

MINNESOTA

STATEWIDE CONSERVATION AND PRESERVATION PLAN



PROFESSIONAL CONSULTING SERVICES – NOVEMBER 17, 2006



Table of Contents

➔ Executive Summary.....	1
➔ Project Understanding.....	2
➔ Project Approach.....	4
Comprehensive Team Maximizes Scientific and Strategic Plan	4
Public-private team brings multiple strengths to your project	5
Two-Phase Process with Ongoing Outreach and Communication Identifies Research Gaps to Build Comprehensive Final Product.....	7
GIS-Based Analysis and Information Systems Provides Access to Broad Knowledge-base.....	10
Public Outreach Engages Citizens and Builds Support	11
(see below) Closely Related, But Separately Funded University Projects Adds Value.....	12
Collaboration and Coordination with State Agencies and Public Interest Groups Broadens Information Network, Paves the Way for Plan Implementation.....	13
Quality Control Defines Responsive Products.....	15
Products and Processes Chart.....	16
➔ Project Team	
Introduction to Our Team	16
Organizational Chart	18
Core Management Team	20
Team Leaders for Research and Analysis Team	22
Faculty and Consultant Advisory Members for Research and Analysis Teams.....	27
➔ Proposed Work Plan.....	28
Internal and External Communication and Support Tasks.....	28
Preliminary Plan: Assessment of Current Conditions and Key Issues	32

Table of Contents

Final Plan: Tools and Strategies for Conservation and Preservation	34
➔ Schedule.....	38
➔ Deliverables & Compensation.....	39
Core Tasks Project Deliverables & Budget.....	39
➔ Additional Tasks.....	40
➔ Appendix	44
Resumes	44
➔ Required Forms	separate envelope

Executive Summary

We have assembled a strong, public-private partnership to develop a plan that will help guide the LCCMR in determining funding priorities and effective strategies for conservation and preservation of natural resources. Our team draws upon the broad and deep scientific expertise and technical resources at the University of Minnesota, and complements it with the experience in planning, natural resources, implementation and facilitation of CR Planning and the recently merged consulting firms of DSU and Bonestroo, Rosene, Anderlik, and Associates. This partnership brings a solid understanding of science and policy, and experience in creating responsive plans and strategies.

Our team will use an efficient and targeted approach to the creation of the Statewide Conservation and Preservation Plan. We will: develop an understanding of the current conditions of natural resources in the state based on analysis of existing data and plans; predict two possible future scenarios for those resources based on an evaluation of key issues, principal drivers of change, and major trends; and finally, use qualitative cost-benefit analysis to prioritize effective strategies for achieving conservation.

The preliminary plan will draw on our integrated synthesis of current conditions to formulate recommendations to help the LCCMR decide its initial investments. The final plan will harness our comparison of the two future scenarios to recommend strategies for investments over the longer term. This final product will be a report and map products that illustrate key issues challenging Minnesota's resources, and articulate recommended actions, policies, and strategies for conservation.

Our work will take place in close collaboration with agencies, organizations, interest groups, and government at various levels. We will draw upon a number of existing and relevant projects, including the ongoing work by the Campaign for Conservation, recent studies by the Metropolitan council regarding issues affecting the Twin Cities region, as well as numerous other efforts for various regions and the state as a whole. A parallel project currently underway at the University of Minnesota, *Minnesota 2050: Pathways to a Sustainable Future*, will further enhance our team's work and directly supplement data analysis and public engagement efforts.

This proposal outlines in detail a carefully designed process to develop a sound and practical Statewide Conservation and Preservation Plan. We have assembled a wealth of expertise with knowledge across all key disciplines and relevant to issues across the state. Our extensive contacts with public and private stakeholders in the state will allow us to cultivate broad acceptance of the investment and implementation strategies outlined by the plan. *By combining these strengths, we will develop a Statewide Conservation and Preservation Plan for Minnesota's Resources that is based in sound science, thorough analysis and public outreach, and that can be effectively implemented.*

Project Understanding



Minnesotans are fortunate to have access to diverse natural resources that provide recreational and refuge opportunities, such as the ones illustrated in the pictures above.

Top picture was used with permission from www.davemech.org.

The quality of life and economic vitality in Minnesota depend on clean air and water, abundant fish, wildlife, forests, and access to quality recreation. The threat of losing these natural resources holds the attention of policy makers, state agencies, public interest groups, anglers, hunters, scientists, recreation users, and business leaders. There is a growing urgency to change how we plan for Minnesota's environmental future.

Complex and rapid changes affecting our landscapes and watersheds can no longer be addressed in a piecemeal fashion. The water-related needs of people, fish and wildlife need to be holistically addressed as metropolitan areas continue to expand. Without a big-picture view, ongoing conversion of forest lands into disconnected parcels threaten the economic viability of the forest products industry and the resilience of forest ecosystems. A realistic statewide conservation plan also should consider possible effects of climate change on animal and plant communities, and even on behaviors of recreational users.

The challenge is to forge a more interconnected understanding of the state's environment and natural resources into an integrated conservation and preservation plan.

Synthesizing numerous data is key to project success

Numerous studies have been completed or are ongoing to determine the status of and threats to our natural resources, as well as strategies and costs for protecting them. Multiple outreach efforts are also underway to quantify public desires and support for resource protection.

The Legislative-Citizens Commission on Minnesota Resources (LCCMR) seeks a consultant to comprehensively consider these studies, plans and efforts to produce a statewide preservation and conservation plan. The plan will provide analysis and recommendations to assist in making strategic investment decisions—such as acquiring land, filling knowledge gaps, and analyzing policy options—to conserve and protect Minnesota's most important natural resources.

Plan needs team with experience in science, policy, and strategic planning.

Our team has the experience in science, policy, and strategic planning needed to develop a plan that is scientifically and strategically sound as well as broadly supported.

Knowing where we came from, comprehending where we are now, and understanding the interconnected drivers of change enables us to see possible futures for Minnesota's environment and natural resources. Understanding the scientific and policy-based connections across these conditions will advance the state's position to act effectively on behalf of conservation.

The team selected to work with the LCCMR must meet the challenge of building on existing data, analysis and outreach efficiently and productively. The requested products are quantitative, qualitative and strategic.

Existing analyses, plans, programs and policies will be synthesized to determine the status and likely future of Minnesota's resources. Outreach to stakeholders will build a shared vision for Minnesota's natural resources toward which strategic actions will be directed.

The scope of work requested in the RFP is challenging to complete within the budgeted amount, even considering the significant existing foundation on which to build. Our team presents a core work plan and budget detailing the tasks requested by the RFP that we feel can be successfully completed within the LCCMR budget and project timeframe. To assist in future planning, our work plan suggests additional tasks and timeframes not included in our core budget and work plan.

The following sections outline our approach to protecting the quality of life and economic vitality provided by our natural resources.

➔ Comprehensive Team Maximizes Scientific and Strategic Plan

HIGHLIGHTS OF OUR APPROACH INCLUDE:

- Maximizing project cohesiveness by integrating science and strategy
- Coordinating a public-private team to build upon the appropriate mix of knowledge and experience
- Implementing a two-phase process to identify gaps and create a comprehensive final plan
- Using GIS information systems to access a broad knowledge-base
- Extensive public outreach to build support and understand public opinion
- Adding value by integrating closely-related, but separately funded University projects
- Collaborating and coordinating with state agencies to create a plan that is supported by regulatory agencies and easy to implement

Because this project requires a solid understanding of science as well as a broad perspective on policy and implementation, we have assembled a multi-disciplinary, private-public partnership to respond to the LCCMR's request for proposals. Our strong partnership includes the University of Minnesota's Institute on the Environment, the recently merged consulting firms of DSU and Bonestroo, Rosene, Anderlik and Associates (Bonestroo/DSU) and CR Planning, Inc. Each member of the team brings strong skills to the partnership.

The *University of Minnesota* is a pre-eminent research institution, and the newly formed Institute on the Environment provides an umbrella under which to gather their multi-disciplinary environmental expertise to develop a statewide plan. This team includes faculty from several departments, including:

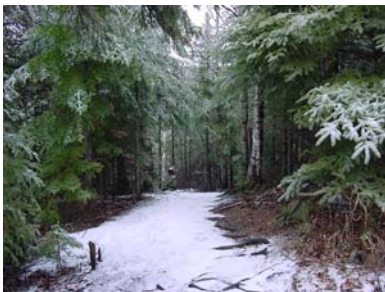
- Agronomy and Plant Genetics
- Applied Economics, Soil, Water and Climate
- Bioproducts and Biosystems Engineering
- Environmental Health Sciences
- Fisheries, Wildlife and Conservation Biology
- Forest Resources
- Landscape Architecture
- Geography
- Soil, Water, and Climate

Additional University units participating include the Natural Resources Research Institute (NRRI), the division of Environmental Health Sciences, the Center for Changing Landscapes, the Minnesota Geological Survey, the Water Resources Center, and the Regional Sustainable Development Partnerships. In total, more than 35 faculty from six colleges at the University's Twin Cities campus as well as the NRRI at the University of Minnesota Duluth are collaborating in this effort.

A core management team consisting of Deborah Swackhamer, Anne Kapuscinski, and Lance Neckar will help guide this project in close consultation with the team leads for each main topic area and members of the core management team from DSU/Bonestroo

and CR Planning. Through a high-level of faculty commitment, the University will bring a broad and deep understanding of environmental science and strategies. Its talented research and support staff will confirm the plan is based on sound science.

Bonestroo/DSU is a leading engineering, planning and natural resources firm in the Upper Midwest, with more than 450 employees and over 50 years of experience serving communities throughout Minnesota and the upper Midwest. John Shardlow of the DSU Planning and Landscape Architecture Group and past president of DSU is one of the leading names in the industry. He brings significant experience in large –scale planning projects, and offers a broad understanding and connections with both the public and private sector. Paul Bockenstedt, Liza Gould, Randy Neprash, Mark Wallis, and Ben Meyer are ecologists and natural resource engineers, They have worked extensively with Minnesota communities, state agencies, and state and regional planning groups on a broad array of natural resource issues ranging from planning and natural resource inventories, to on the ground implementation. They regularly help plan and develop sound and effective environmental policies and regulations. Their experience working directly with communities and regulatory agencies will help create a practical plan that can be easily implemented.



