### Multidisciplinary project idea or sustainability theme

<table>
<thead>
<tr>
<th>Assessing current land use and agronomy practices of Wisconsin's corn growers to determine best &quot;sustainable&quot; practices: Bob Welch, Wisconsin Corn Growers Association</th>
<th><strong>Project justification</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>This opportunity touches directly on the &quot;sustainable energy&quot; priority area, as almost all biofuels currently in production are made from corn. It also directly relates to the &quot;climate change&quot; priority area, as biofuels have a significant impact on greenhouse gas emissions. One current area of concern in the biofuels arena is the effects of direct and indirect land use on the total carbon footprint of ethanol. By studying current practices and identifying the most practical best practice improvements, policy makers will be able to target rapid improvements in the effectiveness of corn ethanol to combat climate change. Also, as corn stover and other corn by-products are one of the target areas for cellulosic ethanol production, learning more about how to most efficiently make use of this material. We also believe that this type of study can address a lot of misconceptions in the public arena about the sustainability of modern corn production. Topics could include tillage practices, fertilizer application rates and timing, soil erosion effects of various practices, genetics, water usage, crop rotations, and many other agronomy practices. Also land use changes since the birth of the full scale ethanol industry can be measured as the industry has now been &quot;full grown&quot; for several years.</td>
<td></td>
</tr>
</tbody>
</table>

| Tsyunhehkwa, Program of the Oneida Nation of WI, Jeff Metoxen | **Local Food Security, ensuring production on small scale in communities throughout the state, to reduce dependency on large scale markets. Community level, organic production to reduce the environmental impact of pesticides and herbicides. Food Policy Councils established in counties, made up of community food policy councils within the counties.** |

| Building new models for environmental responsibility that do not depend on traditional carrots and sticks: Richard Castelnuovo | **Cost-sharing and existing enforcement approaches have not been successful in building a sustainable approach to environmental compliance. Instead of actively managing farms to respond to environmental challenges, our current tools have encouraged farmers to wait until they are required to act. We need to explore supporting tools and programs that get farmers actively engaged and invested in management decisions that result in environmental improvements. The new farmland preservation program requires new levels of conservation compliance and monitoring that may provide a model. Also emerging loan programs offer an option to cost-sharing that requires farmers to take a more active role in management decisions. Also opportunities in the bio-fuel production may open the door to conservation improvements. The project focus would be on getting farmers more involved and invested in making good environmental decisions as part of their every day farm management.** |
The Dairyland Initiative: A guide to welfare friendly dairy cattle housing: Nigel Cook

The Dairyland Initiative is a program recently launched by the Food Animal Production Medicine group in the School of Veterinary Medicine. Its primary goal is to facilitate the construction of welfare friendly environments for dairy cattle using a website to facilitate the transfer of new guidelines for housing to farmers and industry professionals, and as a frame work for connecting lenders and builders in an iterative process which continues to be refined. By 2050, the world will need 100% more feed than it currently produces, and the US dairy industry is an excellent example of production and efficiency increases over the last 50 years. The industry produces one third of the CO2 per kg of milk produced currently compared to 1944 (Capper et al., 2009), through greater productivity per cow. However, this achievement has come at a price - with a move from grazing to housed dairy units of larger and larger size. Those concerned with animal welfare point out the failures of housed dairy cattle - increased rates of lameness, metabolic disease and associated poor longevity, and there is considerable push back now developing through powerful organizations such as HSUS and PETA. How will the dairy industry in the State meet these challenges? We believe that cattle can be housed successfully to create a win, win, win situation for cow wellbeing, producer viability and for sustainability. A decade of research and experience in improving environments for dairy cattle by our group has culminated in this outreach tool, which is available free to all Wisconsin dairy farmers (http://thedairylandinitiative.vetmed.wisc.edu), and partially supported for 3 years by the Reilly Baldwin Wisconsin Idea Endowment. Further funding is required to make sure that the program becomes permanent and free to Wisconsin stakeholders.

