Minnesota Forest Resources Council
Minutes
MN DOT Training and Conference Center – Shoreview, MN
23 March 2011

Members Present: Dave Epperly (Acting Chair), Wayne Brandt, Bruce Cox, Alan Ek, Bob Lintelmann, Shaun Hamilton, Gene Merriam, Dave Parent, Mike Trutwin. **Members Participating by Phone:** Jim Sanders, Joel Koemptgen, John Rajala, Shawn Perich, Kathleen Preece, Mary Richards

Absent: Dale Erickson, Al Sullivan

Staff: Dave Zumeta, Lindberg Ekola (by phone), Calder Hibbard, Leslie McInenly, Rob Slesak, Clarence Turner

Guests: Amber Ellering (Minnesota DNR), Ann Pierce (Minnesota DNR), Mike Prouty (Great Lakes Forest Alliance), Bob Stine (University of Minnesota), Jim Zandlo (Minnesota DNR), Connie Chaney (Superior National Forest - by phone), Mary Shedd (Superior National Forest - by phone)

Chair's Remarks
Dave Epperly, Acting Chair in Al Sullivan's absence, welcomed attendees and asked for a round of introductions. He provided a brief update on the legislative session and the state budget process.

Deferral of consideration and approval of a Northeast Landscape Plan revision was suggested due to budget uncertainties. Shaun Hamilton moved to defer action on the Northeast Landscape Plan revision until the May 25th Council meeting. Alan Ek seconded the motion. *There was unanimous agreement to defer consideration of the Northeast Landscape Plan until the next MFRC meeting on May 25, 2011.*

Public Communication
None.

Approval of the 26 January 2011 Minutes
Mike Trutwin moved to approve, and Dave Parent seconded, the 26 January 2011 MFRC minutes. *The minutes were approved.*

Approval of the 23 March 2011 Agenda
Gene Merriam moved to approve the 23 March 2011 MFRC agenda. Dave Parent seconded the motion. *The agenda was approved.*

Executive Director Remarks
Dave Zumeta stated that the Information Management Committee (IMC) has spent significant time reviewing and considering the priority issues identified by the Council in 2008. Climate change and carbon sequestration was identified as one of the priority issues on which to focus. The IMC developed an agenda for today's meeting to provide an overview on the science related to climate change and

forests in Minnesota. The intent is to provide a foundation for Council discussion this fall regarding priority issues for the next few years.

He also noted that public research review forums will be held in April to get feedback on the Forest Resources Research Assessment developed by the MFRC Research Advisory Committee. He encouraged members to attend or send comments to Calder Hibbard.

Committee Reports

Personnel and Finance

Dave Epperly reported that the Personnel and Finance Committee has not met since the last Council meeting.

Site-level Committee

Dave Parent reported that Site-level Committee meetings are scheduled to be held two weeks in advance of each Council meeting; however, the March meeting had to be cancelled and will be rescheduled. Dave is hopeful that committee evaluation of guidelines under consideration for revision will be completed this year. Rob Slesak provided a brief update on LCCMR grants with which he is involved. The recommended funding level for projects is currently under consideration by the legislature; the leave tree study was removed from the list of recommendations but the biomass harvest study is still on the list for funding. Most of the LCCMR recommended projects that were cut were research-oriented.

Landscape Committee

Shaun Hamilton reported that the Landscape Committee has not met since the last Council meeting.

Information Management Committee (IMC)

Kathleen Preece stated that recent work of the IMC is reflected, in part, on the agenda for the day and asked Calder to provide an update on committee efforts. Calder reported that the committee is still working to pull together information on invasive species to inform the Council's September discussion on priority issues to address in the next few years.

Written Communications to the MFRC

Dave Zumeta reported that there were no written communications to the MFRC. He did note that he received an email from Becky Knowles, Leech Lake Band, requesting MFRC support for a funding proposal, but limited lead time did not allow for a formal response from the MFRC.