All team members involved in our public-private partnership have extensive experience protecting Minnesota's natural resources, such as this treasured hiking trail or the above canoe area.

Jean Coleman of **CR Planning** brings extensive experience in project management and natural resources planning. CR Planning focuses its technical expertise on developing unique policy and regulatory solutions for its local government clients and their community resources. Ms. Coleman's facilitation skills will achieve good communication among the project team members, between the project team and the LCCMR, and help deliver a timely product.

Public-private team brings multiple strengths to your project

The key strengths of our public-private team are:

- Team members have diverse knowledge built on decades of scientific natural resources research and expertise in documenting and synthesizing issues driving natural resource changes.

Project Approach

Benefits of a public-private partnership include a diverse knowledge-base and easy access to data

No stone is left unturned. The conservation and preservation plan will thoroughly address each project element.

- Team members have quick access to the widest variety of available natural resources data. Many data sets are already at hand and being used in their current projects.

The savings we receive accessing and gathering data will be forwarded to the LCCMR to allow a larger return on investment.

- Team members apply natural resource conservation and protection strategies on the ground in their daily work.

Practical implementation strategies garnered from our daily work will benefit plan users.

- Team members bring broad experience working with state, local and federal policy makers developing strategic policies and programs for natural resource protection.

Team members' experience with local, state, and federal policies will help avoid creating a plan that cannot be implemented due to unknown regulations or policies.

- Team members are committed to involving the LCCMR closely in developing natural resource conservation and preservation strategies.

LCCMR will have input and involvement to make sure their concerns and goals are addressed.

- Team members are experienced in, and committed to, creating products that can be understood by the general public.

We will use this experience to ease plan implementation and gain widespread support.

Bringing together the strength of science, policy analysis, and applied strategy, our team is prepared to produce timely and responsive preliminary and final products. Our team structure and organizational system are designed to maximize scientific and strategic thinking within the project budget and timeframe.



Team members will rely on their experience with public meetings, brochures, and other communication pieces, such as this interpretive sign, to create easily understood public documents.

➔ Two-Phase Process with Ongoing Outreach and Communication Identifies Research Gaps to Build Comprehensive Final Product

In response to the goals and objectives in the request for proposals, we are approaching the project in two phases:

1. The preliminary plan to be completed in June 2007
2. The final plan to be completed in June 2008.



The preliminary plan will identify current landscapes in Minnesota.

Significant products are produced at the end of each phase. There are also ongoing tasks that continue throughout the process, including public outreach and communication with the LCCMR. The graphic on page 16 illustrates our team's approach to the project and deliverables.

Preliminary plan identifies historical and current conditions to better inform decision making

The preliminary plan will start with a brief documentation of natural resource conditions during the settlement era using existing data. Depicting this reference point is critical to inform a wiser evaluation of strategies in the final plan.

For example, at the time of European settlement, prairies covered vast stretches of Minnesota's landscape. Today, alternative strategies for prairies include protecting remnant prairies or extensive prairie restoration. Knowing past conditions will inform strategic choices between the alternatives, such as restoration and preservation and the extent of restoration.

The preliminary plan will also stress the current condition of our natural resources, and present it in GIS maps, graphics and text. Our team will synthesize existing data, plans and policies and identify and describe drivers of change. We will specify which drivers the LCCMR can influence through strategic investments and which ones need coordination with other entities.

In addition to documenting conditions and drivers, the preliminary plan will:

- Identify gaps in data and plans
- Identify key issues for each Natural Resource Trust Fund Constitutional category: air, land, water, fish, wildlife, and other natural resources (outdoor recreation)
- Identify key issues that cross categories
- Recommend key issues for further investigation based on strategic selection criteria developed with the LCCMR (One selection criterion indicating an issue needs further investigation could be the issue creates impacts across several natural resource categories)
- Validate key issues with the LCCMR at a mid-project retreat
- Incorporate and build on outreach and communication efforts already underway by the University

We believe the significant level of product proposed for the preliminary plan can be achieved in six months because our team is comprised of experts skilled in documenting natural resources changes, drivers of interconnected changes, and applied resource conservation and preservation strategies.

Our internal communication process and support staff structure will draw on team members' extensive knowledge to identify existing data and plans, and focus review and synthesis. Consistent and structured communication among members of the core management team is essential to accomplishing the preliminary plan goals and delivering a product that meets the LCCMR's needs.

We propose to closely integrate LCCMR members and staff in the communication structure. An integrated communications structure will deliver preliminary and final products that are attainable and meet the decision-making needs of the LCCMR.

Final plan outlines potential future of Minnesota's natural resources

Two potential futures will be described in the final plan:

- The future of Minnesota's natural resources if no change is made in current policies, programs or actions

Project Approach

- The future if we prioritize strategic conservation and protection policies, programs and actions

The consultant team will apply their best scientific and applied judgment to describe the two possible futures and alternative implementation strategies to achieve the preferred future. The project team must also clearly describe the consequences of choosing between alternative strategies. Our approach enables the LCCMR to select strategies that are most effective in meeting its mission.

The two future scenarios and alternative strategies will be created through:

- Investigating selected key issues and related drivers
- Conducting qualitative cost-benefit analysis of key issues
- Analyzing scenarios and trends
- Working directly with the LCCMR in strategy selection
- Confirming the preferred future and testing possible strategies to realize that future through additional outreach and communication efforts

We will create two possible futures to contrasts where we are going (business as usual) and where we might go under changes in policy, programs and action. Maps and graphics will be used to help present complex, synthesized data and areas of priority concern for each natural resource category.

The final plan will also include:

- Recommendations for key additional research and analysis
- A general cost-benefit analysis
- Identified benchmarks for measuring success



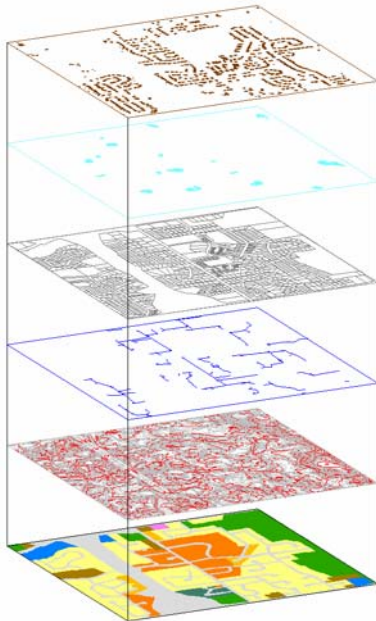
These rare trumpeter swans are impacted by a variety of drivers. A comprehensive look at the Minnesota's natural resources will help waterfowl.

Project Example 1: A brief, simplified example of a resource and driver carried through our proposed process is waterfowl influenced by draining wetlands. The preliminary plan will present available data on the historic mix and range of waterfowl in Minnesota, followed by a description of the change driver - draining of wetlands. Other key drivers of change will be incorporated where data is readily available, such as new waterfowl diseases affecting population dynamics.

Current data, plans and policies on waterfowl and wetland management will be gathered, synthesized and reported in the preliminary plan. Outreach workshop participants will be asked to consider the importance of waterfowl and potential conservation strategies. The LCCMR will be engaged to verify key issues.

For the final plan, trend analysis will be applied to waterfowl habitat and population dynamics resulting in two possible future scenarios described in maps, graphics and text: future waterfowl habitat if current policies and actions are maintained; and future waterfowl habitat if selected strategies for conservation and preservation are implemented. Alternative strategies for waterfowl habitat conservation will be developed by the project team and preferred strategies chosen by the LCCMR.

Project Example 2. Another resource and its driver are forest resources and changing ownership patterns. Forest extent and composition at settlement and current status will be documented using existing data. Changing ownership patterns (i.e. increasing parcelization) would be mapped and their effect on forest ecosystems and economy would be described.



GIS Mapping will allow numerous data sets to be stacked into one comprehensive map.

Based on extensive knowledge, practical experience and available data, team members would describe alternative strategies for conserving and preserving forest resources. Alternative strategies may include education to incentives, to regulation and policy change, to investment or purchase. LCCMR members will be engaged in choosing alternative strategies that best meet the LCCMR's goal of setting funding priorities.

GIS-Based Analysis and Information Systems Provides Access to Broad Knowledge-base

Geographic information systems (GIS) mapping is a significant component of the statewide conservation and preservation plan. Primary team members include the Natural Resources Research Institute (NRRI) and the University of Minnesota's Forest Resources Department, the Center for Changing Landscapes and the University of Minnesota's Geography Department. All these team members are at the forefront of analyzing natural resource

change and will direct the production of maps, including priority conservation and preservation area maps in the final plan.

Quantitative analysis will be synthesized to determine the status and likely future of Minnesota's resources. Natural resource inventory and spatial (GIS) databases that provide assessments of Minnesota's natural resources are currently distributed across many agencies and departments.

Although there are several groups that serve as clearinghouses for spatial data, (LMIC, the DNR Data Deli, and NRRI's CoastalGIS and Lake Superior Decision Support System), these projects act simply as data servers, and the user must devise queries to convert these data into useable information.

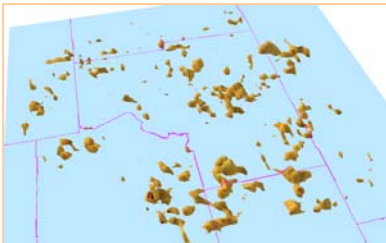
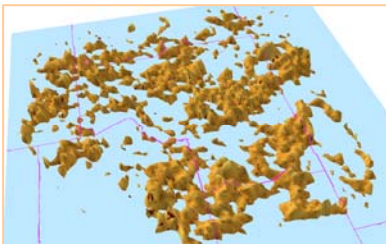
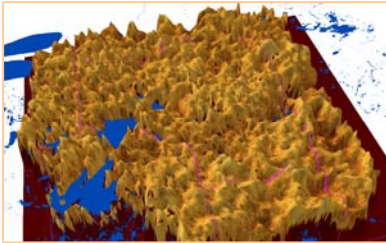
With additional funds, our GIS experts are poised to develop a web-based front-end application that will allow project team members and LCCMR members and staff to query the data (for example, what are the trends in water quality for lakes in a particular region of the state), and return maps and tables that provide answers to these questions.

