

Agriculture and Forestry in Minnesota's Greenhouse Gas Reduction Efforts: Getting Organized for Action

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Executive Summary

Minnesota has a statutory goal of cutting the state's greenhouse gas emissions by 30%, or approximately 45 million metric tons, by 2025. The Next Generation Energy Act of 2007 calls for state agencies and stakeholders to develop climate change action plans detailing how emission reductions can be achieved. Among potential strategies is increasing terrestrial carbon sequestration on private and public forest and agricultural lands. The Minnesota Climate Change Advisory Group recommended six ways that forest and agricultural sequestration could contribute to 2025 targets. The Minnesota Terrestrial Carbon Sequestration Initiative also developed scenarios describing how approximately 10% of the 2025 emission targets could be achieved through a multi-faceted program of reforestation, forest stewardship, agricultural best management practices, etc. In the coming year, federal and international climate policymaking will clarify the role of forestry and agriculture in greenhouse gas reduction programs. As policies are set, mobilizing action must quickly follow to meet goals and timelines.

During June 2009, interviews were conducted with experts in land management, terrestrial carbon sequestration, and climate policy to discuss steps that could be taken to advance effective carbon sequestration activities in the state. Three themes dominated interviews: (1) the anticipated arrival of a large domestic carbon offset market; (2) the implications of increased carbon focus on public and private land management; and (3) the lack of rigorous scientific and practical management information and tools needed for successful carbon mitigation projects. To address these issues, interviewees called for multifunctional program(s) that could foster interagency coordination and partnership-building between private and public organizations; development of scientific expertise and increased two-way flow of information between researchers and practitioners; and creation of a stakeholder and technical advisory council for state lawmakers. As one policymaker succinctly put it, "We need to know what is needed to displace fossil fuels; what land-based activities can provide; and what the linkages are between carbon sequestration and other resource management objectives. Are the offset credits we need really there? What will they really cost?" A number of models – including the Minnesota Forest Resources Council and the Clean Water Legacy and Council - were suggested for a carbon-focused program. Building such a program will take time and resources and might best be launched following scoping meetings among stakeholders to prioritize needs and actions.

Background

In mid-2009, international and US domestic climate policies are taking shape that will affect energy and greenhouse gas management for decades to come. Later this year, Copenhagen will host an international meeting to finalize a replacement for the expiring Kyoto Protocol, including new agreements on long-term greenhouse gas (GHG) emission reduction targets, actions, financing, and global carbon markets. Similarly, Congress is negotiating a massive energy and climate proposal that sets mandatory caps on emissions and creates a market in emission allowances and offset credits. These developments parallel actions taken by numerous U.S. states, including Minnesota. In 2007, Minnesota's Next Generation Energy Act established ambitious emission reduction targets and timeframes; in 2008, a Governor-led initiative, the Minnesota Climate Change Advisory Group (MCCAG), developed 46 recommendations on how emission reductions could be met.

The keys to success in these efforts are building capacity and mobilizing action in the years immediately ahead. This paper discusses how to build capacity for one set of carbon dioxide (CO₂) reduction strategies - increased protection, expansion, and enhancement of biological carbon stocks on the land. Terrestrial carbon sequestration, or bio-sequestration, is the natural absorption and storage of atmospheric CO₂ in plant tissue. Land use changes to increase vegetation density and management changes to reduce disturbance could increase bio-sequestration and simultaneously produce important environmental co-benefits now and in the future. Such a strategy is important to Minnesota both because of the enormous volumes of carbon stored in the state's forests and peatlands (bogs, marshes, fens, and other wetlands), and because of the potential to increase carbon sequestration on millions of acres of agricultural land. The MCCAG recommended eleven strategies for managing forests, prairies, and agricultural lands to help meet the state's GHG reduction goals.

