during his expeditions, and the urgent need for human action to respond and change the trends.

The following morning, the main day of the conference began with presentations by Dave Epperly, State Forester with the Minnesota Department of Natural Resources and Jean Coleman, Coordinator for the Statewide Conservation and Preservation Plan. Their presentations provided a statewide perspective on climate change and how it impacts forest values and forest management alternatives.

The agenda for the rest of the day included three panel presentations:

Framing the Issue: Addressing the Theory and Science of Climate Change

Mark Seeley, Minnesota Public Radio and the University of Minnesota

Lee Frelich, Director, Center for Hardwood Ecology, University of Minnesota

Framing the Opportunities: Addressing the Carbon Markets & Climate Policy

Nathaniel Gorence, Policy Analyst, National Commission on Energy Policy

John Gunn, Program Leader, Manomet Center for Conservation Science

Jim Bowyer, Director, Responsible Materials Program, Dovetail Partners, Inc.

Hitting the Ground: Sharing Examples of Existing Forest-Based Carbon Credit Trading and Ecosystem Market Projects

Gerald Gray, Vice President, Policy, American Forests

Kent Scheer, Minnesota landowner

Bruce Miller and Doug Peterson, Minnesota Farmer's Union

John Gunn, Program Leader, Manomet Center for Conservation Science

Due to inclement weather, the conference was adjourned before the final response and discussion session. The final event of the conference happened several weeks later in early-April with a follow-up webinar.

Speakers for the webinar were:

Anthony D'Amato, University of Minnesota

Mark Jacobs, Land Commissioner, Aitkin County Land Department

Steve Morse, Executive Director, Minnesota Environmental Partnership

The overall outcome of the event was an increased understanding of the complexity, challenges and opportunities presented by climate change and carbon credit markets. There is evidence that clearly suggests climate change could have significant impact on Minnesota's forests and that opportunities exist for landowners and managers to take action that is responsive to the challenges.

Forest Values and Carbon Markets: Opportunities for Minnesota

Table of Contents

Forestry Tour	5
Keynote Speakers	8
Chuck Leavell	8
Will Steger	9
Opening Presentations	9
Dave Epperly, State Forester, Minnesota Department of Natural Resources	9
Jean Coleman, Statewide Conservation and Preservation Plan Project Coordinator	10
A Celebration of Family Forest Stewardship Accomplishments	10
2c Managed Forest Law Tax Program & the Sustainable Forest Incentive Act (SFIA)	11
Forest Stewardship Program	12
Panel Presentations	12
Framing the Issue: Addressing the Theory and Science of Climate Change	12
Mark Seeley, Minnesota Public Radio and the University of Minnesota	13
Lee Frelich, Director, Center for Hardwood Ecology, University of Minnesota	13
Framing the Opportunities: Addressing the Carbon Markets & Climate Policy	14
Nathaniel Gorence, Policy Analyst, National Commission on Energy Policy	14
John Gunn, Program Leader, Manomet Center for Conservation Science, Forest Carbon Offsets: A Scorecard for Evaluating Project Quality,	14
Jim Bowyer, Director, Responsible Materials Program, Dovetail Partners, Inc., Carbon Storage and Low Energy Intensity in Harvested Wood Products: Critically Important in Developing a Rational Carbon Trading Policy	15
Hitting the Ground: Sharing Examples of Existing Forest-Based Carbon Credit Trading and Ecosystem Market Projects	17
Gerald Gray, Vice President, Policy, American Forests, Advancing a Reforestation Project Under the California Climate Action Registry (CCAR)	17
Kent Scheer, Minnesota landowner	17
Bruce Miller and Doug Peterson, Minnesota Farmer’s Union	17
John Gunn, Program Leader, Manomet Center for Conservation Science, Minnesota North Woods Carbon Partnership: Cass and Aitkin County Land Departments Case Study	18
Follow-up Webinar	19
Conference Outcomes	22
Audience Participation Technology Results	22
Speak-Up Questions	25
Conference Evaluation	25

Forestry Tour

The opening event for the conference was a tour of forest management strategies at the Cloquet Forestry Center and a discussion of the carbon storage implications.¹ About 75 foresters, researchers, and others participated in the field tour.

The tour included visits to red pine; aspen, and mixed aspen-spruce stands with a variety of management histories, including no active management in some areas to a century of intensive management in others. At each stop, the presenters discussed with the group the stand history, rates of carbon sequestration and accumulation, and the carbon impact of past and possible future silviculture treatments.

Pure red pine: The student thinnings

The stand originated following natural disturbance around 1910, so it's about 100 years old. On one side of the road, the 40-acre stand has been thinned four times: in 1950, 1960, 1970, and 1985. On the other side of the road, the stand has never been thinned.

Focusing on carbon dynamics, both stands have sequestered approximately the same amount of carbon during the past 100 years. However, in the unthinned stand, almost 40% of that carbon has returned to the atmosphere, or is in process of doing so, through mortality and decomposition of dead wood in the stand and on the forest floor. In the thinned stand, that natural mortality has been "captured" through thinning and turned into forest products.

In the early thinnings, nearly all of the harvested material went into pulp production. Pulp is a short-lived product, so much of this carbon would have returned to the atmosphere within 5-10 years. However, in the later thinnings, larger and larger proportions of the harvested wood went into long-lived wood products such as construction materials. Long-lived products store carbon for a much longer time period (e.g. many decades to centuries).

The two stands illustrate the potential of active forest management to provide three important benefits: 1) reduce atmospheric emissions of carbon through mortality and decomposition, 2) increase long-term carbon storage by increasing the proportion of harvestable wood products that are long-lived rather than short-lived, and 3) produce a financial return for the landowner.

¹ The summary of the tour developed by Eli Sagor of Extension and distributed through MyMinnesotaWoods.org was extracted from for inclusion in these proceedings. The full article is available at: <http://myminnesotawoods.wordpress.com/2009/03/05/fvcm-field-tour/>

Aspen-spruce mix

The next stop on the tour was at a 22-year old mix of aspen and white spruce. The stand originated from a 1987 clear cut. Natural regeneration was almost pure aspen, and in the same year as the harvest, 800 white spruce seedlings per acre were planted on the site. Like most of the area's soils, this is a low-productivity site for aspen, with a site index of only about 55 (meaning 50 year old aspen would be about 55 feet tall).