This and other additional projects are listed in the budget section of this proposal with estimated costs where available. The application will allow the LCCMR to pose questions about the current status or projected future of single resources or combined resources. The project team would use the data, interface and questions to produce a series of maps for both the preliminary plan and the final plan.

Public Outreach Engages Citizens and Builds Support

External communication, or outreach, serves two vital project functions. It offers an understanding of the natural resources needs and visions of Minnesota citizens, and it provides an opportunity to build support for the final plan. Science alone can not set priorities for action and policies to protect and conserve natural resources. It must be considered within the context of culture, history, economy and decision-making structures.

Outreach helps us understand citizens' needs and build support for strategies based on science. Outreach also disciplines us to



The above 3D renderings illustrate conservation value for lands in and around Itasca County.

The lower two figures show high value sites remaining after different thresholds are applied. Magenta lines show county boundaries.

This work was done to identify lands for potential conservation easements, and was funded by TNC through the Blandin Foundation.

Science alone can not set priorities for action and policies.

produce user-friendly products that are easy-to-understand. The University has several on-going projects that complement the outreach needs of this proposal. Our approach builds upon the associated University projects for the purpose of:

- Informing the widest possible spectrum of interested citizens about the project
- Inviting citizen participation
- Empowering citizens to support the product

Highlights of our outreach program to engage the public include:

- Two series of six workshops around the state to engage the general public and interest group representatives. We will discuss their needs and desires for natural resources, as well as the viability of alternative conservation and preservation strategies
- Two series of focused conversations with stakeholder groups
- An interactive project website to engage a broad range of citizens and solicit their comments on products
- Interest group networks to create an extensive e-mail database to which we will send project updates and requests for comments

Integrating Closely Related, But Separately Funded University Projects Adds Value

Our team proposes to add substantial value to the project through faculty commitment and the integration of closely-related, separately funded projects. Recognizing the importance of this project to the state of Minnesota and building on high faculty interest in the project, the University of Minnesota is committing faculty to this project with no budget impact.

Our team brings the unique value of separately funded projects that enhance and expand the statewide conservation and preservation plan project, particularly in the areas of public outreach, assessment of environmental conditions and projections of key environmental quality indicators.



Recognizing the importance of Minnesota's varying landscapes, (pictured above), the University of Minnesota is committing faculty to this project with no budget impact.

For example, the University of Minnesota's Ecosystem Science and Sustainability Initiative, funded by the Bush Foundation, launched *Minnesota 2050: Pathways to a Sustainable Future*, a project that dovetails perfectly with the goals of the LCCMR project. *Minnesota 2050: Pathways to a Sustainable Future* investigates Minnesota's possible environmental futures through analyzing relevant environmental trends, as well as engaging citizens and stakeholders across the state.

The trends analysis portion of the project will directly complement the current resources assessment completed for the statewide conservation plan. This work has already begun and will continue through June of 2008 with the work of a post-doctoral research fellow to be hired by the Sustainability Initiative.

Involving stakeholders is another integral part of *Minnesota 2050*. In collaboration with the Regional Sustainable Development Partnerships, the project will conduct structured environmental discussions across the state in 2007.

This major effort will expand considerably the public engagement efforts associated with the statewide conservation plan, yet the costs of staff time, professional facilitation, and travel, food, lodging and other logistical expenses will all be paid for by the Sustainability Initiative.

In sum, we estimate the dollar value of the complementary work funded by the Sustainability Initiative to total approximately \$200,000 over the 18-month duration of the LCCMR contract.

Collaboration and Coordination with State Agencies and Public Interest Groups Broadens Information Network, Paves the Way for Plan Implementation

This project's success requires forging partnerships and collaborating with state agencies and public interest groups. The timeframe for the preliminary and final plan necessitate building upon and adding value to existing research, analysis and outreach efforts. In addition, forging partnerships and collaborating will create support for the final plan.

Project Approach



Collaborating with various agencies and public interest groups is key to the project's success.

Several University and private consultant team members are currently working with state agencies and public interest groups on projects directly related to the LCCMR conservation and preservation plan. For example, team lead George Host is working with the Campaign for Conservation on mapping conservation priority areas for Minnesota. The Campaign for Conservation also has contracted with the MN Extension service to carry out listening sessions with citizens across the state, and we hope to link this work with our own outreach and public engagement efforts.

During proposal development, our team contacted many state agencies and advocacy organizations to assess their willingness to collaborate. All contacts recognized the efficiency and strength of collaboration. State agencies, such as Minnesota Department of Natural Resources (DNR) and the Minnesota Pollution Control Agency (MPCA), emphasized their willingness to partner with the project team selected by the LCCMR.

Our organization chart on page 18 lists as partners or advisors the agencies and groups we have contacted. We anticipate additional partners and advisors will be identified soon after project start. Partners and advisors will choose to participate at varying levels in the project.

Our partner team structure accommodates consistent, involved participation with groups such as:

- The Environmental Quality Board
- The Campaign for Conservation
- The Minnesota Environmental Partnership

Our advisors, who will be called on for advice at appropriate times, include:

- The Nature Conservancy
- The Minnesota Forest Legacy Partnership
- The Parks and Trails Council of Minnesota
- The Minnesota Environmental Initiative

➔ Quality Control Defines Responsive Products

Given the project timeframe, quality control efforts are critical to achieve a timely success. Our team's project approach includes multiple levels of quality control mechanisms:

- A detailed work plan agreed upon at project start by the LCCMR and the project team, defining project benchmarks and a series of interim products. Interim products will be reviewed during the project to determine if adjustments are needed.
- A small core management team consisting of project team members and LCCMR members and staff.
- Consistent contact between the project team coordinator and the LCCMR project coordinator.
- A single point of supervision within the consultant team for support staff consisting of post-doctorate researchers, geographic information systems (GIS) technicians, and research assistants.
- Monthly progress reports and scheduled intermittent reflection on progress, including a mid-project retreat following the preliminary plan delivery.
- Systems for internal communication such as an established meeting calendar and standardized meeting agenda and summary forms.

Our approach is designed to be responsive to LCCMR's needs in creating a statewide conservation and preservation plan. The plan will emphasize interconnections among natural resource categories and drivers of change.

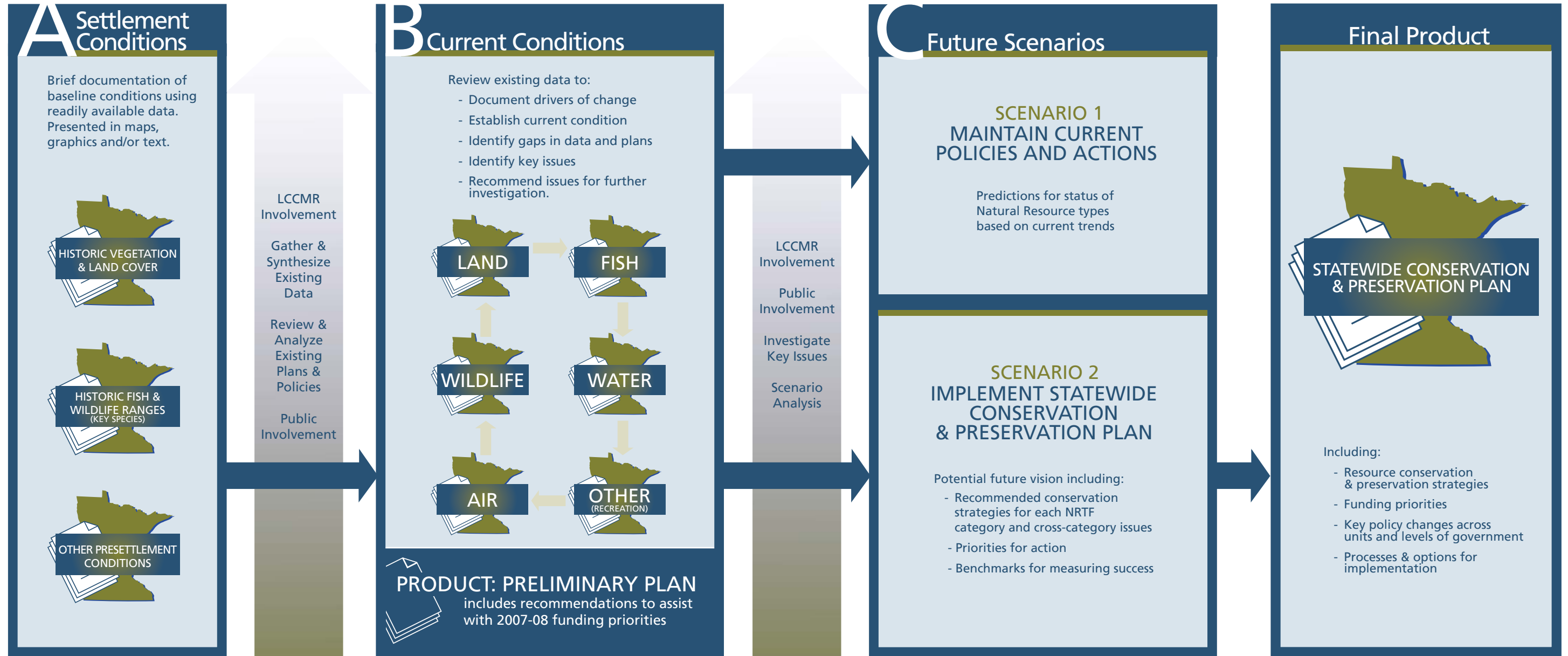
It will also identify useful strategies and tools that are responsive to the needs of the LCCMR in creating a statewide conservation and preservation plan. This approach underlies the team organization, detailed task descriptions, and schedule on the following pages.

