Summary of the 2009 National Silviculture Workshop

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Abstract—The theme of the 2009 National Silviculture Workshop held in Boise Idaho in June 2009 was, "Integrated management of carbon sequestration and biomass utilization opportunities in a changing climate." The session had a series of outstanding presentations and field tours focused on the theme of the meeting nationally, and with specific reference to the forests of the northern Rocky Mountains. There was consensus in the meeting that climate change will be the defining issue for this generation of resource managers. Silviculture will play a key role in the future of climate change, and it will be option-creating silviculture, not option-reducing silviculture. Silviculturists and decision-makers must use the best science regardless of how it tests the popular will and the politically easy decision—and this is no simple task in light of the administrative issues that govern forest management on Federal lands. An adaptation strategy for climate change will also require integrating the principles of landscape ecology modeled via landscape succession models with principles of forest ecology and silviculture modeled using tools such as the Forest Vegetation Simulator. Data from long-term experiments will be increasingly important to validate simulation outcomes. Finally, state-of-the-art science delivery programs will be needed to think about and develop silvicultural prescriptions that address climate change adaptation strategies in project-level decisions, and that are implemented spatially in a strategic way across the forested landscape.

Introduction

Approximately 150 attendees convened in Boise, Idaho, in early June 2009 for the 12th biennial meeting of the National Silviculture Workshop. Amid pleasant weather and a fine setting along the Boise River, the speakers and attendees met to discuss topics on the theme, "Integrated management of carbon sequestration and biomass utilization opportunities in a changing climate." The session had a series of outstanding presentations and field tours focused on the theme of the meeting nationally, and with specific reference to the forests of the northern Rocky Mountains.

The speakers welcoming the group succinctly summarized the challenges in science and management facing silviculturists. Mr. Bill LeVere, Director of Natural Resources for the USDA Forest Service (FS) Intermountain Region (Region 4) in Ogden, UT, noted that 12 of the warmest years on record have occurred since the 1990s; that we have experienced earlier snowpack melt, longer growing seasons, earlier greenup rates, and a 30 percent decline in August streamflows in the northern Rocky Mountains; that warmer climate provides longer periods for forests to be under stress from insects and disease; and that resource managers have lots of questions but few answers. Dr. Tom Crow, Program Manager with the FS Rocky Mountain Research Station in Fort Collins, CO, suggested that climate change will be the single defining issue facing the current generation of resource managers, that there are deep scientific questions underlying the concepts of managing forests for resilience and adaptation in the face of climate

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change—and that all of this is occurring in an era of declining Federal budgets. Ms. Cecelia Romero Seesholtz, the Forest Supervisor of the Boise National Forest in Boise, ID, offered a generous welcome, and thanked her staff for working so hard and successfully to convene the Workshop. To Supervisor Seesholtz, the organizing committee and attendees at the Workshop offer heartfelt thanks for her leadership and support.

Plenary Session

The keynote address was provided by the Hon. Cecil Andrus, Director of the Andrus Center for Public Policy in Boise, ID. He engaged the Workshop with a highly entertaining presence, and included two key concepts in his comments. First, he challenged attendees to manage National Forests for energy, economic development, and environmental quality for a changing climate—and suggested that these three objectives are important and they can be contradictory. And he challenged research scientists and resource managers alike to use the best science in making resource management decisions, regardless of how it tests the popular will and the politically easy decision.

Two other speakers were invited to participate in the Plenary Session. The first was Dr. Dave Cleaves, Acting Deputy Chief for FS Research and Development (R&D), who suggested a number of key elements from his position of research leadership in Washington, DC. He noted that silviculturally, there is "no sequestration without adaptation"; that the Forest Service mission under changing climate will not change, but we'll have to work in a different context to fulfill the mission; and that silviculture is a key role in the future of climate change—specifically, option-creating silviculture that expands opportunities available for future managers, not option-reducing silviculture that constrains what future managers can do in the field. The second was Mr. Mike DeBonis, Southwest Region Director for the Forest Guild in Santa Fe, NM, who reminded us of two key points: that the forester in the field is the eyes and ears, or the first respondent, when things go awry in the woods, and that collaboration and alliances are critical.