This stand has interesting silvicultural potential and management choices. Perhaps the most likely treatment would be to harvest the aspen when it becomes merchantable, likely around age 45-50, leaving the spruce intact. Depending on the pattern of harvest (e.g. uniform vs. patches), this would lead to some regeneration of aspen and more shade-tolerant conifers such as white spruce or balsam fir.

From a carbon storage perspective, this system would retain a relatively high level of carbon storage on site after the sale and harvest of the aspen. White spruce is relatively long-lived in Minnesota and could be managed on an 80-120 year rotation. The extended rotation, combined with the increase in growing space from the aspen removal, would also increase the growth rate of the spruce, producing larger trees and a higher proportion of long-lived wood products at the final harvest.

Based on research conducted in northern Minnesota, on stands of similar age and composition, this stand is estimated to accumulate carbon at a rate of about 2.35 tons of CO₂ equivalent per acre per year. (Accumulation is sequestration minus respiration.)

Mixed reserve stand

Just across University Road from the aspen-spruce stand is a reserved (unmanaged) mixture of aspen, birch, balsam fir, white spruce, and scattered other species. (This stand is in reserve status on the CFC management plan.) This stand is very similar to the stand that was clearcut in 1987 to produce the mixed aspen-spruce stand described above.

Typical of older stands, this one is breaking up fairly rapidly with accelerating levels of canopy tree mortality. Dominant birch and aspen are nearing the end of their natural lives, particularly for northern Minnesota sandy sites. Decadent stands like this one have a number of important ecological benefits: they provide coarse woody debris for forage, den sites, and cover as well as a different kind of habitat from intensively managed stands.

From a carbon dynamics perspective however, stands like this one are less than optimal. Even before they fall, the dying trees begin to decay and emit carbon through the respiration activities of decomposition.

Based on research conducted in this area, on stands of similar age and composition, this stand is estimated to accumulate carbon at a rate of only about 0.4 tonnes of CO₂ equivalent per acre per year. This is little more than 25% of the accumulation rate of the aspen-spruce mix across the road. The primary difference is the high rate of decomposition-related respiration in the reserve stand.

Young pure aspen

The final stand we visited was a young pure aspen stand. By this point of the tour, most of the big ideas were clear. This stand is accumulating carbon at a relatively fast rate, which is great for addressing that management goal. However, the likely silvicultural trajectory for pure aspen in this part of the world is a 40-55 year rotation followed by clearcut. This pattern, while creating important benefits for wildlife habitat and local production of renewable wood products, does not result in a high level of long-term storage of atmospheric carbon.

This point is clarified by comparison with the mixed aspen-spruce stand described above. In that stand, after harvest of the merchantable aspen, a large standing stock of carbon remains in storage in the stand (in the form of a spruce forest). The tradeoff, of course, is lower production of aspen, which is important to Minnesota's wood products industry, local communities, and consumers who are looking for locally produced products from well-managed forests.

B4WARMED

After visiting all of the stands, the final tour stop was a visit to the B4WARMED experiment. This experiment, led by Peter Reich with a number of other University of Minnesota collaborators, simulates the projected warming trend and monitors the impacts on native trees. The study uses a sophisticated system to carefully monitor and manipulate soil and air temperature fluctuations.

Conclusions from the Field Tour

The tour included several hours of discussion, in the woods, of practical issues associated with forest-based carbon accumulation, the role of silviculture, and related issues. The group also discussed possible carbon credit payments and associated (and complex) issues like additionality, leakage, and carbon credit protocols. The take-home messages about carbon are as follows:

- Increasing stocking of a long-lived shade tolerant species can increase the stand's potential for long-term carbon storage.
- Longer rotations, regardless of species, can increase long-term carbon storage as long as they don't exceed the natural lifespan of the dominant species.
- Increasing the proportion of harvestable products that are long-lived (e.g. construction materials) as opposed to short-lived can increase long-term storage after harvest.
- Frequent thinning can capture mortality, turning trees (that would otherwise die and decompose) into products that can be harvested and sold, and at least some of which will contribute to long-term post-harvest storage.

Keynote Speakers

Following the tour, the conference opened with an evening program that included comments from Chuck Leavell, a presentation by Will Steger and musical entertainment.

Chuck Leavell

Chuck Leavell's piano and keyboard work has been heard on the works of Eric Clapton, The Rolling Stones, The Black Crowes, George Harrison, The Allman Brothers Band, The Indigo Girls, Blues Traveler, Train, Montgomery-Gentry, Lee Ann Womack and many more. In addition to being a well-established pianist/artist in the music industry, Leavell is also a published author, tree farmer, and advocate for the environment. Recognized as a talented and respected musician, Chuck Leavell's accomplishments as a conservationist and tree farmer are equally impressive. Along with several conservation recognitions, he and his wife Rose Lane were given the ultimate honor for their outstanding management of their own forestland, Charlane Plantation in Macon, Georgia, by being named National Outstanding Tree Farmers of the Year in 1999. Today, Leavell plays a strong role in environmental issues in the US and beyond. He is a Board member of several important and influential organizations including the American Forest Foundation, the US Endowment for Forests and Communities, the Georgia Land Conservation Council and others. His name is well known on Capitol Hill for his advocacy work on behalf of the environment, and he has played a solid role in forming the forest component of the past two US Farm Bills. In 2009 he and his partner, Joel Babbit, co-founded The Mother Nature Network (mnn.com), one of the top environmental websites in the world.

Mr. Leavell's comments included sharing his personal commitment to forest stewardship and tree farming while emphasizing the important role all family forest owners play in providing forest products and services as the owners of more than 60% of the nation's forests.

Will Steger

Will Steger is best known for his legendary polar explorations. He has traveled tens of thousands of miles by kayak and dogsled for more than 45 years, leading teams on some of the most significant polar expeditions in history, earning him the Lifetime Achievement award from National Geographic Adventure Magazine in 2007. Will led the first confirmed dogsled journey to the North Pole without re-supply in 1986, the 1,600-mile south-north traverse of Greenland (the longest unsupported dogsled expedition in history) in 1988, and led the first dogsled traverse of Antarctica (the historic seven month, 3,471-mile International Trans-Antarctica Expedition) in 1989–90. Will has continued his commitment to education and exploration through the Will Steger Foundation. Recent expeditions have included a dynamic online component and have taken Will and his expedition teams to Ellesmere Island and Baffin Island in Canada's High Arctic.