Process & Products

Project
Initiation
January 2007

Preliminary Plan
June 2007

Final Plan
& Product
June 2008



EXAMPLES OF DRIVERS OF CHANGE

INVASIVE SPECIES
INDUSTRY
FORESTRY

AGRICULTURE
LAKESHORE DEVELOPMENT
WATER USE

RESTORATION
ENERGY
MINING

RECREATION
TRANSPORTATION
POLLUTION

DEMOGRAPHIC TRENDS
CHANGING CLIMATE PATTERNS
LAND USE AND LAND PATTERNS

➔ Introduction to Our Team

Our project team brings together the scientific strength of an array of departments and units within the University of Minnesota and the applied strategic experience of Bonestroo/DSU and CR Planning, private consultants working on natural resource protection efforts around the state.

With this partnership, our project team offers the LCCMR efficiency and value-added efforts in developing the statewide conservation and preservation plan. Project team functional organization will determine success in this effort. The organization of our project team is illustrated on page 19.

Team Organization

The following summarizes our team organization and the level of effort of team members:

A consultant team **project coordinator** providing a single point of contact for day-to-day communication with the **LCCMR project coordinator**, and a single point of accountability for the support staff work. Jean Coleman will serve as the lead project coordinator.

Level of effort: The consultant team project coordinator will contribute at least 20 hours per week for the 18-month timeframe of the project.

A small **core management team** will consist of Jean Coleman from CR Planning, leads from the University team and from Bonestroo/DSU, and an **LCCMR Steering Committee** comprised of LCCMR staff and interested members. The core management team is responsible for directing research and analysis teams, providing direction to the project coordinator and support staff, synthesizing issues that cross resource categories, and reviewing all products produced during the project.

Level of effort: Core management team members will meet at least monthly throughout the project to coordinate research and analysis team activities and direct the project coordinator and support staff.

Team leaders for each natural resource category, external communications, and information systems teams. Team leaders

are responsible for coordinating among their advisory members, coordinating with the core management team, and reviewing documents produced during the project that relate to their natural resource category or cross-category issues.

Level of effort: Team leaders will meet once per month with their team and once per month with the core management team. Team leaders will work with the project coordinator to set meeting agendas, team goals, and direct support staff effort.

Advisory team members consisting of University of Minnesota faculty and private consultants will provide access to data and analysis, bring their knowledge on identifying key issues, developing alternative strategies, and reviewing selected documents.

Level of effort: Advisory team members will meet once per month with their research and analysis team.

Project **partners** are included to leverage scientific and strategic thinking in agencies and non-governmental organizations (ngo's) that are not part of the consultant team. Partners will participate in all research and analysis team meetings for their given resource area.

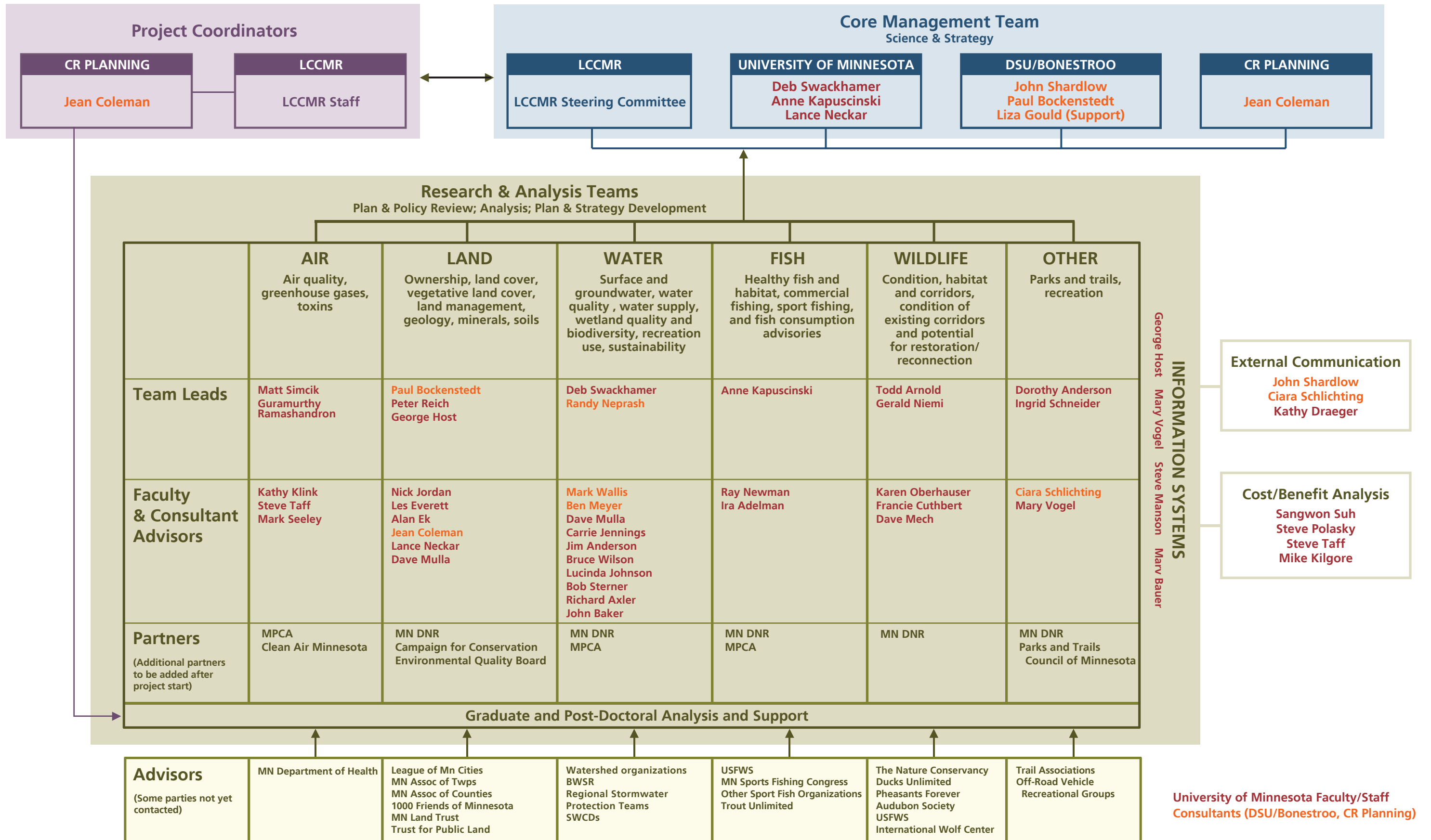
Project **advisors** are included to tap into a broad range of knowledge. Advisors include representatives from state agencies, ngo's, units of local government, and special interest groups. Advisors will be called upon to participate in the project at points where their knowledge is most valuable.

A **support staff** of three to five post-doctorate researchers, geographic information systems (GIS) technicians, and graduate research assistants will support the team's general efforts.

Level of effort: Support staff will contribute at least 3,700 hours over the project (200 hours per month).

Short introductions to key members of the project team are begins on page 20. The appendix includes additional information on project team members.

Project Team Organization



➔ Core Management Team

University of Minnesota

Deborah Swackhamer, PhD, Co-Director, Water Resources Center, Interim Director, Institute on the Environment

Dr. Swackhamer's expertise includes the chemical and biological processes that control the fate of toxic organic contaminants in the aquatic environment, particularly bioaccumulation of persistent compounds in fish in the Great Lakes; the processes that control exposure to environmental estrogenic compounds; and the development of contaminant indicators of ecosystem health. Dr. Swackhamer currently sits on the Science Advisory Boards of the US EPA and the International Joint Commission of the US and Canada, and is the US Chair of the Emerging Issues Work Group for the IJC SAB. She also serves on the Advisory Board for the National Undersea Research Program of NOAA for the North Atlantic-Great Lakes region. Dr. Swackhamer is a member of the Editorial Advisory Boards for the journals *Environmental Science & Technology* and *JEM: Journal of Environmental Monitoring*.

Anne R. Kapuscinski, PhD, Department of Fisheries, Wildlife and Conservation Biology

College of Food, Agriculture and Natural Resources Sciences

Dr. Kapuscinski is Professor of Fisheries and Conservation Biology and co-leads the Ecosystem Science and Sustainability Initiative funded by the Bush Foundation. She has broad expertise on how technologies from dams to fish hatcheries to genetic engineering affect fish conservation and is active in analysis and formulation of policies fostering sustainability of aquatic biodiversity. She holds a Pew Marine Conservation Fellowship, the world's preeminent marine conservation award, has advised three past Secretaries of Agriculture and serves on advisory committees to the FDA and various agencies of the United Nations.

Lance Neckar, MLA, Department of Landscape Architecture

Professor Neckar is a professor of landscape architecture responsible for all or portions of over \$2 million of funded applied research on the relationships between urban development and the

sustainability of water and other resources. His current teaching focuses on sustainable infrastructure. He also brings over 20 years of experience as a registered landscape architect with several award-winning urban design projects.

Bonestroo Rosene, Anderlik and Associates & DSU

Bonestroo recently merged with DSU, bringing together some of the best regional talents in engineering, architecture, planning, landscape architecture, and urban design. Our combined team now provides integrated services in one organization.

John Shardlow, BS, Senior Principal and Director of Planning, past-president and owner, Dahlgren, Shardlow, and Urban (DSU)

Mr. Shardlow is past president and co-founder of DSU. He has extensive and wide-ranging experience serving clients in both the public and private sectors, and has led many multi-disciplinary teams of consultants in large, complex planning projects. His skills include comprehensive and community planning, project planning, re-development planning, regulations, and environmental assessments. He is a faculty member of the Government Training Service, and is a member of the American Institute of Certified Planners, the American Planning Association, Minnesota Planning association, and past president of the Minnesota chapter of the Community Association Institutes'. He is a past president of the Sensible Land Use coalition, and currently serves on the executive Committee of the Twin Cities Chapter of the Urban Land Institute (ULI).

Paul Bockenstedt, MA Senior Ecologist and Project Manager, Bonestroo Natural Resources.