Natural Omega 3 Fortified Agricultural Products for Economic Growth and Sustainability: Jerome Donohue, JLD's Exchange

In concert with NC-1039 (review project online) directive through USDA / NIFA we propose the implementation of omega 3 fortified agricultural products through animal base systems (dairy, beef, swine, poultry, fish, etc...) for human products providing increased sustainability to agriculture based systems in the Wisconsin. These products will provide a healthier food based system in society that is needed to combat areas of disease through current based food systems. Childhood obesity, metabolic syndrome, cardiovascular diseases, high cholesterol are just some of the areas of disease related issues in need of continued research effort in developing agricultural based omega 3 fortified food systems. We are looking at the educational system through the extension system for public education of these processes and are working with MATC in Madison for coarse work development for sustaining the Vet Technician and Veterinarian for agriculture sustainabilities of animal based systems through the AG Innovation Center to be built in the spring of 2011 in Owen Wisconsin. Other areas of research needs are the cascading agricultural components and by products of omega 3 fortification through animal based systems including aquaculture, horticulture, vermiculture and bio-fuels to energy will work in conjunction with Kansas State, North Dakota university systems as well as Marshfield Clinics in Marshfield Wisconsin. These omega 3 fortified systems will begin the platform for dissemination of the technology model based system to other states in the USA and other countries fulfilling the global initiatives within this request. Through global change in our daily lives these technology systems are looking to design high output sustainabilities of the agricultural base systems as the face of the farming community continues to change. These products would lead to a food safety initiative to bolster current safety systems currently in place. If awarded the granting opportunities other areas of omega 3 sustainable agricultural systems including new economic development would provide a system wide benefit to all sustainable systems in the field of agriculture providing an economic support platform tears to come. If further need of information / discussion is needed for this efforts support please do not hesitate to give me a call. Thank you, Jerome Donohoe
**Small anaerobic digesters for small to medium size farms:**
Jonathan Rivin

The number of farms in WI has been decreasing with shrinkage most pronounced with the small to medium size farms, with economic nonviability and farm consolidation being the primary causes. Anaerobic digesters are an option for farms to enhance survivability, albeit only for larger farms due to the economic restrictions. Increasing the ability for farms to install anaerobic digesters may decrease the farmers’ reliance on fossil fuel, generating biofuel which may decrease their fuel costs, and contribute to the farm’s profitability and sustainability. Reducing fossil fuel use also decreases ghg emissions which is the primary wellspring for global warming. Agriculture is a major source for economic well being in WI, and providing the option of anaerobic digesters to small to medium size farms may be critical to the well being of agriculture. Additionally, enhancing the survivability of farms will promote “local foods buying”, enhance community resilience, as well as promote food security. WI is a leader in anaerobic digesters and there is a big push for biofuels now. It’s an opportune time for more work in this area.

**Economics of grazing dairy cows vs producing feed for large scale dairies:** Adams LWCD, Petenwell and Castle Rock Stewards

Phosphorus contained in stormwater runoff is the single most important issue for Wisconsin water quality. If 500 to 999 Animal Unit dairies were able to utilize grazing systems instead of producing feed, storing and spreading manure, phosphorus runoff into states waters would be reduced.

**Reduction of Food Insecurity in Wisconsin - The Field to Foodbank Concept:** Jim Scheuerman, Second Harvest Foodbank of Southern WI

One in six people in Wisconsin are food insecure. Of this population, 37% are children. Fresh produce represents the most nutritious way to fight hunger in our state. Wisconsin is currently ranked #3 in the production of potatoes and #4 in the production of carrots. Our state is also ranked #2 in unharvested potatoes, #4 in unharvested carrots, and #3 in unharvested onions. Additionally, Wisconsin is listed as #6 in harvested but not sold potatoes. Simply stated, there is an abundance of fresh produce which could be made available to feed those in need. The "Field to Foodbank" concept can provide the means to capture this abundance of fresh produce grown in Wisconsin which currently does not get to the marketplace. We need to make this concept work. It is the right thing to do. No one in Wisconsin should have to go to bed hungry, especially a child. No one should have to make choices of whether to pay the rent or buy food, to pay for heat or buy food, to purchase medications or food, or to make a car payment so you can get to your job or buy food.