For the past four years, an ad hoc research and policy forum at the University of Minnesota has focused attention on the state's carbon resources. The Minnesota Terrestrial Carbon Sequestration Initiative sponsors research, educational outreach, and promotes dialogue among university researchers, government, and private sector stakeholders on carbon sequestration capacities and options in the state. In 2007-8, the Initiative oversaw scientific and policy reports to the legislature. These reports, produced by the University's Department of Soil, Water, and Climate; Department of Ecology, Evolution, and Behavior; and Department of Forestry Resources (Anderson et al, 2008; Nater and Miller, 2008), describe how land use or management changes could reduce net GHG emissions by 3 million to 6 million metric tons per year, representing 6-12% of 2025 emission reduction targets mandated in Minnesota. The Initiative outlined three near-term steps:

- Protect existing large carbon stocks in peatlands and forests by identifying and protecting areas vulnerable to conversion, fire, and other preventable losses. Re-emission of stored carbon would accelerate global warming and require greater emission reductions elsewhere.

- Promote land use and land cover changes most certain to cause carbon sequestration by including them in local, regional, and statewide conservation, renewable energy, and sustainable development priorities.
- Invest in monitoring and demonstration programs to build public, practitioner, and investor confidence in terrestrial carbon sequestration as a viable emission reduction strategy. An integrated demonstration and monitoring network is needed to document actual carbon sequestration costs and benefits specific to this state and to determine the feasibility of expansion.

Another set of studies, funded by the Blandin Foundation and undertaken in conjunction with the University's Carlson School of Management and its Center for Natural Resource and Agricultural Management focuses on financing carbon sequestration. Among its products is a conceptual design for a proposed "Minnesota Climate Investment Fund" that could raise and direct funds to low-carbon and sequestration projects. Copies of these reports are available at <http://wrc.umn.edu/randpe/policy/carbon/index.htm> or upon request.

With completion of these studies, the Initiative's task force began to consider institutional needs for deployment of carbon management practices statewide. Initial planning meetings by the Initiative's steering committee and task force led the Minnesota Forest Resources Council (a founding member of the task force) to fund expansion of this discussion to more groups around the state. This report is a compilation of research, interviews, and task force meetings which considered whether a more formal program related to terrestrial carbon sequestration is needed to support the state's GHG reduction efforts, and if so, whom it should serve, what it should do, and how it should be structured. The report has three parts: a summary of interviews with representatives of organizations involved in land management or carbon issues; a description of applicable governance models and processes; and recommended next steps.

Section One: Interviews

Informal interviews were conducted in June 2009 with 35 people in agriculture, forestry, business, government, scientific research, and environmental advocacy. Interviewees were identified based on their knowledge of technical, management, or policy aspects of carbon sequestration and/or carbon markets. The goals of the interviews were to identify major issues and needs related to these topics and to discuss institutional options to address them.

Major issues

Our first question to interviewees was: "From your perspective, what are the key issues about terrestrial carbon sequestration that need continuing study and discussion?" Three themes emerged: the imminent arrival of a cap-and-trade program and carbon market in the United States; the increased attention given to carbon in land management; and the importance of building the state's capacity for technical analysis and action.

The carbon offset market

The first issue brought up by most interviewees is the expected growth and power of carbon markets in coming years. The cap-and-trade program proposed in Congressional bills would limit (“cap”) the amounts of greenhouse gases that companies in regulated sectors (e.g., electricity generation, manufacturing, etc) can emit. The program also allows up to two billion tons of the capped emissions to be “offset”, rather than directly reduced by the regulated companies. Carbon offsets are credits for voluntary reduction or sequestration projects; one carbon offset represents one metric ton of CO₂-equivalent greenhouse gases which, when certified, can be traded through a variety of voluntary or regulated carbon markets. The types of projects that will be eligible for offset credits are not specified in federal legislation, but agriculture and forestry are expected to be included. This is not the case in international, UN-coordinated, treaties. The Kyoto Protocol sets high performance standards for all offsets and strictly limited the types of land use projects eligible to offset fossil fuel emissions. Depending on how these differences are worked out, forestry and agriculture could play a relatively larger or smaller role in offset programs here and abroad.

General perspectives on carbon offsets. Interviewees have different opinions about carbon offsets in general and whether or not terrestrial carbon sequestration should be included among eligible offset activities.