Mr. Bockenstedt has over 23 years of experience in the natural resources field including 13 years of experience with State and County agencies in Iowa and Minnesota, and most recently nine years working throughout the upper Midwest at Bonestroo. He has been involved with natural resources inventory, conservation, management and planning at the local, County, Regional, watershed and State levels in Minnesota and Iowa since 1992. He has served as the project manager and/or lead ecologist for over 100 natural resource and recreation/parks planning projects and botanical inventories and written over 125 ecological restoration

plans during his career. In addition, he has numerous publications and presentations to his credit.

CR Planning, Inc.

Jean Coleman JD, MA, Attorney and Land Use Planner, CR Planning, Inc.

Ms. Coleman has proven skills in managing complex teams over tight timeframes and extensive knowledge of using natural resource information in land use planning and zoning. In addition to serving on the core management team, Ms. Coleman will serve as the consultant team project coordinator. Her primary role is to manage internal communication, document creation, and supervise project support personnel. Ms. Coleman has extensive experience in natural resource and farmland protection, preparing comprehensive land use plans and zoning ordinances, group process facilitation, and growth management. Her work combines her interests in planning and law by using public participation and conflict resolution techniques to develop policies, ordinances, and programs. She enjoys working in a variety of landscapes and has managed multiple projects at the neighborhood, township, county and regional scale.

Team Leaders for Research and Analysis Teams

Air

Gurumurthy Ramachandran, PhD

Dr. Ramachandran is Professor of Environmental Health Sciences in the School of Public Health, University of Minnesota. His expertise is in the areas of assessment of human exposures to aerosols and volatile organic compounds (VOCs) in ambient, residential and occupational environments, measurement techniques for these air contaminants, and policy issues related to urbanization, air pollution, and public health infrastructure. He has served on several study sections for the National Institutes of Health (NIH) and the National Institute for Occupational Safety and Health (NIOSH).



Matt F. Simcik, Ph.D.

Dr. Simcik is an Associate Professor of Environmental Health Sciences in the School of Public Health. He has broad expertise on air toxics and their interactions with aquatic and terrestrial systems.

Land

Paul Bockenstedt, MA

Please see Paul's profile under the Core Management Team

George Host, PhD

Dr. Host is a Senior Research Associate and Landscape Ecologist with the Natural Resources Research Institute at the University of Minnesota - Duluth, and Director of the Natural Resources Geographic Information System laboratory at UMD. He currently is principal or co-principal investigator on 15+ research projects distributed across the fields of forest ecology, ecological assessment and indicator development, plant response to atmospheric pollutants, linkages between terrestrial and aquatic systems (particularly with respect to stormwater issues), and data visualization and spatial analyses for land use planning. Dr. Host has over 50 refereed publications, and has served on advisory panels for the MN Dept of Natural Resources, the MN Forest Resources Council, and numerous county and municipal groups.

George Host is currently involved in a GIS analysis to identify lands of high conservation value for the development of conservation easements through the Forest Legacy Program.

Peter B. Reich, PhD

Dr. Reich is Professor and F.B. Hubachek, Sr. Chair in Forest Ecology and Tree Physiology in the Department of Forest Resources, as well as a Distinguished McKnight University Professor. He co-leads the Ecosystem Science and Sustainability Initiative funded by the Bush Foundation. His research focuses on the impacts of global environmental change on terrestrial ecosystems. This includes effects of climate change, rising atmospheric carbon dioxide, management, and fire on health, biodiversity, and sustainability of forest and grassland ecosystems, both in Minnesota and globally. He has served on





numerous editorial boards, as well as advised Minnesota and federal agencies on environmental issues.

Water

Deborah Swackhamer, PhD

Please see Dr. Swackhamer's profile under the Core Management Team

Randy Neprash, BS

Mr. Neprash is a Stormwater Regulatory Specialist and Engineer with the Water and Natural Resources Group at Bonestroo. He has served as the technical/administrative consultant for the coalition of more than 100 cities regulated under the NPDES MS4 Stormwater Permit program for more than four years. In this capacity, he has represented cities on the Minnesota Stormwater Steering Committee (MnSSC) and its Operations Subcommittee since its conception. The MnSSC is charged with informing, advising, and coordinating stormwater management efforts across the state. It also provides support for other programs that include stormwater components such as: impaired waters, shoreland management, drinking water source water, wetland management, MN Nonpoint Source Management Plan, federal funding programs, groundwater recharge, watershed organizations, surface water management plans.

Fish

Anne R. Kapuscinski, PhD

Please see Dr. Kapuscinski's profile under the Core Management Team section



Wildlife

Todd Arnold, PhD

Dr. Arnold is Associate Professor of Fisheries, Wildlife and Conservation Biology. He has also worked extensively with environmental NGO's, including stints as Senior Scientist for Ducks Unlimited Canada and Scientific Director for Delta Waterfowl Foundation.

His research focuses on prairie- and wetland-dependent wildlife, especially waterfowl. He has worked on numerous regional issues in waterfowl management, including development of a Decision

Support System for conservation planning in the Canadian Prairie Pothole Region.

Gerald Niemi, PhD

Dr. Gerald Niemi is Professor of Biology and Director of the Center for Water and the Environment at the Natural Resources Research Institute both at the University of Minnesota, Duluth. He received his Ph.D. from Florida State University and Bachelor's and Master's degrees from the University of Minnesota.

He also was a Fulbright-Hays scholar to Finland. His primary research interests include birds, Great Lakes ecosystems, conservation biology, and sustainability of natural resources. He has written over 200 articles, publications, book chapters, and technical reports. He has received more than \$18 Million in research funding. Niemi regularly teaches Ornithology and Conservation Biology.

Other

Dorothy Anderson

Dr. Anderson is H.T. Morse Distinguished Professor of Recreation Resource Management and Director of the Great Lakes-Northern Forest Cooperative Ecosystems Studies Unit. She has broad expertise in planning and managing lands for recreational use. Her research focuses on developing the benefits based approach to public land management, especially lands with recreational value. Federal agencies [National Park Service, the USDA Forest Service, the Bureau of Land Management, and the U.S. Army Corps of Engineers] and the Minnesota Department of Natural Resources Division of Parks and Recreation have adopted the benefits approach recreational lands management. She has worked with government officials in Thailand, People's Republic of China, and Australia in their efforts to adopt parts of the benefits approach to land management.

Ciara Schlichting, MS, AICP, Senior Planner, Bonestroo/DSU Planning and Landscape Architecture Group

Ms. Schlichting has extensive experience reviewing the environmental impacts of development and redevelopment on Minnesota's natural resources. She has managed numerous environmental review projects that cumulatively assess the impact of development on resources including, but not limited to wildlife



habitat, fisheries, water resources, air quality, soil resources, and recreation resources. She is skilled at working with large teams of technical experts and bringing their analyses together in one document and presenting the broad analysis to the public in non-technical language.

Ingrid Schneider, PhD

Dr. Schneider is an Associate Professor in Forest Resources and Director of the University's Tourism Center. She has broad experience in visitor behavior in outdoor recreation management and sustainable tourism with particular emphasis in visitor attitudes, conflict and constraints. She is a member of the Governor's Council on Tourism.

Information Systems

George Host, PhD

Please see George's profile under the "Land" resource section

Mary Vogel, MA in Architecture

Ms. Vogel co-directs the Center for Changing Landscapes at the University of Minnesota. She has led a broad range of community engaged research projects that focus on the intersection of natural resource preservation, resource management, and sustainable development issues throughout the State of Minnesota. She is skilled at producing usable products that inform public and private decision makers at the state, regional, and local levels. She has served as the statewide director of the University of Minnesota's Regional Sustainable Development Partnerships, a citizen driven program that focuses on natural resources, sustainable agriculture, and natural resource based tourism.

Cost Benefit Analysis

Sangwon Suh, PhD

Dr. Suh's research focuses on environmental and economic systems analysis in the interface between engineering, economics, ecology and public policy. His expertise lies on building and management of database, mathematical modeling and systems analysis. For the last five years he authored or co-authored around 30 peer reviewed journal articles, 2 books and 2 commercial databases. He is an Associate Editor of the International Journal of Life Cycle Assessment and serves editorial boards of economics and engineering journals. He advises Eco-Industrial Development

Council (EIDC) and the European Commission's Directorate General, the Environment on its Integrated Product Policy (IPP).

Faculty and Consultant Advisory Members for Research and Analysis Teams

There are more than 30 additional academic and professional staff who will participate in the Natural Resource Research and Analysis teams associated with the project. Their expertise and experience is both broad and deep, and ranges from in-depth knowledge of the science in key areas, to analysis and presentation of findings, and to translating this understanding into effective policy and strategy recommendations. Resumes of all project staff can be found in Appendix A.

Our team developed the following work plan to meet the LCCMR's vision for a statewide conservation plan, and to be responsive to the requirements outlined in the request for proposals. The work plan consists of three primary task groups:

- Support tasks and internal and external communication tasks that continue throughout the project
- Preliminary plan tasks
- Final plan tasks

The work plan presents the flow of tasks our team will complete over the 18-month project period to produce the preliminary and final plan products described in our project approach. The tasks we have outlined below shall be completed within the \$300,000 project budget.

A graphic illustration of the tasks over the 18-month project schedule can be found on page 38.

Internal and External Communication and Support Tasks – January 2006 through June 2008

Task 1: Project initiation and internal project coordination

The goal of this task is to guide the project so it is completed on time and within budget. Project initiation includes finalizing a detailed work plan, budget and schedule, and executing contracts. Responsibility for ongoing internal project coordination lies with the project coordination team, and the core management team. The project coordination team will meet regularly and be in frequent contact to ensure progress.

The consultant member of the project coordination team (consultant project coordinator) is responsible for scheduling and managing all core management team, research and analysis team, and outreach team meetings throughout the project. The core management team will meet monthly with team leaders, which will be particularly important in the brief preliminary plan phase. The consultant team project coordinator will also supervise the project team support personnel.

The consultant project coordinator will make project **updates to the full LCCMR** every LCCMR meeting, and the LCCMR will be engaged at critical decision points in the project. For example, in March 2007 the consultant team will work with the LCCMR to develop strategic criteria for choosing key issues to investigate. These criteria will be applied in choosing the recommended key issues in the preliminary plan. Other critical decision points may include presenting and considering feedback from outreach efforts, and developing criteria for choosing among alternative conservation strategies.