Technical Papers, Day 1

The first day of technical papers provided some perspective on the workshop theme using computer models, academic training, and plot data from the Forest Inventory and Analysis (FIA) program of the USDA Forest Service. Nick Crookston of the Rocky Mountain Research Station in Moscow, ID, described the first version of Climate-FVS, an extension of the widely used Forest Vegetation Simulator (FVS). A key component of this model is based on species-level climate profile models that predict the climatic range of species occurrence. He included some example outputs of this model that were quite sobering, suggesting that climate change will drastically alter at least some of our forest ecosystems during this century.

Bob Deal of the Pacific Northwest Research Station in Portland, OR, defined terms such as sequestration and ecosystem services; he then suggested that there will be opportunities in formulation of policy and in field practice to link sequestration, ecosystem services, and climate change—but cautioned that we have to get it right.

Keith Moser, with the North Central Research Station in St. Paul, MN, pointed out the extraordinary value of FIA data across the Nation. The FIA survey is

designed to describe forest resources at a large scale (States and Regions), but increasingly has value at small scales (such as National Forests, and large private land holdings), especially when supplemented with state-of-the-art aerial imagery.

Linda Nagel from Michigan Technological University, Houghton, MI, described a science delivery program for the consideration of climate change in project-level decisions that she and her colleagues have developed as part of the Forest Service National Advanced Silviculture Program. It was generally agreed in side conversations at the Workshop that this program is an outstanding model for other regions of the nation as well, not only from the perspective of content but also highlighting the cooperation between the academic community and the Forest Service to address a timely issue from a practical perspective.

Don Vandendriesche from the National Forest System (NFS) Forest Management Service Center in Fort Collins, CO, described the use of FVS to calibrate state and transition models (a Rube Goldberg-style modeling approach with algorithms for buckets, pipes, and valves) that are being used for landscape assessments to quantify long-term trends in forest structure. He posed the question: "Are analysts truly able to assist decision makers or just add complexity to already overburdened planning staffs?" Indeed, the methods presented support the effort by providing an empirical basis to an otherwise subjective process.

Reuben Weisz from the Southwest Region (Region 3), in Albuquerque, NM, reported on a pinyon-juniper (*Pinus edulis-Juniperus* spp.) grassland case study, and spoke to a practical tradeoff between restoration and sequestration—an inherent contradiction between managing for open canopy conditions in a restoration context versus on-site opportunities for carbon sequestration through accumulation of biomass. He cautioned that balancing such contradictory concepts requires a long-term, life-cycle-based perspective.

Technical Papers, Day 2

The second day of the Workshop was introduced by a panel addressing climate change at the local, regional, and national scales. Ed Gee, National Woody Biomass Utilization Team Leader, Forest Management Staff, in the Washington Office, brought the Workshop up to speed on national issues. Dave Atkins, Biomass Utilization Program Manager in the Northern Region (Region 1) office in Missoula, MT, introduced the concept of "negawatts"—efficiencies that feed power into the grid or conserve the drawing of power from the grid. Jay O'Laughlin, Professor of Forest Resources at the University of Idaho in Moscow, ID, noted that wood energy has its own byproducts—restoring forest health, providing renewable energy alternatives, restoring local economies, and yielding a bonus in carbon management. Barry Wynsma, a field forester on the Idaho Panhandle NF in Bonner's Ferry, ID, described the silvicultural tactic of "designation by description" as the "Leatherman tool" for foresters, who save $50/ac in time spent in sale preparation when using that tactic in combination with weight scaling, compared to individual tree scaling by volume.

Following the panel, three technical papers were included in the remainder of the morning session, and seemed to share a theme of carbon sequestration. Doug Basford with the Salmon-Challis NF in Salmon, ID, described a growth model for mixed conifer stands in southwestern Idaho without using FVS—and reported excellent results. This descriptive analysis shows that analog approaches to data analysis sometimes work as well as computer models, and point to the value of experience in interpreting data.

Matt Busse with the Pacific Southwest Research Station in Redding, CA, reminded the workshop of the "Miracle of Photosynthesis" in which carbon dioxide is taken in by growing trees, and stored as cellulose under the familiar equation:

$$6\ CO_2 + 6\ H_20 \Rightarrow C_6H_{12}O_6 + 6\ O_2$$

Busse then described what he called the lesson of mitigation: that managed stands store more carbon than unmanaged stands (in the short term); that managed stands are more stable in sequestration of carbon than unmanaged stands; and that as a result, forest management can help mitigate climate change.

Don Bragg with the Southern Research Station in Monticello, AR, noted that reality is a special case in the context of computer modeling. He suggested that southern pines have a role to play in carbon sequestration, and that data from the real world—specifically, from long-term experiments—are useful to validate simulation outcomes.