- A policymaker expressed concern that offsets of any kind will deflect attention from reducing fossil fuel emissions at their sources and therefore will not directly address the principal cause of climate change;
- Industry representatives expressed concern about the cost of complying with proposed regulation and whether enough carbon offsets would be available to keep costs down. Interviewees supported use of terrestrial sequestration as a low-cost alternative to other offset types. Several corporate representatives expressed caution about carbon sequestration and the importance of identifying investment-grade offsets. “Investors will go where the best offsets are,” said one interviewee. “It doesn’t do anyone any good to ‘subprime’ this effort.” Several emphasized the importance of research and development and of connecting researchers and investors to make Minnesota terrestrial credits marketable and competitive.
- Several environmentalists and conservationists also expressed caution or opposition to carbon sequestration to offset greenhouse gas emissions and about its potential impact on market confidence. Some project types (e.g. energy efficiency improvements, landfill methane capture) provide easily quantified and permanent emissions reductions; biologically sequestered carbon is difficult to quantify and its stability is uncertain over the long term. One interviewee said that initially, offsets should be limited so that infrastructure and oversight can be built. “The carbon market will be the largest commodity market the world has ever known but it could collapse within a year if confidence is destroyed.”
- Agricultural representatives in general were enthusiastic about carbon offset markets and strongly supported voluntary programs such as the Chicago Climate Exchange (CCX), which pays landowners for certain land management practices. One interviewee worried about market volatility impacts on small landowners.

Others asserted that farmers are accustomed to commodity markets and would be eager to participate, particularly if short-term contracts are allowed.

Carbon offset requirements. Views also differ on verification and other requirements of regulatory offset programs. Some interviewees are skeptical that terrestrial sequestration projects can meet widely used offset requirements for permanence, additionality, leakage, and enforceability. Other interviewees questioned whether sequestration *should* be required to meet those standards. At this writing, it is unclear whether federal legislation will establish a single set of offset standards or separate standards for forestry and agriculture.

- “It is very hard to account for the effects on carbon sequestration resulting from changes in forest management. We don’t really understand it or how to measure it,” said a forestry researcher.
- “We need an inexpensive way to verify projects in the state,” a project sponsor remarked. “Anything else could lead to fraud.”
- “It is important to account for all components of land-based activities,” a forest industry representative noted, “including emission reduction and carbon sequestration in vegetation, soils, and forest products.”
- A government official noted that the federal government will set the standards, but the state will need to review and comment on them from a Minnesota perspective.
- Another government representative wondered if promulgating a set of standards and funding options specifically for the voluntary market would be useful. “What are the financial opportunities on and off the books, inside and outside the carbon market?” he wondered.

Positioning Minnesota for coming carbon market. As these issues are worked out, many interviewees expressed strong interest in Minnesota’s competitive advantage in carbon markets and other incentive programs. Comments and suggestions:

- Several people asked about supply and demand issues. “We need to know how much carbon there is, who are the big buyers, who are the big sellers, and what would help them get connected?”
- “Minnesota should create an infrastructure of landowner information on carbon markets and standards, decision tools, and land targeting,” said one official.
- Some business sector interviewees expressed a preference for purchasing offsets locally or within a defined service area.
- A project sponsor from a conservation organization pointed to a requirement that offset projects produce “additional” reductions above normal practices, saying that carbon prices would never be high enough to take on projects just to sequester carbon.
- Several government officials thought that economists are needed to develop business cases (including sensitivity analyses) for industry, small and large (public) landowners, and conservation organizations;
- Numerous interviewees were interested in how the carbon market can leverage a larger ecosystem services market. “Let’s put Minnesota on the map for more

holistic carbon and ecosystem services,” said one project sponsor, referring to nascent markets for water quality, wildlife habitat, and flood reduction services.

Land use and management implications

The second major theme concerned anticipated changes to current land management practices to increase carbon sequestration: what they are, how they fit with Minnesota’s landscape, and what positive and negative impacts they might have on other resources now and in the future.

Changes in land use and management practices. Many techniques to enhance terrestrial carbon stocks, such as conversion of annual crops to trees, are relatively straightforward and their costs and benefits well-documented. Other techniques are believed to have a positive effect on carbon but specific results and guidance is lacking.