A half-day **mid-project retreat** with the full LCCMR and the core management team will be held after the preliminary plan is delivered. The goals of the project retreat are:

- Review the preliminary plan recommendations
- Choose key issues to investigate in the second phase of the project
- Define the parameters of the investigation
- Preliminarily discuss additional research and analysis

LCCMR level of commitment: The LCCMR member of the project coordination team (LCCMR project coordinator) will be available for regular contact and meetings with the consultant team project coordinator and assist in scheduling LCCMR updates and the mid-project retreat. The LCCMR Steering Committee will meet monthly with the core management team. The full LCCMR will attend the project retreat and project update meetings.

Task 2: External project coordination/partnerships

The goal of external project coordination and partnerships is to build upon and add value to existing efforts outside of the LCCMR project, rather than duplicate work. Coordination and partnerships will take a variety of forms, including:

- Agency staff participation on research and analysis teams
- Access to natural resource data and analysis
- Access to summaries or compilations of plans and policies
- Access to environmental and land use trend analysis

Drawing on existing contacts of other team members, the project coordinator will be responsible for managing external project coordination.

Examples projects of external partners that relate directly to the statewide conservation and preservation plan include:

- MnDNR Comprehensive Conservation Strategies, Conservation Corridors, Species of Special Concern, compilation of all completed MLCCS land cover mapping, and study of growth pressures on sensitive natural resources in the Central Region
- The Campaign for Conservation's priority area mapping and listening sessions
- MPCA impaired waters inventory
- USGS Cooperative Research Unit
- USFWS National Fisheries Habitat Initiative, North American Fisheries Action Plan, and Upper Mississippi Valley/Great Lakes Waterbird Conservation Plan
- The Nature Conservancy's Statewide Conservation Plan
- The MN Dept. of Health's air quality data and wellhead protection area planning
- Embrace Open Space web-based communication and outreach tools
- Metropolitan Council's water supply planning for the Twin Cities metropolitan region
- And many others

Task 3: Public involvement and outreach

The goal of public involvement and outreach is to connect with the widest spectrum of citizens possible to inform them about the project, invite them to share their views and values, and empower them to support and advocate for the final plan.

Our team will work with the LCCMR staff and members to identify stakeholders groups that must be involved in developing the conservation and preservation plan. We will create multiple points of contact and access to the project for stakeholders. The University will create and host a project website that offers information about the project and opportunities for providing views and comments. Project partners and advisors will be asked



Public outreach will help identify practical implementation considerations in terms of public and agency support.

to use their contact lists to invite people into the process, directing them to the website and other outreach efforts.

As a key outreach component, our team will coordinate closely with an ongoing University of Minnesota environmental outreach effort, *Minnesota 2050: Pathways to a Sustainable Future*. The project will use the framework of the Regional Sustainable Development Partnerships to develop multiple plausible scenarios of Minnesota's future environment, and relate these distinct futures to alternative policies and management practices.

**Outreach Will Include/
Incorporate the Following
Efforts:**

- Project website
- Minnesota 2050
- Future of the Land documentary
- Campaign for Conservation

Beginning in January 2007, *Minnesota 2050* will convene six broad-based groups around the state to create future scenarios. A second round of workshops will be held in fall 2007. For the LCCMR project, we propose to enhance the framework of the *Minnesota 2050* project by adding unrepresented stakeholder groups to the process and providing an assessment of current conditions. The workshops will be used to identify needs and desires of citizens, validate key issues, and test possible strategies.

Another component of the *Minnesota 2050* project is a partnership with the Bell Museum of Natural History to produce a video documentary series on the *Future of the Land*, a reflection of the *History of the Land* series. The scenario-building workshops will be a featured component of the documentary. We propose to broaden the video documentation to include the statewide conservation and preservation plan development by incorporating map and graphic products and additional interviews.

In addition to the direct public involvement efforts described above, external project coordination with the outreach efforts such as the Campaign for Conservation's listening posts will also complement the LCCMR project outreach efforts. We anticipate identifying additional complementary outreach efforts of partners and advisors as the project is initiated.

➔ **Preliminary Plan: Assessment of Current Conditions and Key Issues – January to June 2007**

Task 4: Gather and synthesize existing data

Project team members, partners, and advisors will be asked to identify pertinent data and studies in assessing the status of Minnesota's natural resources, as well as information related to drivers of change.

The consultant team project coordinator and support staff will gather and synthesize this data and prepare summary reports related to each natural resource category and cross-category issues.

This task will include:

- Inventorying and assessing Minnesota's natural resources
- Identifying important natural resource areas
- Producing GIS maps based on available data

Members of the research and analysis teams and the core management team will review the summary reports and maps to help identify gaps and deficiencies. The review will also aid in preparing the preliminary plan. The summary reports and maps will form the basis for the two preliminary plan components: baseline natural resource conditions; and current conditions of our natural resources.

Task 5: Review and analyze existing plans and policies

Similar to Task 4, project team members, partners, and advisors will be asked to identify existing plans and policies related to natural resource conservation and preservation at all levels of government and private policies.

The consultant project coordinator and support staff will gather, review, and analyze these plans and policies; and then prepare summary reports related to each natural resource category and cross-category issues. The summary reports will be presented to the research and analysis teams and the core management team and integrated into the preliminary plan.

Task 6: Identify gaps and deficiencies in data, plans and policies

After reviewing and analyzing the existing data, plans and policies, the consultant project coordinator and support staff will prepare a report that identifies gaps and deficiencies in data, and outlines plans and policies related to each natural resource category and cross-category issues.

The gaps and deficiencies report will be presented to the research and analysis teams and the core management team for review and confirmation. The report will be incorporated into the preliminary plan and be considered in Task 10 recommendations for additional research and analysis.

Task 7: Highlight 3-10 key issues for each natural resource category

Based on Tasks 4, 5, and 6, the research and analysis teams and the core management teams will identify and describe three to ten key issues for each natural resource category. The issues may be resource-specific issues, cross-category issues, or emerging issues.

The consultant project coordinator and support staff will prepare a report on the key issues that will become part of the preliminary plan.

Task 8: Prepare preliminary plan; develop recommendations for investigating key issues

Based on strategic criteria developed at a meeting with the full LCCMR, the core management team will recommend key issues to be investigated in the final plan phase. The consultant project coordinator and support staff will prepare a preliminary plan that consists of GIS maps, graphics, and text. The plan will:

- Briefly document baseline natural resource conditions
- Document current condition of our natural resources
- Identify and describe drivers of change
- Review and synthesize existing data, plans, and policies
- Identify gaps in data and plans
- Identify key issues for air, land, water, fish, wildlife, and other natural resources (outdoor recreation)
- Identify key issues that cross categories

- Recommend key issues for further investigation based on strategic selection criteria
- Describe preliminary plan phase outreach and communication efforts

The preliminary plan will be presented and discussed with the full LCCMR and the core management team at the mid-project retreat. The retreat will accomplish:

- Identifying key issues to investigate in the second phase of the project
- Defining the parameters of the investigation of the key issues
- A preliminary discussion of additional research and analysis

Final Plan: Tools and Strategies for Conservation and Preservation – June 2007 to June 2008

Task 9: Investigate a limited number of key issues and develop alternative strategies

To remain within the established budget, we must limit the number of key issues to investigate in the final phase of the project. We believe a thorough effort can be applied to a maximum of three key issues, which will be selected at the mid-project retreat with the full LCCMR. The selected issues may be cross-cutting or single-resource.

The investigative project team members will be identified after the issues are selected. The teams may include:

- Initial team members
- A combination of teams for cross-cutting issues
- New team members recruited for a particular expertise

Once the teams are established for each key issue, the teams will propose scopes of analysis for their investigations. The core management team and the LCCMR will consider and discuss the scopes before investigations begin.

The key issue investigations will:

- Provide trend analysis for the two future scenarios to be mapped and described in the final plan
- Develop recommendations for alternative strategies

Task 10: Mapping priority natural resource areas

The information systems team will work with all research and analysis teams formed at the project start to map natural resource areas for the final plan scenarios, and to map possible outcomes for alternative conservation and preservation strategies.

In developing maps and strategies for the final plan, the information systems team will engage the LCCMR to present their questions about natural resource trends and conservation and preservation strategies. Learning the LCCMR's priorities and information needs will inform and guide the research and analysis teams' processes.

Task 11: Recommend additional research and analysis

All research and analysis teams formed at the project start will meet to provide recommendations for performing additional research and analysis not included in this scope of work, but may be desirable for the LCCMR to explore.

The core management team will work with the project coordinator and support staff to provide justification for the recommended additional research and analysis, specifically identifying what products would result. The recommendations will be presented and discussed at a project update meeting with the full LCCMR.

Task 12: Identify and describe alternative conservation strategies and benchmarks

To reach the preferred future scenario as recommended by the project team for Minnesota's natural resources, directed strategies must be implemented. Based on input from all the research and analysis teams, the core management team will identify and describe plausible alternative conservation strategies that could achieve the desired future for each natural resource category and for cross-category issues.

Alternative conservation strategies will range from education to incentives, to regulation and policy change, to investment or purchase. Benchmarks that could be used to measure progress toward the desired future will also be identified and described.

The project coordinator and support staff will prepare a report describing the alternative conservation strategies and benchmarks. The report will be presented and discussed at a project update meeting with the full LCCMR, at which members will be engaged in selecting strategies that best meet LCCMR's goals.

Task 13: Prioritize strategies

At the same project update meeting where alternative conservation strategies are presented, the full LCCMR will create selection criteria for prioritizing the strategies. The core management team will apply the selection criteria to make priority strategy recommendations for the final plan.

The priority strategy recommendations will be reviewed with the full LCCMR to ensure the strategies meet the needs of the LCCMR. Once strategies are prioritized, general timelines and responsible parties will be identified for implementing the strategies.

Task 14: Conduct general cost/benefit analysis

A qualitative Cost-Benefit Analysis (CBA) will be carried out via a panel method. A series of panel discussions will be held to identify key cost and benefit drivers. A group of experts will examine the possible magnitudes of the costs and benefits.