Will's presentation provided information about the impact of global warming, the change that he has observed during his expeditions, and the urgent need for human action to respond and change the trends.

Opening Presentations

The morning session of the conference opened with presentation that provided a statewide perspective on climate change and how it impacts forest values and forest management alternatives.

Dave Epperly, State Forester, Minnesota Department of Natural Resources

The State Forester, Dave Epperly, opened the morning sessions with an overview of the Minnesota DNR's policy and management related to climate change and Minnesota's forests. With the DNR's responsibility for nearly 5 million acres of public lands it is well recognized that the agency has a large role to play in managing Minnesota's forests and responding to change. Mr. Epperly reported that the DNR recognizes that climate change is occurring at a rate that is higher than historical levels and that the rate is likely to continue to increase.

The DNR, Minnesota's Governor and the Legislature have all taken action to respond to the challenge of climate change. The DNR anticipates that the impacts of climate change on Minnesota's forests will include more intense and more frequent natural disturbances (e.g., wildfire, windthrow), shorter winter harvest seasons, increased pest

problems, and changes in species compositions of forests. Mr. Epperly views the DNR's responsibilities to the citizens of Minnesota as being to help mitigate climate change where possible and to help forests adapt to change.

The goal of the DNR is to influence energy and climate policies and decisions so that they promote the long-term quality and health of our natural resources. The strategies for realizing this goal include promoting conservation of natural resources and energy, mitigating and adapting to climate change through land management, and increasing the energy efficiency and use of renewable energy in DNR operations. Specific to the strategy of mitigation and adaptation, the DNR is developing carbon measurement protocols, incorporating carbon management in decision-making, promoting incentives for improving carbon management, developing comprehensive management strategies for diverse habitat types, and integrating monitoring systems and applied research to track indicators of climate change and its impacts.

Jean Coleman, Statewide Conservation and Preservation Plan Project Coordinator

Ms. Coleman presented on the Minnesota Statewide Conservation and Preservation Plan and its relationship to forest values and carbon markets. The plan provides a comprehensive inventory and assessment of Minnesota's environment and natural resources, including recommendations for actions to change course for better outcomes for our natural resources. Recommendations within the plan are identified in terms of their potential to provide specific benefits and values, including the potential for the recommendation to aid in addressing climate change mitigation or adaptation. Some of the recommendations that were identified as having the potential to aid in addressing climate change include the increased utilization of cellulosic ethanol produced from forest biomass and conversion of annual row crops to short rotation tree crops. The plan also recommends the protection of large blocks of forested land to enhance ecosystem resilience in the face of climate change, and support for and expanded use of forest management practices that aid in carbon sequestration. The plan acknowledges that additional research is needed.

A Celebration of Family Forest Stewardship Accomplishments

During the conference, time was taken to reflect upon and celebrate the family forest stewardship accomplishments that have been achieved in recent years.²

² The complete report of accomplishments is available for download at:
http://www.blandinfoundation.org/_uls/resources/FamForAccomplishRpt2309.pdf

Since 2006, the Blandin Foundation and its many partners have been in a dialogue with family forestland owners, forestry professionals, policy makers and stakeholders to advance efforts to foster and encourage sustainable forestry practices among family forest owners.

At conferences held in 2006 and 2007, participants identified specific goals for Family Forest Stewardship in Minnesota and provided recommendations for strategies to be pursued. A leading outcome from past events has been the “Million Acre Goal”. The goal is to increase family forestland under sustainable management through a number of efforts, including the preparation of Forest Stewardship plans for 1 million acres of Minnesota family forestlands that did not previously have a plan.

- More than 30 organizations have endorsed the Million Acre Goal and are actively supporting the growth of family forest stewardship in Minnesota.
- More than 200,000 acres of Forest Stewardship Plans have been written since 2006, reaching a 6-year high in 2008 with more than 80,000 acres of plans written in the past year. The Stewardship Program has set a goal of writing 125,000 acres of plans in 2009 to stay on track to hit the Million Acre Goal by 2015.
- In 2008, the 2c Managed Forest Land tax program became law and delivered on the goal of revamping the *ad valorem* tax. Minnesota’s family forest owners are now benefiting from the program. To be eligible for the 2c program the landowner must have a current (less than ten years old) stewardship plan. Nearly 100,000 acres have been enrolled in the 2c program so far.

2c Managed Forest Law Tax Program & the Sustainable Forest Incentive Act (SFIA)

During the 2007 legislative session, the final 2007 Omnibus Tax bill (HF 2268) included provisions to create a new property tax classification for certain unplanted rural lands, including undeveloped forests. Properties under this classification would have been taxed at a reduced net class rate from 1.0 to .65 percent if they met certain conditions. Under the proposed changes, the subjective requirement that undeveloped lands be taxed at their “highest and best use” was removed. Unfortunately, this language was lost when the Omnibus Tax Bill was vetoed by Governor Pawlenty on May 30, 2007.

During the 2008 session, supporters took advantage of the opportunity to build on the agreement reached the previous year as well as to push for additional improvements. In 2008, the language made it into law, and Minnesota’s family forest owners are now benefiting from the 2c Managed Forest Land tax program (Minnesota Laws 2008,

chapter 366). To be eligible for the 2c program the landowner must have a current (less than ten years old) stewardship plan. The law created a new classification, which has been given the name Class 2c Managed Forest Land, that provides qualifying land with a class rate of 0.65 percent for the 2008 assessment. As of January 2009, 94,405 acres have been enrolled in the 2c Managed Forest Land program.

Currently more than 800,000 acres are enrolled in the SFIA, an increase of about 200,000 acres since 2006. There are 1,394 participants as of January 20, 2009, a near doubling from 731 in 2006. Interest in SFIA is growing as landowners respond to the marketing of the 2c Managed Forest Land program by county assessors. Landowners, who are enticed into the county assessor's office because of 2c marketing, receive information from the assessor on SFIA and 2c. Landowners, who came in because of 2c, are making informed decisions about which program best meets their needs.