- “Farmers are willing to consider land management changes but they need to know it’s going to work,” said one agricultural representative. “Farmers are looking ahead but they’re skeptical of the unknown in re-doing their operations. We just don’t have enough data specific to Minnesota.”
- Forestry officials agreed: “We need accurate baseline data and an ability to compare the effects of different management activities and intensities.”
- The economics of conversion is a large issue: “What is the cost of conversion, including opportunity costs?” asked one policymaker. “We might need to invent mechanisms to fill financial gaps if we want to support broad transition.” Others suggested that landowners needed economic analyses at the whole-farm scale that include management, marketing, and all transaction costs (including verification).
- The carbon values of some land uses, such as livestock pastures and wetland restoration, are poorly understood. Better information on the carbon dynamics of complex systems (including increased plant diversity in ecological restorations) is needed. This is also true of the products of land management. “Product cycle is a key calculation that needs better understanding and protocols,” said a forest industry representative.
- Bottom line: “Foresters are eager, have lots of questions, and need management guidance, and results,” concluded a forest landowner.

Implications of landscape-level changes. In order for carbon sequestration to make significant contributions to CO₂ reduction efforts, land use and practices must change on millions of acres across the state. If applied carefully, these changes could provide substantial benefits to air and water quality, habitat conservation, and other priorities. Some effects, however, may not be entirely benign, as several interviewees pointed out.

- Public lands managers put it this way: “We need to know which practices enhance carbon and then whether we should change current management. We need to be sure the opportunity in carbon is a sustainable one and is consistent with other goals. Adaptive management as the science evolves will be important.”
- “We need to integrate stand-level and landscape-level planning,” said one project sponsor. “Where is the greatest potential to increase carbon stocks and then what practices should be applied to maximize them?”

- “How can a million acres of new forest be spread around the state?” asked one policymaker, referring to a MCCAG recommendation to reforest one million acres in Minnesota in the next 15 years. “Should each of the 87 counties have a part in that?”
- “It’s important to look at how different farming systems – not just practices – affect carbon at regional scales,” said a sustainable agriculture representative.
- Several government officials wondered about “low-hanging fruit” and the ability to increase carbon stocks without massive changes in land use patterns, reflecting concerns about landowner willingness, costs, and economic impacts of large-scale changes.
- “What is the effect of all of this on communities?” asked one policymaker.

Climate change adaptation. Preparing for the negative effects of a changing climate is a topic of growing interest among government and scientific communities. Many changes in growing cycles, plant and animal ranges, and weather patterns are observed today and can be expected to increase over time. In these interviews, growing concern about and interest in planning for a changing climate was evident.

- “Big disturbances of all types are coming,” warned a forestry researcher. “Damages from wind, fire, insects, and disease are all likely to increase.”
- An agricultural official expects more drought, erosion, insect movement, weeds, and disease to plague Minnesota farmers. “We need research on adaptation science that we can connect to public policies and use in public outreach,” she observed.
- “Linking carbon mitigation and adaptation is essential,” a government official said. Another: “An important use of carbon market revenues would be to help our natural resources adapt to climate change.”

Scientific and technical support

The third theme – the importance of scientifically sound information – pervaded most interviews. The text below breaks this broad theme into the needs for scientific research, management guidance, and public education.

Scientific basis for action. Significant scientific uncertainty exists about many aspects of terrestrial carbon sequestration, even about the ability of some widely used techniques to positively increase carbon sequestration rates. As stated above, a fundamental weakness exists in the lack of Minnesota-specific data on baseline carbon stocks and quantified carbon accrual rates resulting from land use and management changes, particularly below-ground effects.

- “The key issues are QA/QC and coordination,” said one scientist. “There are many good ideas out there but they’re not fully baked. We need rigor and demonstrations translated into educational tools.”
- “We need to marshal technical information to support programs,” an agency representative said, indicating that without technical assessments and projections, there was insufficient basis for making changes.
- “We need very good information to calculate additionality,” a project sponsor observed, saying that information collected on forests needs to be more

specifically tailored to carbon and to be collected and reported more consistently in different forest areas. “We should invest in the common information needed in analysis.”

- Several scientists proposed that an energy General Environmental Impact Statement (GEIS) was needed to focus attention and lay the foundation for the state’s larger energy and emissions reduction strategies.