The afternoon session featured five papers continuing along the theme of carbon sequestration. Alan Ager with the Pacific Northwest Research Station in Prineville, OR, discussed risk analysis at a landscape scale from the perspective of catastrophic fires and then extended the idea to climate change. He suggested that the impact of climate change can be calculated as a risk analysis, or the probability of some event occurring coupled with the changing value of the loss associated with that event.

Mike Battaglia with the Rocky Mountain Research Station in Fort Collins, CO, discussed the practice of thinning, noting that thinning removes carbon from the site—but that removal is preferable to losing all the carbon on the site in a catastrophic fire. He further noted that there are substantial amounts of CO_2 offsets in areas that need fuel reduction, and that denser and more productive stands will provide greater benefits.

Terrie Jain with the Rocky Mountain Research Station in Moscow, ID, pondered the origins of the commonly used conversion:

$$[C] = \text{biomass} * 0.5$$

Her data show that [C] ~42-48 percent, which led her to wonder whether is it worth the effort to use actual carbon content rather than the commonly used conversion. Her reply suggested that it depends on the analysis, but her demeanor implied that of course using the real value of the conversion is appropriate, especially at the stand level.

Tara Keyser with the Southern Research Station in Asheville, NC, reported results from her dissertation research in Black Hills ponderosa pine (*P. ponderosa*) crown physiognomy. She observed that ponderosa pine there features an unusually large lollipop-sized crown that contributes to growth and to flammability; she concluded that it was important to properly model canopy physiognomy.

Finally, Chris Keyes with the University of Montana in Missoula, MT, gave an update on research and management of the school's renowned Lubrecht Experimental Forest (EF). He reported on the status and planning for continuing several classic long-term studies and for initiating new research, and observed that challenges facing the Lubrecht EF included concerns about infrastructural support and competing uses other than research.

Field Trip, Day 3

The Workshop always includes a field trip as part of the session, and this year the trip headed for the Boise Basin Experimental Forest, on the Idaho City Ranger District (RD) of the Boise National Forest. The tour guides were

Russ Graham, Terrie Jain, Bob Denner, and Jonathan Sandquist of the Rocky Mountain Research Station in Moscow, ID; Tom Martin, Regional Silviculturist with the Intermountain Region in Odgen, UT; Barry Stern of the Boise NF Supervisor's Office; John Sloan of the Lucky Peak Nursery in Boise, ID; Ray Eklund, Shannon Hitch, and Allyn Spanfellner of the Idaho City RD; and John Roberts with the Idaho State Department of Lands, Idaho City, ID. Thanks to all of these folks for an outstanding tour.

Tour stop 1 featured a 40-year-old ponderosa pine plantation established on terraces created by bulldozers (fig. 1). Terracing was a highly controversial practice in the 1960s and 1970s. It was designed to remove competition, stabilize erosion, and provide a more or less level planting site on steep slopes after clearcutting in the northern Rocky Mountains. The practice fell into disrepute in the 1970s, largely because of the cost and the critical response from the public about the aesthetic and ecological effects. However, after 40 years, this plantation appears to be growing at an acceptable rate, and the harshness of the terraces is somewhat diminished by time.

The second tour stop demonstrated the effects of fire exclusion in mixed conifer stands in the northern Rocky Mountains (fig. 2). Fire exclusion in mixed conifer stands in the northern Rocky Mountains results in high densities of seedlings and saplings, which can serve as hazardous ladder fuels in fire-adapted ecosystems.

One way to ameliorate that condition is to engage in a restoration treatment conducted using the free selection approach championed by Graham and Jain (2005) in these stands. The third tour stop illustrated a recently conducted free selection restoration treatment (fig. 3). This stand features the heterogeneous clumped and scattered distribution of trees that Graham and Jain seek when implementing the prescription. However, the Boise Basin EF also supports a number of more traditional long-term uneven-aged selection reproduction cutting studies in ponderosa pine stands, in which the classic reverse J-shaped distribution of stand structure are readily apparent (fig. 4).

Figure 1—A terraced 40-year-old ponderosa pine plantation on the Idaho City Ranger District, Boise NF, in southern Idaho. (USFS photo by James M. Guldin).

Figure 2—Fire exclusion in a mixed conifer stand in the northern Rocky Mountains results in high densities of seedlings and saplings, which can serve as hazardous ladder fuels in fire-adapted ecosystems, as illustrated in this image from the Boise Basin Experimental Forest in southern Idaho. (USFS photo by James M. Guldin).