Relevant previous studies have estimated quantitative costs and benefits strategies for conservation and preservation and the team will review and discuss these efforts. Given the budget constraints, the team will not generate revised cost and benefit figures, but rather will note costs and benefits with qualitative scales derived from the panel discussions.

Task 15: Prepare final plan and provide final recommendations

The project coordinator and support staff will prepare the final plan. The final plan will incorporate the results of each of the tasks in the second phase of the project, including public involvement.

The strategies chosen by the LCCMR in Task 13 will be included in the final plan. Two potential futures of Minnesota's natural resources will be described in GIS maps, graphics and text in the final plan:

- The future if no change is made in policies or actions
- The future if the LCCMR and the State of Minnesota, including policy makers, landowners, and business people prioritize strategic conservation and protection policies and actions

The final plan will be reviewed with the core management team and presented to the full LCCMR for review and discussion. An electronic copy of the final plan will be placed on the project website and a minimum of 50 hard copies will be printed.

Project Schedule

Task		Preliminary Plan: January - June 2007						Final Plan: July 2007 - June 2008													
		January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June		
Internal and External Communication	Project Coordination and Partnerships	Project Initiation Meeting	X																		
		Project Coordinators –Bimonthly Meetings	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Core Management Team Monthly Meeting	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Research Team –Monthly Meeting	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		Coordinate Research and Document Preparation (Project coordinator and Graduate/Post Doc Support Team)		X	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
		Updates and Interim Presentations to LCCMR Quarterly or as Requested by LCCMR				X			X			X			X		X			X	
		Preliminary Plan Presentation to LCCMR								X											
		1/2 day Retreat with Core Management Team and LCCMR to Finalize Priorities for Phase II									X										
		Final Plan Presentation to LCCMR																			X
	Public Involvement and Outreach	First Round MN 2050 Scenario Building Meetings																			
		Focused Conversations with Stakeholders																			
		Develop and Maintain Website for Outreach and Communication																			
		Build Email Database to Distribute Information Regarding Project and Solicit Public Input																			
		Second Round MN 2050 Scenario Building Meetings																			
		Additional Focused Conversation with Stakeholders																			
		Collaboration with EQB on Possible Environmental Congress (ADDITIONAL SERVICE)																			
	Tools and Strategies	Preliminary Plan	Gather and Synthesize Existing Data																		
			Review and Analyze Existing Plans and Policies																		
Identify Gaps and Deficiencies in Data, Plans, and Policies																					
Highlight 3-10 Key Issues for Each Natural Resource Category																					
Prepare Preliminary Plan and Recommendations for Key Issues for Further Investigation																					
Resource Conservation and Assessment	Final Plan	Investigate Limited Number of Key Issues and Predict Future Condition for Resources (Trend Analysis)																			
		Investigate Additional Key Issues and Predict Future Condition for Resources (Trend Analysis, ADDITIONAL SERVICE)																			
		Mapping of Priority Natural Resource Areas																			
		Identify and Describe Alternative Conservation Strategies and Benchmarks																			
		Prioritize Strategies																			
		Conduct General Cost/Benefit Analysis																			
		Prepare Final Plan and Provide Final Recommendations																			

Our team proposes to complete the core project tasks detailed in the proposed work plan for \$300,000. This budget represents approximately 6,000 hours of compensated effort and does not include University of Minnesota faculty commitment or associated separately funded projects.

In addition, there will be considerable contribution of University faculty time and resources to this project. Project expenses within the proposed budget include: photocopying, meeting expenses, website maintenance and production of the final plan as specified in the request for proposals.

Core Tasks Project Deliverables & Budget

Task	Deliverable	Cost
Task 1	Detailed project work plan, budget and schedule	\$5,000
Task2	<i>No deliverable directly associated with this task</i>	-
Task 3	Initial construction of project website Completion of scenario-building workshops	\$5,000 \$10,000
Task 4	Existing data summary report	\$40,000
Task 5	Existing plans and policies summary report	\$20,000
Task 6	Gaps and deficiencies report	\$10,000
Task 7	Key issue report	\$10,000
Task 8	Preliminary plan	\$20,000
Task 9	Key issue investigation reports	\$75,000
Task 10	Priority natural resource area mapping	\$30,000
Task 11	Recommended additional research and analysis report	\$10,000
Task 12	Report on alternative conservation strategies and benchmarks	\$25,000
Task 13	Priority strategies report	\$5,000
Task 14	General cost benefit analysis	\$10,000
Task 15	Final plan	\$25,000
TOTAL budget for core tasks		\$300,000

In its request for proposals, the LCCMR states its interest in identifying additional work items that will contribute to the value of the product. A fully comprehensive and integrated statewide conservation and preservation plan is not supported by the budgeted amount of \$300,000.

In crafting this proposal, our team has identified several additional tasks we feel are necessary to create a fully comprehensive conservation and preservation plan. These tasks build on services described in the base proposal in the following ways:

- Expanding the public outreach
- Increasing the amount of time for technical input from faculty and consultant staff
- Allowing for analysis of additional ‘key issues’
- Providing for a more detailed analysis on the costs and benefits of potential conservation strategies and policies

If these additional tasks were performed during the 18-month project timeframe, the broader range of key issues and alternative strategies would be thoroughly investigated. Undertaking the listed additional tasks would also result in more comprehensive outreach to inform the LCCMR in making its decisions.

We anticipate additional tasks not listed here may become apparent during the project as the LCCMR’s strategic priorities become clearer, particularly after the preliminary plan is evaluated. For example, data and knowledge gaps and deficiencies will be identified in the preliminary plan phase. These gaps and deficiencies could be researched and filled during and after the final plan phase.

Identified additional services are described below with preliminary budgets where possible. If other additional services are desired by the LCCMR, we would welcome discussions to fully define the scope of the services and budgets.

Additional Tasks

Interactive GIS application

With additional funds added to the project, our GIS experts are poised to develop a web-based front-end application that would

allow project team members and LCCMR members and staff to ask questions of the data (for example, what are the trends in water quality for lakes in a particular region of the state), and return maps and tables that provide answers to these questions.

The application would allow the LCCMR to pose questions about the current status or projected future of single resources or combined resources. The project team would use the data, interface and questions to produce a series of maps for both the preliminary plan and the final plan.

Estimated Cost:\$70,000

Environmental Congress

The Minnesota Environmental Quality Board (EQB) is charged with intermittently convening environmental congresses to consider Minnesota's environment and natural resources. Last held in 1994, EQB staff have expressed an interest in convening an environmental congress to aid in developing the statewide conservation and preservation plan.

Conceptually, the congress would be held during final plan development to present preliminary findings, solicit input and test alternative resource conservation and preservation strategies. Core management team members would work directly with EQB in developing and hosting the congress.

Estimated Cost: \$20,000 depending on final scope

Investigate additional key issues

The LCCMR may desire additional key issues to be investigated as the final plan is being created. The breadth of our initial team enables us to investigate additional key issues during the final plan phase if additional funds become available. Tasks 9 through 15 of our proposal outline the steps we would take for each additional investigation.

Cost Per Issue:\$60,000

Full cost accounting cost/benefit analysis

There are two potential extensions to the cost-benefit analysis (CBA) component of the proposed work.

- A quantitative CBA can be performed by following accepted models such as the cost-benefit guidelines developed by the Office of Management and Budget (OMB), at the U.S. White House. This type of framework, however, does not include the intrinsic value of the environment in its balance sheets. Thus, it may over- or under-estimate the costs or benefits of policy decisions that effect environmental quality.
- The analysis can be completed using non-traditional accounting frameworks such as Full Cost Accounting (FCA), where the costs and benefits to the environment are quantified in monetary values.

Cost: Dependent on the method of accounting used and the number of parameters evaluated.

Increased level of commitment from Team Leaders and Faculty/Consultant Advisory Members

Because of the statewide importance of this project, University of Minnesota faculty participation will not impact the budget for the core tasks listed in the work plan. Because of this, and because of financial constraints on the consultant members of the team, the involvement and commitment from team leaders and the faculty/consultant advisory team is necessarily constrained.

Additional budget will allow greater participation by team leaders and the faculty/consultant advisory team members, achieving the following benefits:

- Additional/broader review and synthesis of related studies
- Increased involvement in creating products
- Increased involvement in producing reports, and the preliminary and final plans
- Increased interaction with the LCCMR in presenting reports and plans

Cost: Dependent on the number of additional hours desired.

Public Outreach after Final Plan

Public outreach tasks in our core budget end with submitting the final plan. Obtaining “buy-in” and ownership of the final plan from interest groups and the general public is critical for a successful implementation. Additional outreach meetings to secure maximum exposure and buy-in for the final plan can be provided.

Cost:Dependent on the scope of the outreach and number of meetings desired.

Jean Coleman

TOPICS: Core Management Team

Land Use Planner/Attorney

Education:

Juris Doctorate
University of Iowa, 1987
M.A. Urban & Regional Planning
University of Iowa, 1987
B.A. Political Science
University of Northern Iowa, 1983

Employment Experience:

- March 2003 – present
President/Owner
CR Planning, Inc.
Minneapolis, MN.
- 1993 – 2003
Principal/Owner
Biko Associates, Inc.
Minneapolis, MN.
- 1990 – 1993
Midwest Office Director
American Farmland Trust
Chicago, IL.
- 1987 – 1990
Project Manager
Trust for Public Land
New York, NY.
- 1986 – 1987
Junior Planner
T&M Associates
Middletown, NJ.

Professional Associations:

- Admitted to Minnesota State Bar since 1994.
- 1000 Friends of Minnesota, Board of Directors.
- Project NEMO, Steering Committee (Non-point Education for Municipal Officials).

Jean has extensive experience in natural resource and farmland protection, preparing comprehensive land use plans and zoning ordinances, group process facilitation, and growth management. Ms. Coleman's work combines her interests in planning and law by using public participation and conflict resolution techniques to develop policies, ordinances, and programs. Ms. Coleman enjoys working in a variety of landscapes and has managed multiple projects at the neighborhood, township, county and regional scale.