Practical, action-oriented tools. The scientific information described above needs to be translated into educational programs and decision tools. Land management representatives talked at length about the practical, nuts-and-bolts, action-oriented information they need, including:

- Minnesota-specific data relevant to carbon, including accurate baseline data on land use and associated biomass, and fossil fuel use in land-based activities and products. Natural resource inventories should be amended to acquire consistent information on carbon stocks;
- Technical models, monitoring, and indicators estimating carbon effects of timber harvest;
- Carbon calculators for field people to improve management decisions on the ground;
- Technical review and commenting on carbon accounting protocols and their applicability to Minnesota ecosystems;
- Verification and quality assurance guidelines for all carbon sequestration projects;
- Product life-cycle analysis including avoided emissions.

Public education on climate change. Society faces enormous challenges in building a low-carbon energy system and combating climate change. Several interviewees stressed the importance of broadening education on these issues as an essential foundation for change. One policymaker urged an educational campaign directed to the public at large, saying that people will not support government efforts if they do not fully understand why action is necessary. This view was shared by several agricultural representatives who urged public institutions to become better advocates of climate change action. “Foresters are talking about range changes and droughts and disease,” one observed, “but farmers aren’t talking and aren’t worried about climate change. Public institutions aren’t doing their job.”

Need for a Minnesota carbon sequestration program

After identifying key issues, we asked about the need for a program or organization devoted to carbon sequestration. Questions included: “Do you think that a formal and long-term institution (e.g., commission, program) is needed? What functions could it perform? What products could it deliver? How should it be structured? Should it be integrated into existing organizations/agencies or should it be created as an independent entity, and what are the chief advantages and disadvantages? Are there existing models for such a program or organization? How could it be financed?” Major themes in the answers consider how to improve coordination and partnership building; information and education; and stakeholder input into policy process.

Coordination of public efforts. Government representatives expressed interest in establishing better cross-agency interaction to promote consistency and forward momentum. This could be as simple as a single person bringing state agency representatives together periodically for discussion and coordination. Most interviewees, however, emphasized the inter-governmental nature of bio-sequestration initiatives, stressing coordination among local (county and municipal government) and federal agricultural, forestry, conservation, and regulatory agencies likely to have lead roles in national climate, energy, and mitigation efforts.

Public-private partnership building. In addition to simple coordination of efforts, many interviewees see a need for an entity to facilitate partnerships among potential carbon sequestration project sponsors, investors, government, and other interested parties. Several people suggested that carbon sequestration and its potential to generate offsets should be advanced by the state in the same way that renewable energy, bio-business, and other promising commercial ventures are advanced. Such an entity could address questions such as “What are the major sources and supplies of carbon credits? What is the demand for them? What ancillary benefits could form the basis for partnership building? How can the whole package be brought together for mutual benefit?” Interviewees noted that numerous land and water management organizations could serve as channels or communication links for this type of partnership building.

Development of scientific and technical underpinnings. Several people described the need for an independent, expert committee, a sort of mini-Intergovernmental Panel on Climate Change (IPCC), to develop short- and long-term research agendas and to bring the different disciplines (science, resource management, economics) together. This expertise could be used to develop the technical underpinnings of carbon sequestration projects and programs for the state, such as recommendations of MCCAG and other policy initiatives. Several people suggested that such a committee could produce a rigorous assessment (GEIS) of the state’s carbon emissions and reduction strategies. Others suggested that such a committee could provide technical reviews of state agency rulemaking, data monitoring, and carbon sequestration protocols proposed for use in Minnesota. An industry representative thought such a committee would be an effective (and confidence building) intermediary among entrepreneurs, landowners, and offset credit buyers.

Interaction between land management and scientific experts. Forestry and agricultural representatives stressed the importance of a two-way flow of information between scientific/technical experts and practitioners. Rather than establishing a “top-down approach”, they advised:

- Identify who is needed to carry out these programs and find out what they need and what they can provide;
- Structure programs to obtain bottom-up input from practitioners interested in workability on the ground and top-down input for statewide strategies;
- Choose the right delivery mechanism for different audiences and work through them. Don’t duplicate efforts - leverage them;
- Design for action and efficiency and avoid getting bogged down;

- Build and mobilize the private sector.