Figure 3—Implementation of the free selection reproduction cutting method for old-growth ponderosa pine restoration on the Boise Basin Experimental Forest in southern Idaho. The stand featured a heterogeneous clumped and scattered distribution of trees—and ironically, of tour participants as well. (USFS photo by James M. Guldin).

Figure 4—Classic reverse J-shaped stand structure in an uneven-aged reproduction cutting study in ponderosa pine on the Boise Basin EF in southern Idaho. (USFS photo by James M. Guldin).

Wildfire is of course an important issue in the northern Rocky Mountains and Intermountain West, and managers seek information about the ecological effects of salvaging trees in burned areas. That led Jain and Graham to develop a research study that simulates the effects of wildfire and follows up the simulated fire with salvage, in a controlled context where soils and water can be monitored (fig. 5). The study was implemented by the Idaho City RD timber and fire staff, and workshop participants admired the deft creativity and attention to detail that the staff used to meet the researchers' needs.

Participants then viewed an operational ponderosa pine thinning study on the Boise Basin EF in southern Idaho (fig. 6). The size of the slash piles was impressive, not only from the perspective of the cost of conducting follow-up fuels treatments in forest operations on difficult terrain, but also as an indication of the potential of these stands to produce supplemental biomass associated with harvest of merchantable trees.

At the final tour stop, the group observed an application of the shelterwood reproduction cutting method on forest lands belonging to the State of Idaho (fig. 7). The differences between the shelterwood method as imposed by State foresters and the free selection method discussed earlier in the day were apparent, and largely as expected. The shelterwood method removed more merchantable

Figure 5—Simulated wildfire and salvage research study in northern Rocky Mountain mixed conifers, on the Boise Basin EF, southern Idaho. (USFS photo by James M. Guldin).

Figure 6—View through an operational ponderosa pine thinning study on the Boise Basin EF in southern Idaho; the slash piles contain unmerchantable material harvested but not hauled, and show the potential of these stands to produce supplemental biomass associated with harvest of merchantable trees. (USFS photo by James M. Guldin).

Figure 7—Application of the shelterwood reproduction cutting method on forest lands of the State of Idaho. As expected, the shelterwood method removes more merchantable stems and thus retains lower post-harvest residual basal area than was observed in the free selection reproduction cutting studies on the Boise Basin EF. (USFS photo by James M. Guldin).

stems and thus retained lower post-harvest residual basal area than was observed in stands marked using the free selection method.

The day was capped with the official banquet routinely held at the Workshop, with a long and detailed presentation on the history of the region presented by Susie Osgood, Forest Historian on the Boise NF. The highlight of the banquet was the presentation of the National Silviculturist of the Year awards. Honorees this year from the National Forest System were Joseph F. Myers with the Coeur d'Alene Nursery, Idaho Panhandle National Forests, in Coeur d'Alene, ID, Thomas Martin and Donald Vandendriesche. Honorees from FS Research and Development (R&D) were Marilyn Buford, National Program Leader for Silviculture on the R&D staff in Washington, DC., Daniel Dey, Research Forester with the Northern Research Station in Columbia, MO., and Henry Mcnab, Research Forester with the Southern Research Station in Asheville, NC. The names of these recipients have been added to the National Silviculturist of the Year recipient data table (table 1).

Table 1—National Silviculture Workshop Award Recipients, 2001-2009.

YEAR-Region (Location)	National Forest System	Research and Development
2001—Region 6 (Hood River, Oregon)	Fred Zensen, R6 TM	Ray Shearer, Rocky Mt. Res. Stn. Jim Jenkinson, Pacific Southwest Res. Stn. Bob Curtis, Pacific Northwest Res. Stn. Nicholas Crookston, Rocky Mt. Res. Stn.
2003—Region 2 (Granby, Colorado)	Brian Ferguson, R-4 Mary Frances Maholovich, R-1 Monty Maldonado, WO-FM Tom Tibbs, R-8	Jim Guldin, Southern Res. Stn. Kurt W. Gottschalk, Northeastern Res. Stn. Paul Johnson, North Central Res. Stn.
2005—Region 5 (Tahoe City, CA)	William "Bill" Jones, R-9 Glenda L. Scott, R-1 Tom Landis, S&PF Jim Russell, R-10	Jim Barnett, Southern Res. Stn.
2007—Region 10 (Ketchikan, Alaska)	Marlin Johnson, R-3 Kathy Sleavin, WO-Ft. Collins Dave Evans, R-5 Bill McArthur, R-6	Terrie Jain, Rocky Mt. Res. Stn. Steve Shifley, North Central Res. Stn.
2009—Region 4 (Boise, Idaho)	Thomas Martin, R1 Donald Vandendriesche, WO-Ft. Collins Joseph F. Myers, R1	Henry Mcnab, Southern Res. Stn. Marilyn Buford, WO Daniel Dey, Northern Res. Stn.