Committee of the Whole: Northern Minnesota Climate Change Response Framework

Leslie McInenly provided an overview of a two-day meeting that the MFRC and the Great Lakes Forest Alliance (GLFA) co-hosted to assess the interest in, and viability of, development of a climate change response framework (CCRF) for northern Minnesota. As background, the USDA Forest Service (USFS) is required to incorporate climate change considerations into their management planning. To that end, the USFS initiated a few pilot projects in the past couple years. One of the projects focused on developing a CCRF for the Chequamegon-Nicolet National Forest (CNNF). The project was supported by the USFS Northern Research Station - Northern Institute for Applied Climate Science (NIACS) and other partners.

NIACS developed a process that uses global climate model information to inform managers about ecosystem (and specific plant communities) vulnerabilities relative to climate projections. Given information on vulnerabilities and the potential for stressed systems, the project has been working on the development of a decision-making tool for managers. The framework is essentially adaptive management for healthy resilient forests in the face of climate uncertainty.

During the Wisconsin effort, the CNNF and NIACS recognized that this was a shared landscape issue, crossing ownership borders. USFS State and Private Forestry (S&P) and the GLFA became involved in order to start a dialogue and bring in other owners and managers around the National Forest. As partners became involved, a more regional perspective developed. Under the umbrella of the GLFA, and with support from the Trust for Public Land, American Forest Foundation, USFS and the state foresters in Minnesota, Wisconsin and Michigan, there is an effort now underway to bring the process and the work to Minnesota (and subsequently to Michigan).

In bringing this discussion to Minnesota, the USFS and GLFA wanted to get the Council involved at the onset. There was the recognition that the MFRC can bring established partnerships to the discussion as well as a structure to inform the work through our landscape programs. The first day of the meeting was focused on learning from the work in Wisconsin and hearing about research, policies and management activities that are occurring in Minnesota relative to climate change and forest resiliency. The second day focused on brainstorming regarding what a Minnesota CCRF might include as well as identifying next steps. The group agreed to focus on Province 212 (the Laurentian Mixed Forest) but wanted to expand on the material developed in Wisconsin by incorporating a more holistic ecosystem approach (e.g., greater incorporation of hydrology and wildlife issues) and integrating socio-economic components. There was strong interest in having the MFRC lead coordination of the CCRF for northern Minnesota; however the discussion also acknowledged the budget uncertainties relative to MFRC capacity. Moving forward, a small group of people will lay out an initial work plan and describe anticipated outcomes or products based on discussion at the meeting.

Panel 1 – Climate Change Evidence, Impacts, and Potential Responses

Calder introduced the first of two panel discussions. Panel one addressed the data regarding climate change, observed and projected impacts on Minnesota's forest resources and potential management actions in response to climate change.

<u>Climate change: Observed and Projected.</u>

Jim Zandlo, Minnesota State Climatologist, provided a brief overview of the state climatology office. The role of the state climatologist is to access climate data collected by the federal government and other data generators and make the information available to users in the state.

He noted that the DNR has developed a framework of adaptation strategies for management in response to climate change. This is not an assumption that the climate will change, but an acknowledgment that the risk for ecosystems is so high that consideration of a response is merited.

Jim reviewed data on observable climate changes across the nation, including intensified rates of changes, warming temperatures, increasing precipitation and changes in other conditions such as lake

ice out dates and water temperature since the 1980s. When you look at the long-term average, it doesn't look like much is happening relative to average annual temperature in Minnesota. However, in the last 30 years, the temperature has increased at a level equal to 3°F per century. The amount of change varies across the state; temperature is increasing everywhere but it is increasing even more in the north. The number of days above freezing is also rising rapidly. Non-climactic factors, including local climate change (e.g. houses, parking lots, heating equipment, conversion of forests, etc.) and data collection/measurement errors, could influence observed patterns; however, climatologists have tried to minimize the effect of potential biases and errors on the data. Atmospheric humidity has also been increasing since the 1930s. Annual precipitation is climbing 2.7" per century. Snow fall is increasing overall, but decreasing in the southern part of the state. Trends regarding snow fall across the state are likely related to an interaction of increasing temperatures and increased precipitation.

There are many uncertainties in trying to predict the future climate. Jim commented on the difficulties of downscaling, or making global climate models useful at a local level. In addition to model errors at the global level, there will be variation in local responses. Projecting future climate requires integration of socioeconomic models and scenarios, climate models, downscaling methods, and hydrology models. Uncertainty regarding future climate scenarios results from potential errors associated with each layer of models and assumptions. Jim noted that estimations from precipitation models don't fit the historic data as well as those of temperature models. When used to "predict" past conditions, temperature estimates of tested models were off by three to five degrees in either direction and precipitation estimates were off by -37% to +84%.