Access to information. Interviewees talked about the need for a central repository of information and expertise on carbon sequestration and markets that is accessible to all, similar to the Land Management Information Center (LMIC). This repository would contain updated inventories and monitoring data on land use/management and carbon stocks; practical guidance for on-ground management and carbon standards and protocols, financial assistance, demonstrations and case studies, etc. Numerous interviewees suggested a “one stop shop” where landowners, project sponsors, and investors/buyers can get high-quality information on carbon sequestration methods, economics, and related environmental impacts; carbon offset projects, procedures, and results; market and other funding opportunities; regulatory restrictions and planning guidance; risk assessments; and related topics. Such an entity could also function as a clearinghouse or news service and present conferences and workshops on carbon projects and markets.

Public policy development. Interviewees generally pointed to the need for citizen, stakeholder, and expert policy input in public policymaking. A variety of relationships among advisory boards, government agencies, and academia were discussed:

- Pollution Control Agency Citizen Board or Board of Water and Soil Resources model: advisory boards which bring citizen or local government perspectives into the work and decisions of a single state agency;
- Clean Water Legacy and Council model: a broadly representative advisory committee which hammers out agreements on priorities, plans, and programs related to implementation of a single law;
- Forest Resource Council model: a quasi-independent board to provide policy perspectives and information to the governor and legislature and to coordinate research, planning, and education activities specified in forest stewardship statutes;
- Several interviewees said that a government-appointed committee affiliated with the University of Minnesota gave the right “arm’s length” independence to reduce politics, promote public interest, and increase overall confidence.

Funding. Interviews elicited a number of strategies for funding a multi-faceted carbon sequestration program, including:

- state general fund support for committee functions;
- research and development funding through the Legislative Citizen Commission on Minnesota Resources, federal programs, and private sources;
- fees generated by cap-and-trade programs;
- subscription or membership; and
- foundation grants.

Another source and organizational model is the proposed “Minnesota Climate Investment Fund” designed to use a variety of funding sources to finance low-carbon and carbon sequestration projects. This fund concept is still in design stages but essentially proposes a non-profit organization with independent subsidiaries that finance projects using

financial instruments most appropriate for different technologies (e.g., debt, equity, development financing, carbon credits, and grants). The fund would seek out high-quality carbon projects and the finances to support them. Such a program could create an overarching framework and feedback loop for carbon management in the state, project sponsorship and funding, and on-going R&D. A business representative urged consideration of such linkage: “Rather than one-off projects of limited value, we need to get as much as possible from the same investment.”

Section Two: Applicable Models

Minnesota organizations

MN Forest Resource Council and related groups. The Minnesota Sustainable Forest Resource Act (1995) established the Council to “develop recommendations to the governor and to federal, state, county, and local governments on forest resource policies and practices that result in the sustainable management, use, and protection of the state’s forest resources,” (MS89A.03). The Council oversees development of timber harvest and forest management guidelines; landscape-level forest resource committees that develop regional forest plans and coordinate activities; forest resource research; and environmental monitoring. The Council has 17 members representing public and private organizations. It is housed primarily at the University of Minnesota and makes annual reports to the governor and legislature on its progress and accomplishments. The Council works closely with two other organizations created by or referenced in the SFRA: the *Interagency Information Cooperative*, a repository of information about Minnesota forest resources, and the *Minnesota Forest Resource Partnership*, a non-profit organization of forest landowners, managers, and professional loggers dedicated to sustainable and economically viable forestry.

Clean Water Council and Legacy. The primary function of the Clean Water Council is to advise on administration and implementation of the Minnesota Clean Water Legacy Act (2007) to “protect, restore, and preserve the quality of Minnesota’s surface waters by providing authority, direction, and resources to achieve and maintain water quality standards as required by section 303(d) of the federal Clean Water Act . . . and applicable federal regulations.” The Act recognizes the importance of coordinating numerous public water plans and programs and of engaging cooperation of all those affecting the quality of surface waters. The functions of the Clean Water Council are to (1) foster coordination between agencies and private entities; (2) prioritize water quality improvement activities; (3) develop expert scientific review; and (4) develop participation strategies for stakeholders. The council includes 19 governor-appointed and 4 state agency representatives. The Minnesota Pollution Control Agency (PCA) is the overall lead agency for implementation of the Act. It staffs the Council and coordinates agency responsibilities. Funding covers water quality assessment and monitoring, TMDL process, point and non-point source pollution activities, and council activities.