Forest Stewardship Program

More than 200,000 acres of Forest Stewardship Plans have been written since 2006, reaching a 6-year high in 2008 with more than 80,000 acres of plans written in the past year. The Stewardship Program has set a goal of writing 125,000 acres of plans in 2009 to stay on track to hit the Million Acre Goal by 2015. Currently about 1.45 million acres are covered by a stewardship plan.

In 2008, there were thirty-five (35) consulting and SWCD foresters with stewardship contracts and seventy-nine (79) DNR staff certified to write stewardship plans. There are a total of 127 approved stewardship plan writers

In 2008, the USFS for the first time required all states to conduct a survey of stewardship plan implementation. The results found an 82% plan implementation rate.

Panel Presentations

Framing the Issue: Addressing the Theory and Science of Climate Change

Carbon sequestration has been a topic of discussion for several years, coming to the forefront in the last few years, as evidence of climate change has become more evident. Nonetheless there still remain many questions about climate change and the role of terrestrial carbon sequestration in addressing the climate change issue. We need a science-based approach to address those issues and also as the basis for any markets that develop to promote forest based carbon sequestration. This session helped provide the scientific background for climate change and also the rationale and issues related to forest based terrestrial carbon sequestration.

Mark Seeley, Minnesota Public Radio and the University of Minnesota

Dr. Mark Seeley is a professor in the Department of Soil, Water, and Climate, where he has worked since 1978. He has done weekly commentary for Minnesota Public Radio and written the weekly newsletter "Minnesota WeatherTalk" since 1992. His extension educational programs relate weather/climate impacts to Minnesota agriculture, transportation, energy, tourism, and natural resources. Seeley edited a successful series of children's books called the "Amazing Science Series" and recently authored a 200-year history of Minnesota weather called "Minnesota Weather Almanac." He has been awarded the Sigma Xi Science Communication and Education Award, the Mn/DOT Research Partnership Award for his work with the deployment of living snow fences, and most recently the Extension Director's Award for Distinguished Faculty.

Mark presented information about the Earth's climate and how it is changing. Based on his decades of work with climate data, he reported on the research that shows the Earth's climate is changing and that the change is occurring relatively rapidly. While acknowledging that the climate responds to many diverse factors, including both natural and human impacts, regardless of the cause the physical and biological consequences on the landscape are being observed. An important point is that along with the many natural factors influencing climate (ocean currents, polar ice sheets, volcanic eruptions, etc), land use and landscape changes (urbanization, drainage, irrigation, deforestation) and greenhouse gas emissions from society are major drivers of change. Human society has significantly altered the surface of the earth and this impacts our climate. The research shows that the climate models more accurately fit climate outcomes and better predict changes when human factors are included in the modeling.

Lee Frelich, Director, Center for Hardwood Ecology, University of Minnesota

Dr. Lee Frelich is an expert in disturbance ecology with active research related to boreal forests, invasive earthworms, and the restoration ecology of old growth forest remnants. Dr. Frelich's comments included reinforcing Mark's message that climate is influenced by many factors, and that the human factor shouldn't be underestimated. The impacts of climate change to Minnesota's forest could be significant, with boreal species such as black spruce shifting their ranges of distribution to areas north and outside of Minnesota. In addition to black spruce, other species such as jack pine, red pine, white spruce, paper birch and aspen could decrease in abundance as Minnesota's climate warms. Species such as sugar maple, red maple, white pine, basswood, red oak, bur oak, green ash, and yellow birch could increase in abundance. The change in climate could also lead to more disturbance events like the 1999 wind event in the Boundary Waters and changes in fire frequency.

Framing the Opportunities: Addressing the Carbon Markets & Climate Policy

Nathaniel Gorence, Policy Analyst, National Commission on Energy Policy

Nate Gorence's discussion provided an overview of both the architecture and prospects of a federal greenhouse gas emissions trading program. Specifically, Mr. Gorence discussed the critical pillars of a U.S. cap-and-trade program—targets, point of regulation, allowance allocations, international competitiveness, market oversight, and cost-containment—and described how offsets fit into the equation. A cap-and-trade system creates an emissions cap for the economy as a whole and then gives all participants flexibility to make emissions reductions however they can, with whatever technologies, mechanisms, or fuels they choose. An easy determination of how successful a cap-and-trade system is that it must achieve the emissions goals that are set as the cap. Within a cap and trade system, emissions must be monitored, measured and verified, so understanding if targets are met should be straightforward. Other goals of domestic cap and trade should be to limit economic disruptions and incorporate other countries into a global solution. Measuring these factors is not as straightforward. Mr. Gorence explained that previously introduced climate legislation has incorporated offset provisions and they are likely to be included in forthcoming bills. This is growing speculation that cap-and-trade legislation may occur in the near term in the United States and there are projects that the impacts may include raising the price of carbon credits to at least \$15 per ton (a sharp rise from the current \$2-\$4 market values). Mr. Gorence believes that once a national price is placed on greenhouse gas (GHG) emissions in the U.S. and the rest of the world commits to combating climate change, large-scale transformative change will occur. It is difficult to forecast exactly when this will commence but it is imperative that the U.S. take the first step by placing a price on emitting. Over the long run, Mr. Gorence believes that if there is no global solution, what the US implements will make little difference to global emissions. At the same time, action from developing countries is almost assuredly predicated on U.S. leadership.

John Gunn, Program Leader, Manomet Center for Conservation Science, Forest Carbon Offsets: A Scorecard for Evaluating Project Quality,

Mr. Gunn presentation addressed the fact that carbon markets are growing rapidly, with virtually no oversight or standardized rules. From 2006 to 2007, the combined regulatory and voluntary carbon markets grew by 72%, from an estimated 1.73 million tons of carbon dioxide equivalent (MtCO₂e) to 2.98 MtCO₂e. Forestry projects are one of the most transacted project types, holding 18% of the global carbon market. Many standards and protocols are used to develop carbon projects and they vary widely.