**Understanding the role of water resources in sustaining agricultural productivity in Wisconsin:** Kathy Pielsticker, WI DATCP

(See attached description).
| Economic impacts of Wisconsin local foods production and sales, including Farm-to-School markets: Margaret Krome, Michael Fields Agricultural Institute | Wisconsin’s investment in local foods marketing has gained important traction in the past 3-4 years, with farms of all sizes pursuing local sales. However, with tight state budgets, it is important to understand what economic benefits accrue to farmers, communities and the state from local foods markets, including Farm-to-School. This work has potential to address NIFA issues of obesity, and it has direct implications for social and economic aspects of sustainability, and indirect implications for environmental aspects of sustainability, since direct-marketed foods increase the transparency of food production for consumers and is an important marketing strategy for many producers who market their products on the basis of their environmental practices. |
| Green payments - what does it take to impact production practices across U.S. agricultural spectrum?: Margaret Krome, Michael Fields Agricultural Institute | The 2002 Farm Bill included a new program, the Conservation Security Program, which was implemented to provide incentives and rewards for exemplary conservation practices on working farms in certain watersheds in the U.S. The 2008 Farm Bill modified that program to make it a nationwide program, renaming it the Conservation Stewardship Program. However, neither version of this program has been as effective as Europe’s green payments programs at affecting the farming practices of a wide swath of U.S. producers. Understanding the variables affecting how such a program significantly encourages farming practices that are environmentally sound, profitable, and socially responsible would help create a broader coalition of support for such policies. This research would have implications for all of the NIFA issue areas, particularly climate change and sustainable energy. |
Perennial cropping systems are potentially important sources of feedstock for bioenergy within Wisconsin and their adoption may contribute to improved soil and water quality and wildlife habitat suitability within the state. Future markets for biomass from perennial cropping systems may provide additional revenue sources for conventional commodity and dairy operations thus improving farmer profitability and financial resilience. Additional benefits may also be gained through co-location of perennial crop and livestock production with integrated farm management that prevents loss of soil nutrients to air and water. Plot-level experiments and field-based trials demonstrate potential productivity and ecosystem service provisioning of perennial crops, but are insufficient for robust extrapolation to larger areas for understanding their performance across and among landscapes of differing complexity of land use/land cover. Although they are powerful paradigms for organizing the work of science, researcher-lead plot-level experiments and traditional technology-transfer models of extension lack a landscape ecology framework and do not readily support the principle of sustainability describing equity and socio-economic and political empowerment of farmers.

To gain necessary understanding of regional landscape impacts of perennial cropping systems and expand to a larger number of Wisconsin beneficiaries the multiple potential benefits of sustainability derived from perennial cropping systems, it is necessary to combine transdisciplinary* approaches to inquiry and decision-making with a geographically widespread network of on-farm observational studies and demonstrations. The role of university researchers and outreach personnel as leaders in development of transdisciplinary land-based observational networks, particularly as a legitimate form of career track and professional contribution, is under-developed. Therefore, the College of Agricultural and Life Science at the University of Wisconsin - Madison should give institutional support and highest priority to discovery of transdisciplinary knowledge production and circulation leading to improved environmental quality, enhanced farm financial security, and fulfillment of renewable fuel and sustainability goals at local, state and national levels.

Prioritization of a transdisciplinary land-based observational network of perennial cropping systems by CALS would, first and foremost, enable researchers within and beyond the academy, farmers, and change agents to engage in problem-based collaborations potentially leading to perennial cropping systems design that optimizes productivity and sustainability goals across the state's varied agricultural regions. Additionally, the bearing of shared risks and shared outcomes among collaborators and their sponsoring organizations potentially improves the likelihood of project longevity and discovery of multiple pathways toward greater sustainability across agricultural systems. Prioritization of this project could also lead to institutional innovation for developing standardized evaluation methods and metrics in determining the contributions of researchers and outreach specialist engaged in transdisciplinary scholarship, and aid in accounting for these contributions to tenure and promotion, as well as new course development and student education. Not prioritizing this project will likely delay our ability to appreciate and estimate the long-term ecological and sustainability impacts of widespread perennialization of agricultural landscapes, and represent a foregone opportunity for leadership in scientific and institutional innovation.