The BioBusiness Alliance of Minnesota. An industry-led non-profit organization devoted to building a network, strategic plan, and business analysis for expanded biobusiness in the state. The Alliance conducted a comprehensive assessment of Minnesota's biobusiness industry, providing a "line in the sand" against which to benchmark the industry, and in late 2008 it published "Destination 2025," a strategic plan for increasing biobusiness. Services to members include the Biobusiness Resource Network, which helps biobusiness enterprises relocate, start up, or expand in Minnesota, and an International Business Support Center, which assists bioscience firms in global marketing. Another program of the Alliance focuses on bioscience education and workforce needs.

Carbon program models in other states

The (Oregon) Climate Trust. A non-profit organization established to develop and fund high-quality greenhouse gas reduction projects for Oregon. The Trust was created in 1997 following Oregon's enactment of the nation's first-ever requirement that utilities offset a part of their GHG emissions. Companies pay into a mitigation fund to finance projects to avoid, sequester, or displace emissions by utilities. The Trust's diversified offset portfolio is acquired through RFPs; Emission Reduction Purchase Agreements transfer ownership of a project's emission reductions to the Trust.

Colorado Carbon Fund. A voluntary carbon offset program run by the State of Colorado's Energy Office to fund community-based clean energy and climate mitigation projects in that state, support state emission reduction policies, and produce credible offsets for individuals, businesses, and government agencies interested in mitigating their carbon footprint. The Fund partners with communities interested in clean energy and climate mitigation projects, developers of emission-reducing projects that need financial or community support, and entities offsetting their emissions. The State of Colorado is partnering with The Climate Trust, described above, to manage these programs.

Georgia Carbon Sequestration Registry. A voluntary registry of carbon sequestration projects and practices by state farmers and foresters. The Registry is meant to encourage voluntary activities to reduce GHG emissions, to publicize and promote participants in the registry, and to give due consideration to "early adopters" in future regulatory regimes. The Registry adopts rules specifying acceptable types of carbon sequestration and procedures and protocols for establishing credits, including third-party verification. Sale or transfer of registry credits must be recorded by the Registry. A board of directors oversees the program.

Illinois Conservation and Climate Initiative. The purpose of this initiative is to promote adoption of carbon management practices in agriculture and facilitate participation in private carbon markets, principally the Chicago Climate Exchange. The program is a joint venture among the State of Illinois, the Illinois Association of Soil and Water Conservation Districts, and the Delta Institute, a non-profit organization. The Illinois ASWCD educates and works with farmers; the Delta Institute manages CCX

transactions, including aggregating many small landowner projects into 1000-metric-ton units for sale.

Other organizational types suggested in interviews that may serve as models for some components, such as financing, regulating, certifying, or insuring terrestrial carbon sequestration activities.

- USDA State Technical Committees, which serve in advisory capacities to the Natural Resource Conservation Service and other USDA agencies on implementation of conservation provisions of Farm Bill legislation, including state program priorities. The committees are chaired by the NRCS State Conservationists and are composed of public and private resource organizations in each state.
- Port authorities, government commissions incorporated under enabling state legislation to develop property for identified purposes by financing, acquiring, improving, operating, selling, or related activities.
- Public utility commissions, government boards that regulate basic service industries. Duties are defined by law and may include quasi-judicial, legislative, and rulemaking functions related to the conduct of utilities. A key charge is to consider opposing viewpoints, monitor utility activities, and deliberate in the public interest.
- Forest certification programs, third-party certification of forest stewardship management practices and products, based upon independently-developed standards of good forest management. Certification programs serve as “seal of approval” for consumers interested in purchasing sustainably grown forest products.
- Workers’ compensation reinsurance association, non-profit membership organization to cover insurers or self-insurers against catastrophic losses. Members pay premiums based on actuarial projections and cost estimates and are reimbursed for expenses exceeding limitations.