Understanding and navigating the carbon market can be overwhelming, particularly for those unfamiliar with it. How does one determine if a project is legitimate? Has the project adequately addressed issues like additionality, leakage and permanence? How can the relative merits of several projects be compared when different standards or protocols have been used? Manomet attempts to answer these and other questions about forest carbon projects with its Forest Carbon Offset Project Scorecard (Manomet Scorecard).

The Manomet Scorecard is a tool for project developers, offset buyers, and others to evaluate the quality of any forest carbon offset project. It is based on an analysis and synthesis of existing GHG protocols and standards. Using 42 yes/no questions, the scorecard examines eight general characteristics of offset projects: (1) contract structure, (2) baselines, (3) additionality, (4) monitoring, reporting, and verification, (5) permanence, (6) leakage, (7) transparency, (8) and co-benefits/costs. We have determined that a high quality forest project is one that is legally sound, accounts for all relevant GHG stocks and flows, results in a net reduction of atmospheric GHG levels, can be easily verified by a qualified third party, results in the permanent removal of GHGs, does not cause leakage, is fully transparent, and does not compromise other important social or environmental benefits derived from forests.

The scorecard is intentionally rigorous to capture the range of forest projects that might exist in any voluntary or regulatory carbon market; therefore, no project is likely to score 100%. The value of the scorecard is in identifying areas of weakness that can be strengthened prior to a carbon offset transaction.

**Jim Bowyer, Director, Responsible Materials Program, Dovetail Partners, Inc.,
Carbon Storage and Low Energy Intensity in Harvested Wood Products:
Critically Important in Developing a Rational Carbon Trading Policy**

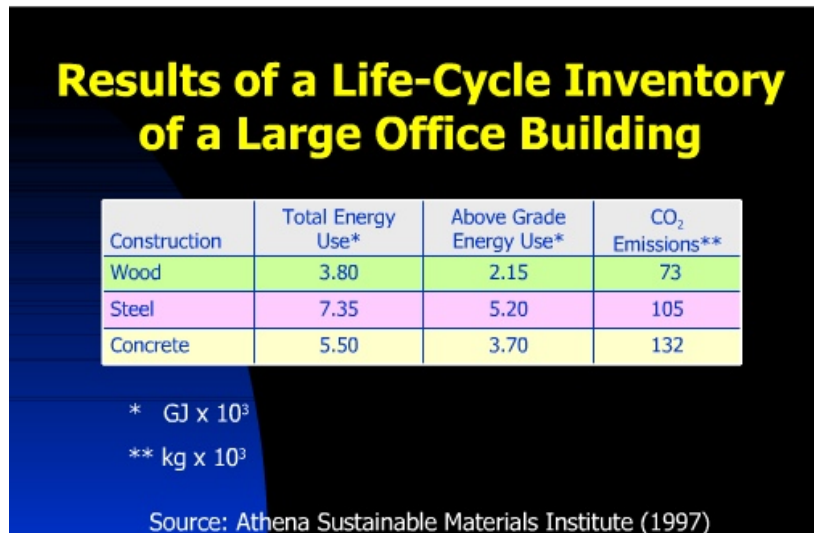
In developing incentives and protocols to reduce carbon emissions and increase carbon sequestration, one glaring omission stands out. Storage of carbon within wood products in use and in landfills has thus far been ignored by those involved in global climate policy development, as has the low energy intensity (and even lower fossil fuel intensity) of wood products in general. The omission is serious since in the United States carbon stored within wood products in use and in landfills is over one-third that being sequestered annually within the nation's forests and almost one-half the annual addition to non-forest soil carbon stocks. The lack of recognition of lower energy and fossil fuel intensity is even more serious because the impact of these factors on carbon flux is substantially greater than that attributable to carbon storage.

Recognition of carbon storage and low energy intensity associated with harvested wood products in regional, national, and international carbon trading programs is important if

society is serious about reducing carbon dioxide and greenhouse gas emissions. Development of rational government purchasing programs and green building guidelines is also dependent upon such recognition.

The voluntary Chicago Climate Exchange program now recognizes carbon storage within harvested wood products, with an extensive protocol in place. The California Climate Action Registry is currently considering such recognition. No program yet recognizes low energy intensity (or substitution) effects. The following figure (Figure 1) illustrates the difference in energy use and CO₂ emissions for alternative construction materials, including wood, steel and concrete.

Figure 1. Comparison of CO₂ Emissions for Wood, Steel and Concrete Construction



Hitting the Ground: Sharing Examples of Existing Forest-Based Carbon Credit Trading and Ecosystem Market Projects

Gerald Gray, Vice President, Policy, American Forests, Advancing a Reforestation Project under the California Climate Action Registry (CCAR)

Gerry discussed an opportunity for American Forests to develop a reforestation project under the California Climate Action Registry (CCAR), including an examination of the climate change policies in California, the development of the CCAR's Forest Project Protocol, challenges presented by the protocol in trying to develop a reforestation project, and a revision process which has made the updated protocol more workable for American Forests, as well as other project developers. The protocol recognizes reforestation, improved forest management and forest conservation (avoided conversion). The protocol is currently being revised and the workgroup continues to explore other issues, including the treatment of harvested wood products. The revised forest project protocol will expand the application and eligibility for registering to include all forestry-based greenhouse gas (GHG) projects located on public and private lands in the United States.

Kent Scheer, Minnesota landowner

As a private landowner, Kent received his first check for carbon credit sales in July of 2008. Although inclement weather prevented Kent from attending the conference in person, he shared written comments that were read by Dean Current. Kent described how he got his property enrolled in carbon credit markets, the landowner's important role in the sale process and recommendations on how to select an aggregator. Kent believes that landowner carbon credit income is here now and coming on stronger. He doesn't see a downside to participating and there is no reason to wait because even if you join now, you get the current market value when credits are sold, so if the market goes up you will still realize the benefit.

Bruce Miller and Doug Peterson, Minnesota Farmer's Union

Doug provided brief comments about the service that the Farmers Union is providing as aggregator of carbon credits through the Chicago Climate Exchange (CCX). He believes carbon credits offer an opportunity for farmers and landowners to explore another revenue stream for their properties. Although it may not fit everyone, it is something to explore as an option. Doug also acknowledges the need to pay attention to the issue of climate change as something we all have to work on, farmers, landowners, urban and rural people.