Technical Papers, Day 4

The final day of the meeting featured papers on the topic of biomass and bio-energy, and a broad spectrum of research was reported. Matt Busse summarized 20-year results of the Long-Term Site Productivity study plots in California, and in doing so illustrated the value of long-term studies, especially studies networked across the Nation.

Mark Coleman with the University of Idaho in Moscow, ID, gave an extensive review of the University's research on pyrolysis. He concluded that the science of pyrolysis requires thoughtful development and testing before it becomes operational. However, issues associated with char and char disposal will be a significant hurdle—or perhaps a significant opportunity as a bridge between carbon sequestration and biomass utilization.

Greg Jones with the Rocky Mountain Research Station in Missoula, MT, addressed concepts of greenhouse gas emissions. He noted that there is less greenhouse gas emission if biomass is processed for energy rather than if it is burned. He also suggested that that energy used to harvest, collect, and transport biomass is tiny compared to the energy lost when biomass is burned.

Tim Swedberg with the Joint Fire Science Program Office in Boise, ID, spoke about the development of integrated decision support systems for fuels treatments.

Henry Mcnab discussed a project in the southern Appalachians using shrubs to support overstory tree site index predictions. This project was inspired by field observations by an experienced professional, and serves as a testament to multiple applications of long-term research studies.

Andy Youngblood with the Pacific Northwest Research Station, La Grande, OR, examined the silvicultural suitability and practical application of ponderosa and lodgepole (*Pinus contorta* Douglas ex Louden) pines for biofuels. In doing

so, he suggested that such studies illustrate the ongoing value of the agency's network of Experimental Forests and Ranges into the 21st century.

John Shaw with the Rocky Mountain Research Station, Ogden, UT, explained current research opportunities and future applications of stand density index research using Forest Survey data, which further points to the value of that national data set in scientific inquiry.

Finally, Mike Ryan with the Rocky Mountain Research Station in Fort Collins, CO, provided a primer on carbon, and reminded the Workshop attendees that forest disturbance does not cause carbon loss unless the area remains unforested.

Discussion

The management actions associated with climate change will change the nature of silviculture in the 21st century. The scale of treatment needs threaten to overwhelm agency capacity, with escalating need for even the simplest ameliorative treatments, such as thinning in the face of declining numbers of personnel and declining budget capacity in the field. With the political overtones of climate change among the public and the ecological overtones implicit in decisions to promote species migration through silvicultural assistance, gridlock in project execution will likely further stifle widespread implementation of management activities conducted specifically for climate change.

Even if gridlock melted away, the agency's capacity to apply silvicultural treatments to forest stands nationwide is limited, given the extensive land base in roadless areas, in unsuitable condition for access or silvicultural operations, or in stands that cannot be economically managed. Some thought should be given to merging approaches for mitigating the effects of climate change on the Nation's forests and rangelands by combining stand-level silvicultural treatments with a much better understanding than we have today as to where on the landscape those treated stands should be located.

There is a need for interim silvicultural recommendations that managers can use to practice robust or resilient forestry in the face of changing climatic conditions. This can most effectively be accomplished through a collaborative partnership between our most creative and experienced practicing silviculturists in the field, and our best silviculture researchers and landscape ecologists in FS R&D and academia. That need exists at two levels—one level for professionals making silvicultural prescriptions consistent with stand dynamics and landscape ecology, and the other for field forestry and biological science technicians who are most often the personnel in the woods with the paint guns implementing the prescribed treatments. The work reported at this meeting by Nagel and others is an excellent step, and unfortunately at this time is limited to the federal agency foresters working for their silvicultural certification in the National Advanced Silviculture Program. There's a much broader need to provide this continuing education across the agency, and there's a concurrent need to carry this training beyond the green line to foresters working for forest industry, forest investment organizations, and non-industrial private forest landowners as well.