Even given the uncertainties regarding our future climate, Minnesota has been warming lately and Jim suggested it would be wise to at least hedge that a warmer condition may be the future scenario. He highlighted a recent study that identified places where the current climate (e.g., that in central Iowa) resembles the future projected climate (central Minnesota) (Galatowitsch *et al.* 2009). Geographic analogies provide a tool for managers to consider future conditions to which a system may be subject. These data are available on The Nature Conservancy website: www.climatewizard.org.

With respect to local information, Jim recommended Council members look at the Galatowitsch study, research conducted by Lucinda Johnson, the adaptation framework being developed by the Minnesota DNR, and the Minnesota Climate Change Advisory Group report.

Climate Change and Forest Systems

Ann Pierce, Minnesota DNR, provided an overview of forest systems with respect to the uncertainty of climate predictions as well as observations that may support some of the climate change predictions. Historically, forests occurred in Minnesota where there was adequate moisture. Forests in the transition zone were protected from frequent fires by available moisture. The prairie forest border is a climate signature.

In general, forest systems are expected to be relatively vulnerable to climate change. Minnesota forests are additionally vulnerable due to our location in the center of continent as well as placement along the transition zone. We have some confidence that we are going to have warmer temperatures; future

precipitation is less well understood. If precipitation is reduced or is primarily falling in extreme events, the available moisture will be lower. Warmer temperatures, combined with reduced moisture availability, could shift the prairie forest border 300 miles to the northeast.

If the climate signature shifts, plant communities may not necessarily shift in the same manner. For example, future climate conditions in northeast Minnesota may result in the extirpation of some common boreal species (B4WARMED study - Reich *et al.* 2010), but the community may not shift from a boreal to a temperate system. There is uncertainty around the collection of species that will result from climate change. The B4WARMED study is investigating seedling response and germination as a result of changes in soil temperatures. The germination response could influence species competition.

Dave Parent asked whether USFS Forest Inventory Assessment (FIA) data has demonstrated a species response to warming temperatures. Alan Ek responded that a study by Chris Woodall demonstrated range changes in the eastern U.S. A number of species appear more often in FIA data than they did in the 1977 surveys (some species move north, a few move south); however, it is too early to capture a significant response.

Ann stated that we are already seeing a 6 mile/year shift in northern tree species. About 84% of resident forest birds have shifted their range north by an average of 75 miles since the 1960s. Increased mortality in tamarack due to eastern larch beetle is likely due to warmer winters. Shorter winters are reducing the available time for winter logging operations. Accelerated climate change will likely change both the nature and extent of forests as a result of more frequent droughts and floods, more frequent natural disturbance events, increased insect outbreaks, and increased tree mortality. An analysis of trends over 61 years at Aldo Leopold's farm in Wisconsin found cardinals singing 22 days earlier, some species blooming earlier, etc. At a system level, phenological changes (e.g. breeding, flowering, migration) will vary among species and could result in some phenological mismatches (e.g. the food supply of European pied flycatcher nestlings now peaks before flycatchers arrive).

Existing threats such as blow down, fire, drought, invasive species, insects and disease, and fragmentation will also play a role in the response of forest systems to climate change. For example, if we are hoping a forest will transition from one community to another, it won't become an oak savanna if the prairie is too far away and corridors are gone.

The net effect is that warming can cause shifts in ranges and species that we are dependent upon, which could cause ecosystem disruptions, recreation changes and changes to the timber industry. For resource managers, the challenge is how to intervene in the face of unintended consequences. We may not see dramatic shifts in standing trees; we need to watch for shifts via changes in germination. We need to manage for functional systems.

Potential Management Actions in Response to Climate Change

Mary Shedd, USFS Superior National Forest, stated that we need to practice adaptive forest management, which is most effective through collaborative management. Adaptive capacity is the ability to adjust to climate change, take advantage of opportunities and cope with consequences.