Bruce Miller provided background and details about the Farmers Union and their Carbon Credit Program. The program currently recognizes a variety of practices that results in carbon sequestration, including no-till, seed grass, rangeland, methane recovery and forestry projects. The eligible forestry products include tree planting and afforestation following the CCX guidelines, limited to land that was degraded or bare as of January 1, 1990 and with planting or reforestation density of at least 250 trees per acre. Landowners do not need to enroll all of their acres. Interested landowners can get more information online. Continuous on-line enrollment is offered for all offset types, including forestry offsets.³

**John Gunn, Program Leader, Manomet Center for Conservation Science,
Minnesota North Woods Carbon Partnership: Cass and Aitkin County Land
Departments Case Study**

The goal of the Minnesota North Woods Carbon Credit Partnership is to develop a carbon credit accounting system that works for Minnesota's North Woods, including considerations for carbon storage associated with active forest management, long-lived wood products, and peatland restoration and management. The project was developed to meet the requirements of the Chicago Climate Exchange (CCX) and the Voluntary Carbon Standard (VCS). The project utilized existing forest inventory and growth and yield data for the region, including information collected by the Forest Inventory and Analysis (FIA) Program of the U.S. Forest Service and data from the Aitkin and Cass County Land Departments.

The Minnesota North Woods Carbon Credit Partnership was developed with the participation of Dovetail Partners, Aitkin County Land Department, Cass County Land Department, Manomet Center for Conservation Sciences, and the USDA Forest Service. The county land departments and the USDA Forest Service had primary responsibilities for providing data as necessary to establish growth models and carbon credit accounting systems. The Manomet Center for Conservation Sciences had lead responsibilities for crafting a carbon credit framework that fits the requirements of the marketplace while meeting the goals of the land managers of Minnesota's North Woods.

The approach outlined by the project can be used to develop estimates of carbon storage potentials. With this information land managers can then complete a third-party audit to confirm the carbon credits and allow them to be marketed. Many of the large land managers in Minnesota are already participating in third-party forest certification and many of the same auditors can provide carbon credit auditing services. The project

³ The link for the MFS carbon program and forestry credits is: <http://carboncredit.ndfu.org/forestry.html>

has been piloted with the Aitkin and Cass County Land Departments and the approach taken by these counties is being made available for use by other public and private land managers.

The overall goal of the project has been to establish a system that could result in carbon credits being sold from Minnesota's Northwoods. The mid-term strategy is to promote the system and demonstrate its utility so that further adoption occurs and carbon markets in Minnesota can be expanded. Over the long-term, additional ecosystem service markets will be pursued that can be easily "layered" on top of the carbon credit framework and expand the economic and environmental benefits to the region.

The North Woods Carbon Credit Partnership utilized the counties' current inventory data and their management plans for their combined 475,000 acres of land. The project modeled forest growth and changes in carbon stocks over the next 5-10 years, typical time periods for marketing carbon credits. The results reported at the conference demonstrate that the forestlands administered by the Aitkin and Cass County Land Departments maintain an estimated 10 million tons of stored carbon, or about 36 million tons of carbon dioxide equivalent (MTCO_{2e}). This storage represents the annual carbon dioxide emissions of more than 5 million cars. As part of the project, the counties evaluated an alternative management scenario that would sequester additional carbon beyond the current level. Under the alternative scenario that was evaluated, the additionality of 47,000 MTCO_{2e} could be realized and would provide up to \$150,000 in annual revenue to the county at current market values. The results from the North Woods project show that currently each county has many tons of carbon stored in live trees and roots. The total forest-based (tree biomass) carbon stores in Minnesota were estimated at 280 million metric tons in a report prepared in 1995 with funding from the Minnesota Legislature. Studies of Lake States forests indicate that at least an equal amount of carbon is also stored in the dead standing and downed wood, as well as in the understory plants and belowground in the soil.

Follow-up Webinar

Due to inclement weather, the conference adjourned before the final response panel was held. On April 8th, a follow-up webinar was held to allow for some further discussion of questions that were raised at the conference. The webinar included speakers who could specifically address the forest management and policy context of carbon credits and the management implications of pursuing market recognition for forest-based carbon credits.

Anthony D'Amato, University of Minnesota, Department of Forest Resources, Forest Management Strategies for Increasing Carbon Stocks and Sequestration

Mr. D'Amato's presentation reviewed the components of the carbon cycle that relate to forest management; discussed common recommendations for increasing carbon stocks and sequestration; and addressed questions raised at the conference. D'Amato noted that sequestration is the amount of carbon absorbed by forest vegetation and calculations of sequestration rates need to account for carbon that is lost to the atmosphere through decomposition and plant respiration. Carbon storage is the amount of carbon accumulated in the biomass and soils. The common recommendations for increasing sequestration rates include increasing or maintaining high-levels of growth through thinning, fertilization and used of improved growing stock. Increased stocking levels can also influence sequestration rates. Carbon storage can be influenced through extended rotation periods, the use of partial harvesting systems, increased quality and size of trees, and practices that reduce decomposition, such as thinning to salvage mortality and utilization of logging residues. There is a recognized need for land managers to balance sequestration and storage and the negative potential impacts of shifting wood product types and emission associated with intermediate treatments. Managing for carbon storage and sequestration can be integrated at stand and landscape- scales while balancing biodiversity goals. For example, both carbon and biodiversity objectives can be addressed through green tree retention, biological legacies, reserve areas, varied rotation lengths and mixed species management.

Mark Jacobs, Land Commissioner, Aitkin County Land Department

Aitkin County's lands store millions of tons of carbon and aid in offsetting carbon dioxide emissions in the region. Carbon is stored throughout the landscape, including storage in young and mature forests as well as in long-lived wood products and peatlands. The Aitkin County forest carbon project aimed to quantify carbon storage opportunities based on current forest conditions, the county's long-range strategic plan and the identified desired future conditions that are guiding land management, including goals for balancing forest age classes over time. The County is also looking at the possibility of adding carbon storage opportunities while maintaining current management goals, including recreation, wildlife, forest products and water quality protection. The forests are diverse and therefore intermediate treatments, thinning, under-planting, big tree management and other practices that increase carbon storage have already been occurring in the county and are addressed in the management plan. The carbon project evaluated practices on a range of high, medium and low intensity types and the impact of shifting practices toward lower intensity management, while maintaining other goals, including forest product utilization. In evaluating the next steps, the county is considering how carbon compliments other forest benefits and is compatible with the forest management plan; the monetary benefit for forest-based communities and

support for maintaining the forestland base; and the benefits for the environment, including reduced greenhouse gas emissions.