Section Three: Summary and next steps

Federal and international climate policymaking will determine the role of forestry and agriculture in GHG emission reduction efforts. If carbon sequestration is an eligible offset activity and if offset programs are large, government will be under intense pressure to act quickly to facilitate large-scale sequestration projects to meet market demand. If land-based offsets are restricted, forestry and agricultural sequestration will more likely be financed through government incentive programs or emission allowance auctions. In such cases, voluntary targets (such as 10% of emission reductions) rather than offset markets may guide forest and agricultural sequestration programs. How this plays out in coming months will clarify the scale of effort and kinds of support needed. Once policies are set, mobilizing action must quickly follow to meet goals and timelines.

People interviewed in this report displayed a strong sense that Minnesota institutions need to provide leadership and support for carbon management actions. Three widely shared action priorities are:

1. *Communication, coordination, and partnership building are needed among the private sector, government (state, federal, local, tribal), and academia to develop and implement a broad and sustained program.*

Scaling up sequestration to the level needed to make a significant contribution to greenhouse gas reduction would affect land management decisions on millions of acres of private and public lands. No single government agency or any group of agencies has the capability or constituency to administer a comprehensive program involving different ecosystems, incentives, regulations, market transactions, education, and other aspects of a major carbon sequestration effort. While public institutions must certainly increase capacity for this effort, greater breadth and efficiencies would result from building a network of existing organizations. An early effort could be to develop a publicly accessible source for information, a “one-stop-shop” on carbon management, project standards and tools, incentive opportunities, and carbon offset markets. Such a center could coordinate educational programs and other outreach activities through many organizations that collectively and over time would become a network capable of serving needs throughout the state.

2. *Building technical capacity to conduct, monitor, and verify carbon sequestration at site- and landscape-level is critical to ensuring positive results, building confidence, and maintaining public support.*

Terrestrial carbon sequestration and the effects of deliberate land use changes and management practices on carbon storage rates and capacities is a relatively new field of scientific study. Although many forestry and agricultural practices have the potential to increase sequestration, there is little Minnesota-specific data available to quantify their results. Before widespread land use or management changes are promoted, an infrastructure should be put in place to provide multi-disciplinary analysis for policymakers, environmental assessments for public lands managers, research and development on innovative sequestration practices, nuts-and-bolts information for practitioners, and transparent quality assurance or verification for all. A starting point for this effort could be development of an interdisciplinary and collaborative research, demonstration, and monitoring agenda prioritizing short- and long-term topics, including land management, economics, and public policy. Another short-term need is to translate known scientific data and analyses into practical information to be disseminated through user groups.

3. *Policymakers would benefit from a process that provides expert scientific and stakeholder perspectives related to large-scale land use changes and market systems.*

As reported above, terrestrial carbon sequestration as a GHG reduction strategy encompasses a wide variety of public policy and technical issues impacting private and public interests across the state. Citizen and expert advisory councils have commonly been used to develop consensus and to advise Minnesota lawmakers on major natural

resource management issues. Short-term committees such as the Minnesota River Citizen's Advisory Committee (1992) and the Red River Flood Damage Reduction Working Group (1997) and permanent councils such as the Clean Water Council and Forest Resource Council have been important in providing expertise, developing strategies, identifying policy options, making recommendations, and monitoring progress. Similarly, a carbon council could bring on-going technical and stakeholder insights to policymakers and, importantly, could help develop consensus on public-private strategies for carbon sequestration projects with larger community and environmental benefits. Such a panel could play an important role in increasing public education and support for actions needed to combat climate change. To increase public confidence, such a council should be broadly representative of different levels of government, land management organizations, business interests, environment/conservation, and other affected groups.

Next steps

A statewide program to protect and enhance terrestrial carbon will take time to build. To get started, a set of scoping meetings with key government, academic, and private groups could be held to develop a short-term action plan and a longer-term process for building the infrastructure and expertise needed for successful carbon management programs.

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Citations

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