She spoke about management actions in the context of the "three R's" –increasing resistance, promoting resilience, and enabling ecosystems to respond. Mary referred to the draft Forest Adaptation Resources (FAR) document that was recently developed as a component of the Wisconsin CCRF. The FAR document presents a menu of broad strategies and more specific approaches for forest management in consideration of climate change. She reviewed the ten strategies identified in the FAR document, listing potential tactics for each. For example, sustaining ecological functions is one of the ten strategies. Applicable forest management tactics could include alteration of the timing of logging operations to prevent soil compaction and help maintain soil quality and nutrient cycling. Other strategies and examples can be found in the draft document posted online (http://www.nrs.fs.fed.us/niacs/tools/draft_docs/docs/FAR_Final_Draft.pdf).

Mary noted that one of the take-aways from the FAR document is that many of the tactics are already in our "toolbox" and in use. There is also a great deal of room for creative problem solving.

Simple modification of long-range management plans to maintain the current forest is probably not an option. There may be new definitions of traditional management and use as we go forward or we may receive similar benefits and values from different species and forests. Adaptation is also going to be inextricably interwoven with social adaptability; people like the forests with which they are familiar. Current management activities must consider social expectations. The population is projected to increase 40% in next 50 years. Technology will also change. The timber industry is also extremely important. Changes in adaptation may come from shifting to different species, different rotations, different diameters, potential increases in plantations, and global shifts. We have to plan for changes in recreation as well (e.g., cold water to warm water fisheries).

In conclusion, there is a national sense that we need to be more flexible with forest management goals. Minnesota is in a very good position because the landscape and operational plans are very amenable to adaptive management. The overarching goal is a resilient forest.

Panel 2: State and Regional Climate Change Policies

Calder introduced the second panel, noting that the presentations will be focused on policy related to climate change.

Current State Policy Regarding Forest Resources and Climate Change

Clarence Turner reviewed Minnesota climate change policy. He described the distinction between climate change mitigation and adaptation. Mitigation attempts to limit climate change by reducing greenhouse gas emissions and/or enhancing sinks. Adaptation reduces the vulnerability of natural and human systems to actual or expected changes in climate. For the most part, state policy focuses on mitigation and doesn't address adaptation. Minnesota climate change policy is based largely on two laws, the Next Generation (NextGen) Energy Act of 2007 (MS 216H) and the Green Solutions Act of 2008 (Minnesota Sessional Laws Ch. 340).

Two primary NextGen energy goals include reduction of per capita use of fossil fuels (15% by 2015) and an increase in energy from renewable energy sources (25% by 2025). NextGen also has some specific mitigation goals, such as reducing emissions by 15% below the 2005 level by 2015, and by 80% by 2050.

The act also requires a climate action plan as well as a system for reporting greenhouse gas emissions. NextGen requires the PCA and Commerce departments to report on progress. Information is requested annually on actions recommended to meet reduction goals. Clarence noted that the information request presents an opportunity for the MFRC to provide forestry recommendations. Regional activities, such as membership in the Midwestern Greenhouse Gas Reduction Accord (MGGRA), are also included in NextGen.

The Green Solutions Act established the Legislative Greenhouse Gas Advisory Group and required studies on the MGGRA efforts regarding a cap-and-trade system; economic, environmental, and public health costs and benefits of cap and trade; and governance structures that can be applied to a cap-and-trade system.

Clarence reviewed interstate climate-related efforts including the 3-Regions effort and The Climate Registry. He also reviewed development and recommendations of the Minnesota Climate Change Action Group (MCCAG) plan. The plan includes recommendations for reducing greenhouse gas emissions or increasing sequestration in all sectors. MCCAG action plan recommendations related to forest management address forestation, urban forestry, wildfire fuel reduction, forest health and carbon sequestration, and increased stocking of forestlands.

Within the DNR, division directors recently identified three trends shaping the DNR mission and strategies, one of which is changes related to energy and climate change. The Climate and Renewable Energy Steering Team (CREST) oversees Energy Efficiency, Climate Change Adaptation, Carbon Sequestration, and Biofuels teams. One of the significant products of the climate teams is a foundational document that identifies observed changes and goes into detail about the work of the climate teams.