Steve Morse, Executive Director, Minnesota Environmental Partnership

The policy overview of carbon credits is an important context for the discussions. The potential benefits of carbon related revenues are important, but it is also important to consider if the benefits are real for climate change and our natural systems and how will these activities influence climate policy. Policies are being developed at state, regional and local levels that may impact carbon markets. Minnesota has adopted a goal of an 80% carbon emission reduction by 2050. At the federal level there is a major climate bill related to reducing emissions by a similar margin and on a similar timeframe. Both the state and federal policies also have intermediate benchmarks. There is a fair amount of controversy with the federal bill and the future policy is not certain, but there is strong interest in taking federal action on climate change this calendar year. It is possible that significant action at the federal level would preempt any state or local action. The Midwest Governor's Association and regional Governor's accord also have relevance to Minnesota's carbon policy context and more outcomes from this work are anticipate in May, including recommendations to Congress and the potential for a model rule that could be adopted by the states in 2010. This offers a potential framework for Minnesota's forest landowners and managers who are interested in providing carbon offsets. It is important that forest-based carbon projects be demonstrated as truly providing additional storage and meeting the definitions of additionality while addressing leakage and other concerns about permanence. It may also be important for offsets to occur at a regional scale and in proximity to where the emission are occurring, which may have important impacts to industrial regions like the Upper Midwest. Stakeholders are also interested in seeing a balance between the offsets and actual reductions in emissions with emphasis on the ultimate goal of reducing greenhouse gas emissions. It is important for landowners and managers to evaluate their options and the role they can play in carbon markets. Cap and trade is being met with a fair amount of skepticism and it uncertain how this will develop. There is still potential that a "carbon tax" approach could be used, and it is important that forestry stakeholders weigh in on these debates. A carbon tax would not result in the same development of carbon markets as a cap and trade system would. The jury is still out on how all of this will develop, but it is important for people to be involved at this stage to aid in the constructive development of the alternatives.

Conference Outcomes

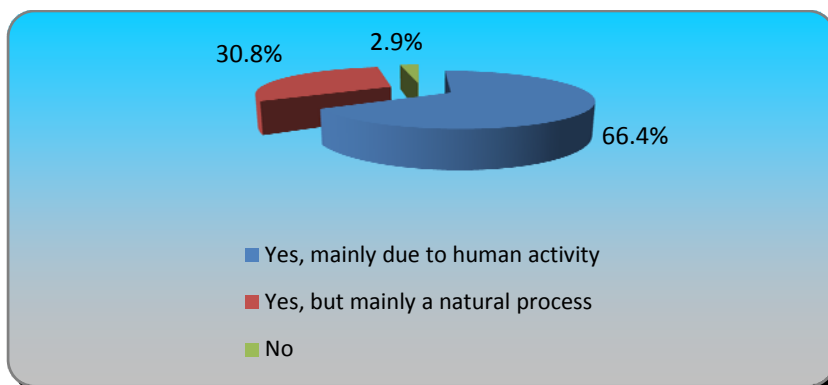
Audience Participation Technology Results

Throughout the conference, the audience was invited to provide feedback and responses to specific questions through the use of audience participation technology that recorded the responses in real-time. The questions included background demographic information as well as opinion questions related to climate change and carbon sequestration.

Based upon the results, about 50% of participants in the conference were 50-64 years of age, have more than 15 years of experience working in forestry, and work for a public agency.

The audience largely (97%) agrees that the global climate is changing, however two-thirds believe it is mainly due to human activity while nearly a third believe it is mainly a natural process (Figure 2).

Figure 2. Do you think global climate is changing? (N=104)



There were several questions where the audience has near consensus, including 87% believing that carbon storage does not increase indefinitely in an unmanaged forest (Figure 3) and 94% believing changes in forest management can increase the rate of carbon sequestration (Figure 4).

Figure 3. Do you believe carbon storage will increase indefinitely in an unmanaged forest? (N=99)

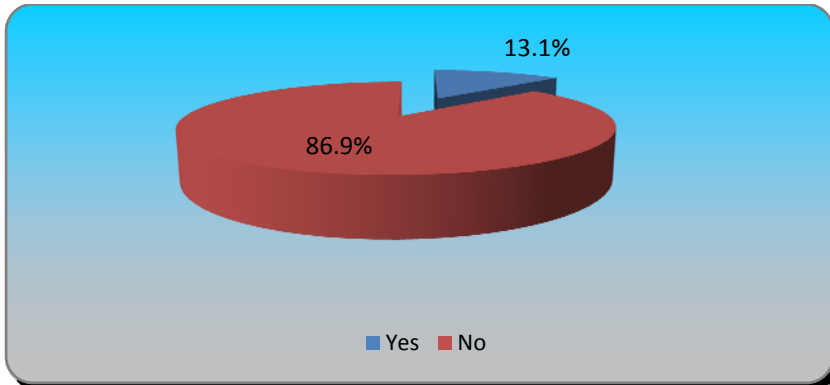
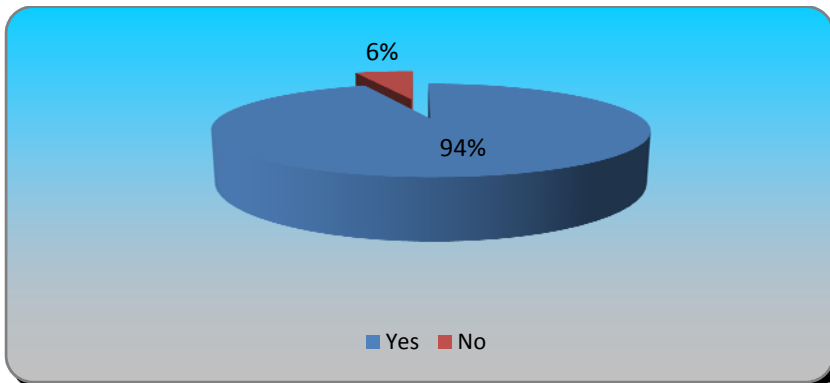
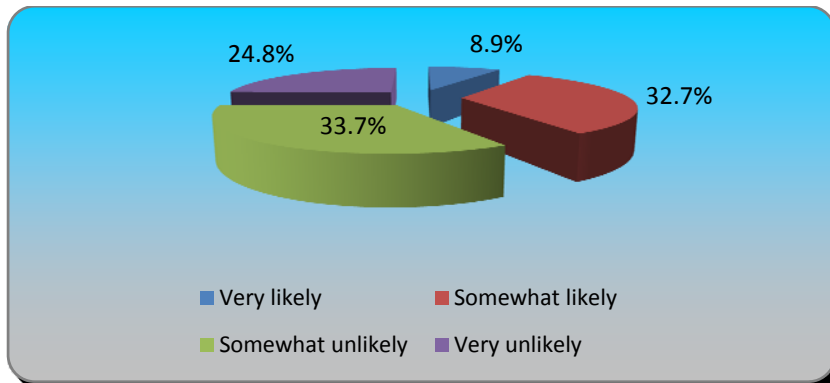