*Transdisciplinary approaches are discourse and interaction frames that facilitate collaboration among disciplinary experts and non-disciplinary practitioners, promote synthesis of perspectives, theory and methodologies, and support co-production of knowledge and outcomes for public good.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
</table>
| Direct market agricultural viability in WI as a means to preserve small farms and increase yield to grow food for residents in WI/upper Midwest region: | Kiera Mulvey, Madison Area Community Supported Agriculture Coalition

WI is a national leader in the direct-market sector with a significant number of small farms serving their communities fresh food direct from the farm. Often our small, family farms do not benefit from state or national agricultural programs because the sector is disjointed and poorly documented. A multidisciplinary project that helps the network of small farms to articulate its critical role, improve systems for innovation and efficiency to improve yield, and grow to provide a larger portion of food consumed in our region would have significant impact on our local economies, communities and agricultural viability. The impact of a project focused on small producers farming and marketing in local communities addresses all aspects of economic, social and environmental pillars of sustainability by contributing to local economies, encouraging innovations to reduce inputs, and working to preserve WI’s agricultural heritage by ensuring farm viability to keep farmers producing food in our communities. We propose a multidisciplinary project (Economics, Agronomy, Horticulture, Sociology, etc) to explore barriers to, benefits of, and opportunities for increased innovation, efficiency, yield, and profitability of direct market farms. Project focus should be on farms producing fresh foods (vegetables, meat, cheese) for direct market sales and consumption in WI and the Upper Midwest with research objectives to: • increase small, direct market farm viability • foster on-farm innovation for improved soil structures, cultivation practices and crop variety to increase yield • increase access to and demand for farm fresh products. Research projects to target increased efficiencies and viability of direct market vegetable farms directly align with USDA’s national priority areas of: • Childhood Obesity by increasing access to and consumption of fresh foods, • Global Food Security by localizing the food system and piloting models for comprehensive, regional self sufficiency • Climate Change by researching, developing and promoting low impact cultivation and production systems that maintain high yield outputs. |
| Efficacy of various strategies pertaining to conservation compliance: | Margaret Krome, Michael Fields Agricultural Institute

Notwithstanding the scores of millions of federal, state, and local dollars that are spent every year on conservation in Wisconsin alone, startlingly little gains have been made since Conservation Compliance provisions were included in the 1985 Farm Bill. While Conservation Compliance was enforced for a few years and demonstrably reduced soil erosion, which was the resource with which it was principally concerned, USDA released a report earlier this summer articulating the many ways in which it is minimally effective now. These pertain to problems associated with enforcement. It is important to better understand what policy frameworks, economic incentives, community social dynamics, and enforcement strategies work most effectively to succeed at the goal of protecting resources crucial to the sustainability of agriculture. |
| Saving 11,600 Wisconsin dairy farms: | Laura Paine, WI DATCP

(See attached description). |
| Corn adaptation to climate change: | Pat Murphy

What genetic potential is there in the corn plant to resist droughty periods in the growing season? Is there some variety that performs better at pollinating in dry periods? Also, consider nitrogen (N) use by corn. This year, farmers stated that they "left some yield in the field" because corn ears did not fill to the end. They attributed this to a lack of N. Are there genetic traits that more efficiently utilize N or are less sensitive to changes in N availability? |
Parity Pricing Study:  
Chris Malek

In order for us to sustain the profitability of farms in our state and the whole country, farms must be paid a "fair wage", or price, for the production they bring to market. If they receive a "fair wage", that income is used to purchase inputs, hire laborers, etc. and pay a fair wage to those suppliers and laborers. That fair level of income cascades throughout the whole economy at a rate determined by our productive technologies (at one time measured 7X, now suspected to be significantly higher). This fair wage, or fair price, is known as a parity price. The United States Secretary of Agriculture, through Title 7 U.S.C.A. 602, is given the authority to set parity prices. However, this law is not being enforced, or at the very least, is not being enforced in the manner as was originally intended to bear its greatest effect. A project should be initiated to study the "parity pricing law" and determine its effect on the economy as a whole and the cycles of boom and bust that continuously plague our economy at home and those abroad. We cannot sustain the health of our environment and the health of the people if we condemn people to debt and poverty. That debt and poverty results from a lack of income to consume the production that brings a healthy standard of living.

Animal Health:  
Wisconsin Pork Association

The issue of how farm animals are raised is becoming increasingly common in today's discussion about agriculture and food supply. Producers must rely on valid scientific information about how current production practices impact the well-being of the animal in order to make sound choices on their farms every day. The ability to make the right choices is essential for producers to remain economically, environmentally, and socially sustainable in today's domestic and global marketplace.
Project Idea for the Wisconsin Institute for Sustainable Agriculture (WISA)

USDA National Priority Area addressed
Global Food Security and Hunger: NIFA supports research, education and extension that will boost U.S. agricultural production and improve global capacity to meet the growing food demand.