State Climate Change Policy across the Country

Calder Hibbard identified the various types of state climate change efforts, including regional climate initiatives, renewable energy portfolio standards, energy efficiency resource standards, renewable fuel standards, and emission targets. Among states, the targets vary widely.

Thirty-one states have developed climate change policies and plans that address forest resources. Three states have plans without a specific forest element, three are in the process of completing their plan, and 13 states have no plan. State climate change strategies, listed in order of how often they occur in plans, include tree planting, expanded use of woody material for energy, maintenance of current forest carbon stocks, forest protection, changing management, expanded use of forest products, monitoring efforts, energy reduction, and other policy measures. Calder provided examples of actions that states are using to address the strategies, such as the use of conservation easements to protect forests or using wood instead of other materials to expand the use of forest products.

Five states have plans which call for addressing adaptation and at least seven states have started adaptation planning. For example, the California plan calls for avoidance of new development in high risk areas, identification of the most vulnerable communities and habitats, monitoring forest health, and guidance or tools for local planning.

Mike Prouty asked whether there is a way to assess the extent to which the plans are implemented. Calder responded that there are metrics available but it would take a very long time. Clarence added that the MCCAG plan was facilitated by a company that has facilitated many of the state plans. As a result, many plans are quite similar.

Joel Koemptgen asked why the goal in Minnesota was to forest a million acres versus a goal focused on increasing biomass. Dave Zumeta responded that he and Clarence had a hand in development of the million acre goal but it was intended as a starting point. The number was critiqued by faculty at the University of Minnesota and the legislature charged the MFRC with a study to assess the feasibility of planting a million acres. Results of the study indicate about 600,000 acres could be planted given certain assumptions about carbon payments. A subsequent report developed by Dovetail Partners puts the recommendation in a more favorable light. Clarence added that there are no DNR efforts to plant more forests to comply with the action plan; most state forestry efforts are modeled around agency objectives and incorporating adaptation approaches.

Other Regional and Federal Climate Change Activities Regarding Forest Resources

Connie Chaney, USFS CNNF, spoke about the USFS response to climate change on a national and regional level. For the Forest Service, climate change is an all lands approach and everybody has their own niche. In development of the CCRF for Northern Wisconsin, the USFS and NIACS depended heavily on the University of Wisconsin, the Wisconsin DNR, the Wisconsin Initiative on Climate Change Impacts, and many private organizations. It is a shared landscape and a shared effort.

From a national perspective, the USFS mission is to sustain healthy, diverse and productive forests while meeting the needs of people. Climate change will have an impact on forest systems and we need to work collectively across landscapes. Science-based management is one of four goals for the USFS climate change strategy; the NIACS mission is to interpret the science and inform land management. The second goal is to develop potential adaptation strategies based on geographic areas. The third goal is to mitigate climate change impacts, primarily through reduction of greenhouse gases. The fourth goal is to incorporate climate change concepts into the work of the USFS.

The agency has put together a climate change scorecard and is trying to measure progress with respect to addressing climate change. Connie reviewed factors that are assessed by the scorecard. Every national forest in USFS Region 9 has been tasked with the development of a CCRF. Development of a CCRF for Minnesota would include many of the same components that have been developed for Wisconsin and will benefit from the collaborative foundation that the MFRC provides.

Dave Epperly raised a question posed earlier by Gene Merriam regarding the impetus on the part of the USFS to address climate change. Jim Sanders responded that there is no specific legislation; the direction came from the Bush Administration and has been carried over to the Obama Administration.

Mike Prouty, Great Lakes Forest Alliance, provided an overview of the Shared Landscape Initiative (SLI) developed to engage public and private landowners and managers in Wisconsin in the CCRF. He noted that if Wisconsin had a collaborative structure similar to the MFRC and its Landscape Program, there would have been no need for the SLI. An additional responsibility of the SLI is to identify socio-economic

vulnerabilities and implications related to climate change. The American Forest Foundation, TPL, GLFA, and USFS are working to coordinate development of the CCRFs in Minnesota, Wisconsin and Michigan to enable a "scaling up" or Northwoods CCRF.

Facilitated Discussion: How can the MFRC best advise the governor and legislature regarding climate change and forest resources?