Figure 4. Do you believe changes in forest management can increase the rate of carbon sequestration? (N=100)



There were other questions where the group was much more disparate in its opinions. For example, it was a fairly even three-way split in response to the question “How likely is it that many Minnesota family forest owners will receive carbon credit payments within 10 years?” (Figure 5).

Figure 5. How likely is it that many Minnesota family forest owners will receive carbon credit payments within 10 years? (N=100)



Finally, two questions provide insight into how the group believes forests and forest management might fit with carbon sequestration with about 70% of the group believing “active management for a full suite of suite of long ad short-lived products” is the best strategy for increasing carbon sequestration in forests (Figure 6) and that there will be a “slight increase” in the degree to which carbon credits would increase family forest management (Figure 7).

Figure 6. The best strategy to increase carbon sequestration by forests is... (N=103)

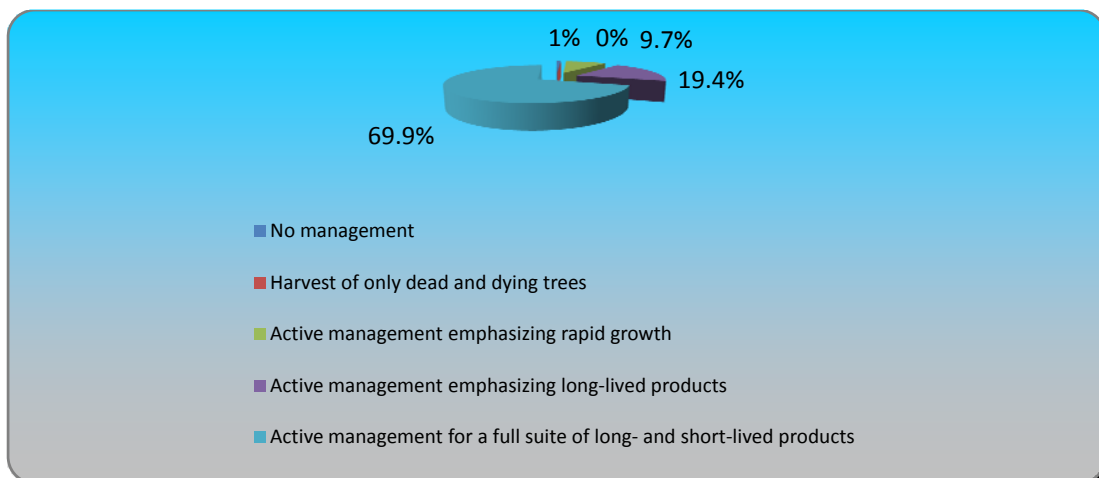
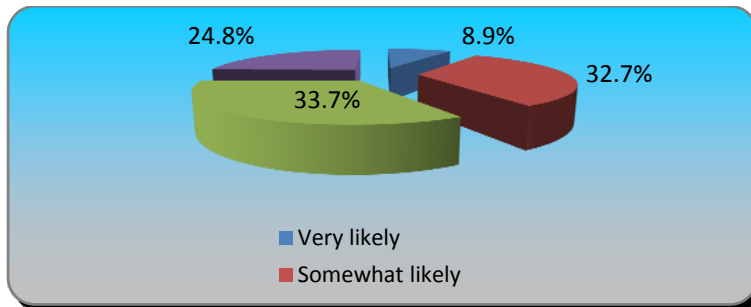


Figure 7. How likely is it that many Minnesota family forest owners will receive carbon credit payments within 10 years? (N-101)



Speak-Up Questions

During the event, participants were invited to put questions that could be asked of the presenters on “speak-up cards”. At least forty-nine questions were submitted throughout the day and have helped provide a framework for online discussions and blog postings following the event.⁴ Some of the questions were also used in the planning for the follow-up webinar.

Conference Evaluation

The conference evaluation form was completed by 129 attendees and demonstrated that the vast majority of the respondents heard about the conference through email from a friend or colleague, a website or an organizational email (e.g, MN SAF message, DNR internet, e-newsletter). The reasons for attending included in order to gain a better understanding of carbon credits and carbon sequestration, how forests relate, and potential policy changes. Attendees are indicated the importance of the continuing education credits being offered for the program. Attendees were primarily land managers, with academics, researchers, educators, and non-profit organizations also well represented. Of the land managers and owners in attendance, slightly more than half are participating in third-party certification. About half of the respondents felt the conference would impact land management actions, including being more likely to seek certification, more likely to implement a sustainable management plan, and other impacts yet to be identified. A full 82% of participants indicated they felt the Blandin Foundation and its partners are making an appropriate amount of progress toward reaching the Million Acre Goal. The presentations generally ranked high in terms of perceived value with the markets and policy panel receiving the highest rating and 95% of respondents found attendance helped establish or reinforce professional or personal contacts. Most people (87%) found the Audience Participation Technology enhanced the conference experience.

⁴ The full list of Speak-Up! Questions is available for download at:
http://www.blandinfoundation.org/_uls/resources/Speak_up_cards_completed.pdf