There seems to be an inherent dichotomy between management for carbon sequestration and management for biomass and bioenergy, where an intensive degree of utilization almost seems like the antithesis of sequestration. More thought should be given to connecting these apparently different ideas, especially in the context of policies that try to separate them. There are some silvicultural opportunities in this context if a stand could be partitioned into elements appropriate for biomass and elements appropriate for sequestration. Unfortunately, offset providers under a program such as the Chicago Climate Exchange typically

operate under a contract that involves all of the forested lands in the ownership. These contracts currently don't allow the owner to enroll some stands but not others, nor do they allow owners to include reserved portions of stands being harvested. This piecemeal approach is inconsistent with the concept of climate change adaptations at the landscape scale.

This all-or-nothing approach limits the ability of a landowner to be rewarded for forest practices that sequester carbon using simple tools such as partitioning some arbitrary portion of the stand into components appropriate for biomass or sequestration. For example, one of the stands on the Boise Basin EF had recently been thinned using the free selection method, with a residual stand containing about 60 ft^2/ac. If the long-term goal in this stand is to retain 60 ft^2/ac indefinitely, that portion of the stand is essentially serving the purpose of carbon sequestration, and the harvested component is serving as a biomass source. Much of the timber-available acreage in National Forest System would fall in this category. However, the retained trees would not qualify as an offset-providing stand for support under existing authorities. The concept of partitioning stands into sequestered residuals versus harvestable surplus is a practical way to combine sequestration and biomass production, but there's currently no provision for this mutualism in current cap and trade markets.

A number of the presentations in the meeting were prepared using FVS, and some of the results presented from these models portend dramatic changes in forest ecosystems of the Nation. It is important to develop the methodology using stand-level models such as FVS as well as landscape succession models to answer hypothetical questions about the long-term effects of silvicultural practices and ecological changes on forest ecosystems. A word of caution from this is that models are better interpreted in a relative sense than an absolute sense. One might ask whether broader efforts should be made to validate models such as FVS and landscape succession models with independent long-term data sets such as those available from FIA on forest growth, yield, and developmental dynamics—as well as data from long-term studies with repeated measurements over time, such as can be found on many of the agency's Experimental Forests and Ranges.

In a similar vein, program organizers should continue to include presentations from real data, especially long-term data, during future workshops. These papers often provide a field-based context for the discussions that occur. They also remind us that the development of tools such as FVS and landscape succession models depend on data collected in the field over time, and on high-quality spatial data from our Nation's forests. It should also remind us of the importance of retaining field-going FS R&D scientists who maintain existing long-term studies and install new ones. If our R&D capacity creates a new generation of research foresters who work only in FVS or other modeling applications rather than in field studies, our infrastructural capacity to build and maintain the field studies necessary to refine existing models and develop new ones will be compromised.

In this workshop, presenters from FS R&D and academia outnumbered those from Regional Offices and National Forests. This may have been due to administrative constraints on travel during the fiscal year in which the meeting was held. One of the great opportunities enabled by the National Silviculture Workshop is to hear the success and failures from the field perspective, and to have practicing silviculturists at Ranger Districts, Supervisor's Offices, and Regional Offices interact with R&D researchers and academics. Speaking as one of the researchers, this interaction clearly flows both ways, and those of us who inhabit the ivory tower learn as much if not more than our colleagues in the field from these interactions. Future meeting organizers are encouraged to continue, and perhaps even to slightly broaden, the opportunities for professionals from the field to give case study presentations during the technical sessions.

This was the first workshop where a deliberate effort was made to broaden participation so that University research scientists could attend. This was an unequivocal success at this meeting. The professors who attended, gave presentations, and participated in the field tour were a welcome addition to the structure of the meeting. In a forestry research environment where Universities and R&D both are losing capacity through erosion of budgets and staff, opportunities to expand participation of University research silviculturists at the workshop should continue. This will provide an additional venue for mutual interaction, and will continue to help University researchers understand and appreciate the silvicultural challenges and opportunities available on Federal forest lands. This also gives field silviculturists the opportunity to interact with academics as well as R&D researchers, with attendant benefits for the range of expertise they can tap when necessary. This concept also applies as the agency tackles the study and application of both mitigation and adaptation strategies for climate change.

The next workshop will be held in Region 8, with tentative plans to schedule the workshop in Tallahassee, Florida, in May 2011. The workshop will feature opportunities to discuss the ecology and silviculture of southern pines during the most pleasant time of year to visit the South. Here's hoping the meeting in Tallahassee can be as successful as was this current workshop in Boise.

References

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