Calder asked for comments regarding how to best advise the governor and legislature on climate change policy. Dave Zumeta noted that there appears to be some dissonance between the Governor's administration and key legislators with respect to climate change policy and indicated that the Council needs to determine the appropriate direction regarding our advisory role.

Dave Epperly responded that the he was not aware of a specific policy commitment from the administration; however, there are many important efforts underway and the Department is continuing to make progress. There is empirical evidence that there are changes happening in the forest; climate change does not need to be emphasized. Within the agency, there is agreement to build resiliency and resistance of natural communities. The long-term impacts of budget reductions and the potential to lose institutions such as the forest industry, private forest management programs, and state nurseries is one issue on which he suggested the MFRC should focus.

Alan suggested that the MFRC could help decouple the issue of climate change and management solutions, noting that a fair description of alternatives may be well received. The Council needs to be realistic about our capability to address these issues; this is not something that will be fixed in the next decade.

Jim commented that the Council can focus on the core issues in the short-term and develop a reasonable climate vulnerability assessment. Based on that, we can advise the Legislature and Congress in an informed manner. The tactics are in place and much of what needs to occur in Minnesota is a modification of what has already been accomplished in Wisconsin.

Shaun noted the shift in openness to global warming language and climate change. Rather than argue about climate change, we want to move toward discussing adaptation. A shift in the language used may improve reception. Mary Richards agreed that the terminology is important and supported moving discussion toward the environmental vulnerability assessment.

Bruce Cox stated it is that clear things are changing in the forest. Management is more difficult then it was 20 years ago. Proceeding with vulnerability assessments as a part of the CCRF will be valuable across all ownerships. It is also important to talk about the value of our institutions and about investing in forest management. Jim Zandlo added that that the forests have always been vulnerable; the point is we need a better understanding of how conditions, which have always been around, affect us. It is possible that these conditions will be affecting us more often.

Jim raised discussion regarding financial and in-kind support for development of a CCRF, suggesting there are many partners and it is more about coordinating the contributions. Dave Zumeta stated that there is a good deal of interest in leadership from the Council. Alan noted that budget stresses won't go

away quickly and the impact to various entities will be different. He stated that we need to be prepared to discuss how development of a CCRF will be funded. He also reiterated that the vulnerability assessment needs to have an environmental component and a socio-economic component.

Calder asked members to comments on state policy and whether we need additional information before the MFRC can provide advice.

Shaun Hamilton commented that adaptation seems to be an emerging issue that is not well addressed in state policy. This suggests some action may be necessary. Dave Parent suggested consideration of a state policy regarding the use of locally grown and processed products. Dave Zumeta responded that there was similar discussion in Governor Pawlenty's Forestry Sub-cabinet.

Bruce stated that the vulnerability assessment and tools would be very useful for managers from a practical standpoint. The climate models are all over the place and managers could use information to make decisions. Mike Trutwin added that use of the assessment to drive decisions would be responsible land management and could help maintain jobs in the state.

Calder asked whether this is the right time for the Council to address climate change. Alan responded that, while not a great time to do it, it is appropriate to put a greater emphasis on the climate change issue. Bruce felt it is a good time to address the issue, to take advantage of the CCRF opportunity. Jim Zandlo suggested that Council also look at other efforts, including the Wisconsin Initiative on Climate Change Impacts and the NOAA Climate Service.

Dave Epperly stated that we need to identify things the Council can do, such as addressing the use of local products and certification. He also noted a lack of commitment to monitoring and analyzing monitoring data. Without monitoring, we can't assess our current situation and progress. As managers, a serious commitment to monitoring should be a policy.

Public Communications to the MFRC
None.

Member Communications
Dave Zumeta stated that the May 25 MFRC agenda will likely include a landscape committee resolution to update the Northeast Landscape Plan. The CCRF would be a subset of the revision. Don Baloun, Minnesota State Conservationist, has been invited to talk about the commitment of the Natural Resources Conservation Service and their Environmental Quality Incentives Program (EQIP) to forestry. There will also be an overview of public and university forestry funding in Minnesota.

Jim Sanders moved, and Dave Parent seconded, adjournment of the meeting. *The meeting adjourned at 3:15 p.m.*