Multi-disciplinary Project Theme
Understanding the role of water resources in sustaining agricultural productivity in Wisconsin

Increased production on a shrinking land base puts pressure on the long-term viability of water resources to sustain that production and other human and environmental uses. Sustainable agriculture in Wisconsin should include the themes of water quality and water quantity protection. Both surface and groundwater impacts are important to understand. Several studies are essential to an understanding of sustainability regarding water resources. They include:

Understanding groundwater quality impacts

- Nitrate is the most common contaminant in Wisconsin’s groundwater. Nutrient management planning is one way to try to reduce the amount of nitrate that leaches to groundwater and causes contamination. However, not enough is known about the nitrate levels that occur in groundwater beneath agricultural fields around the state that have nutrient management plans. We know that in many cases nutrient management planning will help reduce nitrate contamination problems, but we don’t know how much or whether the plans will lead to compliance with the 10 ppm groundwater standard for nitrate-N. We would like UW-CALS/WISA to encourage projects that generate groundwater sampling data that will improve our understanding of the impact of nutrient management planning on nitrate levels in groundwater. We believe a study of nitrate levels in groundwater beneath agricultural fields where nutrient management plans are in force will help UW CALS arrive at fertilizer recommendations that ensure sustainability of Wisconsin agriculture.

This theme is critical to Wisconsin stakeholders because 70% of Wisconsin residents obtain their drinking water from private wells and 10% of private wells in the state already exceed the 10 ppm drinking water standard for nitrate-N. Clean water is equally critical to Wisconsin’s dairy and other agricultural interests. This theme has significant ramifications for the sustainability of Wisconsin agriculture and for maintaining the quality of drinking water for agriculture and for rural residents in the state.

- Agricultural practices may also result in the movement of phosphorus to groundwater, though generally in relatively low concentrations. However, since
groundwater accounts for baseflow in many streams in Wisconsin, and it will be important to know which practices, including nutrient management, are able to mitigate phosphorus movement.

- Recently, manure spreading activities have been shown in some cases to cause contamination of private drinking water wells with various pathogens. More direct research on the movement of pathogens under various management scenarios is needed.

Understanding surface water quality impacts

While significant work has been done in recent years to quantify the movement of phosphorus to surface waters, there has been little done to understand the movement of nitrogen to surface water, in particular to the Mississippi river which has been shown to deliver excessive nitrogen to the Gulf of Mexico, resulting in the Hypoxic Zone. Determination of appropriate nutrient management practices, especially practices to minimize nitrogen losses from tile drained fields, is critical.

Understanding groundwater quantity/conservation impacts

The impact of the consumptive use of groundwater by agriculture on the long-term viability of aquifers for a range of purposes is poorly understood. Impacts on water table elevation over time under a variety of pumping rates, pumping densities, should be studied. Evaluation of the mitigation potential of various water conservation measures should also be undertaken.
Wisconsin Institute for Sustainable Agriculture
College or Agricultural & Life Sciences, University of Wisconsin-Madison
Sustainability Theme Proposal

Saving 11,600 Wisconsin dairy farms
Laura Paine, Grazing & Organic Agriculture Specialist, WI DATCP
Dick Cates, Director, WI School for Beginning Dairy Farmers
Paul Dietmann, Deputy Secretary, WI DATCP
Contact Laura Paine: 608-224-5120; Laura.paine@wi.gov

The character of America’s Dairyland is changing rapidly. While we are no longer first in total milk production, Wisconsin’s dairy industry has tied its long-term sustainability to refocusing on what it does best: specialty cheeses and other value-added dairy products. With our long history of cheesemaking artisanship, Wisconsin is distinguishing itself in specialty dairy and is responsible for more than a quarter of the specialty cheeses produced in the US.

Wisconsin’s 12,000+ family dairy farms and 200+ small scale dairy processing plants are valuable assets for a dairy industry focused on unique high-value artisan products. Several farmstead and cooperative cheese-makers have had impressive successes in the marketplace using grass-fed milk (Paine 2009). Maintaining and encouraging a diverse base of relatively small, traditional, organic, and pasture-based dairy farms and supporting our diverse dairy processing capacity can contribute significantly to this trend.

Another trajectory of the dairy industry, toward increasing herd size, has both positive and negative implications for sustainability. If our only goal is to maintain an adequate supply of milk for Wisconsin’s dairy plants, we can allow the trend toward large herd confinement systems to continue. We only need 400 3000-cow dairy farms to produce as much milk as our 12,000 dairy farms currently do.

The idea centers on the notion that we may not want this consolidation of milk production to continue unabated and that if we do not, we need to make a concerted effort to maintain the diversity of dairy farm types that we now have. The choice is ours: what would Wisconsin’s landscape look like with 400 3000-cow dairies? Do we want to go there? Or are there broad, sustainability-related reasons why we might want to maintain a larger number of family-sized dairy farms dispersed across the Wisconsin landscape?

This is a good time to focus on this bigger, longer-term picture of Wisconsin dairy. With WISA support, we can start a statewide dialogue on the ‘triple bottom line’ implications of the choices before us. Today, about 25% of dairy farms are pasture-based and approximately 10% are large herd confinement farms. There are many challenges facing the other 65% of dairy farms in Wisconsin. Many of these traditional confinement farmers are milking relatively small herds in aging facilities, nearing retirement, and have inadequate plans for transitioning their farms to the next generation. If recent history is any indication, we are likely to lose many of them.

There are many reasons why we should make efforts to help these farmers transition to a more sustainable system or to transfer their farms to the next generation. Managed grazing and other efficiencies may be a good fit for these small scale dairymen, who for any number of reasons, may not want to choose the expansion alternative. Here are just a few:

**Environment:** Distribution of cattle farms across Wisconsin’s landscape provides a significant environmental benefit to the state. Much of our arable land is highly erodible and inclusion of perennial pastures and hay in crop rotations makes it possible for farmers to meet...
environmental standards. Many acres of farmland not suitable for annual cropping can be pastured successfully. All of these acres of perennial forages provide high quality habitat for ground nesting birds and other grassland dependent species.

**Rural communities:** On average, each dairy cow in Wisconsin represents about $17,000 in economic activity in the community where the farm is located (Deller 2009). The concentration of milk production among fewer, larger farms limits the impact of this activity to fewer communities. This effect is compounded by the fact that larger farms are more likely to purchase inputs in large quantities from out of state, while smaller farms tend to make more purchases in their local communities (Jeremy Foltz, pers. comm.). Small scale dairy plants are also a good source of jobs and economic activity for rural communities. This value is also reflected in higher average milk prices received by farmers shipping to small Wisconsin plants compared to larger national dairy manufacturers in other states (Tranel, pers. comm.). Larger numbers of moderate-sized dairy farms in close proximity to small dairy processors can support the continued economic viability of Wisconsin’s rural communities.

**Economics:** The average farm in Wisconsin is about 200 acres in size. Other than vegetable and other specialty crops, no other production system has the potential to return as much profit per acre as dairy. A profitable cash grain farm must be much larger—probably 500 to 1000 acres. The profitability of dairy farms is dependent on many factors. UW Center for Profitability data suggests that, contrary to popular belief, maximum efficiency on a per-cow basis is gained in the 150 to 200 cow range. Management system is a factor as well. Well-managed pasture-based dairy farms have consistently out-performed traditional confinement and large herd confinement farms on a per-cow and a per-cwt basis (Kriegl 2000-2010). Nearly half of beginning dairy farmers are getting their start using managed grazing. The reduced capital investment and reduced cost of production make this a logical means to get off on sound financial footing and stay there over the long term.

The recent prolonged downturn in farmgate milk prices sheds light on the vulnerability inherent in relying on only one capital intensive system of dairy farming. One of the strengths of managed grazing as a system is that it is more likely to return profits even when milk prices are low and cost of production is rising. If dairy is to remain an economic engine for Wisconsin agriculture, we would be wise to ensure continued diversity of size and scale of our dairy farms. We are at a critical juncture, as retirement of the baby boomer generation of dairy farmers escalates. We need to focus our efforts on transitioning those farms into systems that represent a desirable career path for the next generation of dairy farmers and that spread the environmental, societal and economic benefits across Wisconsin’s landscape.

**References**