Related Project Experience

- **Bush Foundation/DNR Natural Resource-Based Land Use Planning Projects, 2006/7.** As a contractor to the Minnesota Dept. of Natural Resources under a Bush Foundation funded project, Jean facilitated natural resource-based land use planning in three communities faced with growth pressures; Shakopee, Oak Grove and the Mid-Minnesota stretch of the Mississippi River. She worked with the Metropolitan Council to produce a companion handbook to their Local Planning Handbook. The companion handbook details how local governments can incorporate natural resource information in land use decisions. Throughout 2006/7 Jean is managing the final project phase, conducting education workshops on using natural resource information in land use decisions. Over 300 local officials and staff have attended the workshops in 2006.
- **Rural Area Policies for the Twin Cities Metropolitan Area. 2002.** Jean managed policy and implementation strategy development for the Twin Cities Metropolitan Council's Rural Issues Work Group as part of the update of the *2030 Regional Blueprint*. Recommendations included: enhancing traditional rural population centers through coordinated planning with surrounding rural areas, transportation improvements and utility investment; defining urban expansion areas; cost estimates and program components of a regional Purchase of Development Rights (PDR) program; and promotion of a Transfer of Development Rights (TDR) program.
- **Statewide GEIS on Animal Agriculture, 2002.** Jean managed ten University of Minnesota teams providing literature review and research services to the state-wide *Generic Environmental Impact Statement on Animal Agriculture*. Primary author of section on land use and conflict management. This section analyzed causes of conflict and land use planning and zoning techniques for reducing conflict over feedlots. Also contributed to the section on the appropriate role for government in feedlot regulation.
- **Comparative Research of State-level Land Conservation Initiatives, 2005.** Jean researched efforts in twelve states to

develop state-level land conservation initiatives. The research was used by the *Campaign for Conservation*, a consortium of environmental and outdoor sporting organizations developing a 50-year vision for land conservation in Minnesota.

- **Natural Resource-Based Land Use Planning Guidebook, 2003.** Working with the University of Minnesota, Department of Landscape Architecture, Jean developed public participation and land use implementation sections for *Environmentally-Based Regional Smart Growth Planning and Design*. This handbook presents a GIS-based process for analyzing green infrastructure and determining local protection and development priorities. The Metropolitan Council funded the application of the process in Washington County, MN.
- **Farmland and Natural Area Program Guidelines, 2003.** Jean managed the creation of an implementation guidebook for the Dakota County Farmland and Natural Area Program. The \$20 million, ten-year program will protect priority farmland and natural areas in Dakota County through the purchase of land and conservation easements. The guidebook project involved working with Dakota County staff and Board of Commissioners to develop policies for project selection, property valuation, negotiations with landowners, and property management.
- **Conservation Easement Negotiation.** As staff for the Trust for Public Land, the American Farmland Trust and as a board member for a local land trust, Jean has negotiated terms and drafted over a dozen conservation easements. She is currently providing conservation easement negotiation services to the City of Anoka.
- **Evaluation of Effectiveness of Conservation Easements, 2005.** Jean evaluated 75 conservation easements in the Midwest acquired under grants from the National Fish and Wildlife Foundation (NFWF). The nationwide evaluation considered ecological outcomes on the protected lands in order to improve NFWFs grant review process.
- **Natural Resource Protection Toolbox, 1998.** Jean authored the guidebook *Protecting Your Community's Natural Resources: A Land Protection Toolbox for Local Government* as part of the LCMR-funded Green Corridor Project. The Toolbox guides local governments in the implementation of a natural resource protection plan using incentive-based techniques such as PDR and TDR. The project included a literature review and survey of existing PDR and TDR programs.
- **Lake Watershed Carrying Capacity-Based Planning, 2003.** Jean managed the public participation and ordinance development portions of the Itasca County Soil and Water Conservation District lake watershed carrying capacity project. The project analyzed water quality impacts of several future development scenarios and educated local residents on the connection between land use choices and water quality. The project will support a carrying capacity-based reclassification of county lakes and changes in lakeshore zoning provisions.
- **Natural Resource Protection Ordinances, 1996-2005.** Jean has incorporated natural resource protection in zoning, subdivision, and traditional neighborhood design (TND) ordinances for Clay County, MN; Crow Wing County, MN; Linn County, IA; Rice County, MN; Itasca County, MN; Cook County, MN; Town of Farmington, WI; City of Mt. Horeb, WI; and the City of North Branch, MN. These ordinances include cluster/conservation subdivision districts, agricultural and forest protection districts, natural resource protection overlays, scenic protection districts, transfer of development rights (TDR), mixed-use districts, and defined urban service areas.
- **Model Sustainable Development Ordinances, 2000.** Jean authored the growth management ordinances section of *From Policy to Reality: Model Sustainable Development Ordinances* for the Minnesota State Planning Office. The model ordinances are used by local governments and include urban expansion districts, natural resource protection districts, transfer of development rights (TDR); and natural resource protection overlays.
- **Model Environmental Ordinances for Project NEMO, 2003.** Jean worked with the Minnesota Dept. of Natural Resources and the Minnesota Erosion Control Association to create model stormwater, erosion control, shoreland and subdivision ordinances to protect water quality. The ordinances contain options for rural and urban communities and communities with high to low levels of administrative staffing. The project includes a PowerPoint™ slide presentation to expand the Non-Point Education for Municipal Officials (NEMO) series.

Deborah L. Swackhamer

TOPICS: Core Management Team, Water

Education:

1976 A.B. in Chemistry, Grinnell College, Grinnell, IA

1981, M.S. in Water Chemistry, University of Wisconsin, Madison, WI

1985, Ph.D. in Oceanography and Limnology, University of Wisconsin, Madison, WI

Positions:

- 3-85 to 11-86 Postdoctoral Research Associate, School of Public & Environmental Affairs, Dept of Chemistry, Indiana University, Bloomington, IN.
- 12-86 to 6-92, Assistant Professor, Environmental and Occupational Health, School of Public Health, University of Minnesota, Minneapolis, MN.
- 7-92 to 7-00, Associate Professor, Environmental and Occupational Health, School of Public Health, University of Minnesota, Minneapolis, MN.
- 7-00 to present, Professor, Environmental Health Sciences, School of Public Health, University of Minnesota, Minneapolis, MN.
- 9-02 to 8-07, Research Scientist Associate, Division of Science and Collections, Science Museum of Minnesota, St. Paul, MN.
- 9-03 to present, Co-Director, Water Resources Center, University of Minnesota, St. Paul, MN.
- 10-06 to present, Interim Director, Institute on the Environment, University of Minnesota, Minneapolis, MN.

Interim Director, Institute on the Environment

*Professor, Environmental Health Sciences, School of Public Health
University of Minnesota*

Key Qualifications

Dr. Deborah L. Swackhamer is a Professor of Environmental Chemistry in the Division of Environmental Health Sciences in the School of Public Health, and serves as Co-Director of the Water Resources Center, at the University of Minnesota. She is currently on leave from this position, and serving as Interim Director of the University's new Institute of the Environment. She has studied the processes affecting the behavior and fate of persistent toxic chemicals such as PCBs, dioxins, and pesticides in large lakes for the past 20 years, including sediment accumulation, source determinations, water column processes, and foodweb bioaccumulation.

Her current research includes projects investigating the bioaccumulation, exposure and impacts of environmental estrogenic chemicals. Dr. Swackhamer currently sits on the Science Advisory Boards of the US Environmental Protection Agency, and the International Joint Commission of the US and Canada.

Selected Appointments

- 2000-present: Member, Science Advisory Board of the International Joint Commission of the US and Canada.
- 2003-present: Member, Science Advisory Board of the National Undersea Research Program for the North Atlantic and Great Lakes, NOAA.
- 2003-2004: Fellow, Academic Leadership Program of the Commission on Institutional Cooperation.
- 2003-present: Member, Science Advisory Board, US Environmental Protection Agency.
- 2005-present: North American Editor, *Journal of Environmental Monitoring*, published by the Royal Society of Chemistry.
- 2005-present: Member, Editorial Advisory Board, *Environmental Science & Technology*, published by the American Chemical Society.

Selected Grants (Current)

- “Hydrophobic Organic Contaminants in Lake Michigan Water”, Co-principal Investigator with Dr. Matt Simcik (PI), U.S. EPA Great Lakes National Program Office, 9/03 - 8/06, \$400,000.
- “Environmental Estrogens: Assessing their Identity and Exposure Pathways to Fish”, Principal Investigator, Minnesota Sea Grant Program, National Oceanic and Atmospheric Administration, 4/1/04-3/31/06, \$86,897.
- “Immunoaffinity: A Novel Approach for Identifying Biologically Active Environmental Estrogens in Great Lakes Coastal Estuaries”, Principal Investigator, Minnesota Sea Grant Program, National Oceanic and Atmospheric Administration, 7/05-6/07; \$75,444.
- “Estrogenic Compounds: Tracking the Generation and Partitioning in Wastewater Treatment Plants”, Co-investigator with Paige J. Novak (PI) and Michael J. Semmens, Legislative Commission on Minnesota Resources, 7/05-6/07, \$300,000.
- “Development of a Great Lakes Basin Screening Model for Emerging Chemicals”, Principal Investigator, Great Lakes Commission, 5/06-7/08, \$201,680.
- “Collaborative Research: Formation of Polyhalogenated Dioxins and Furans from Triclosan and PBDEs in Rivers”, Co-investigator with William Arnold (PI) and Kris McNeill, National Science Foundation, 5/06 – 5/08, \$260,000.

Selected Recent Publications

- Jabusch, T. W. and D. L. Swackhamer 2005. Partitioning of polychlorinated biphenyls in octanol/water, triolein/water, and membrane/water systems. *Chemosphere* 60(9): 1270-1278.
- Swackhamer, D.L. 2005. The past, present, and future of the North American Great Lakes: What lessons do they offer? *J. Environ. Monitor.* 7: 540-542.
- Borga, K., A.T. Fisk, B. Hargrave, P.F. Hoekstra, D.L. Swackhamer, and D.C.G. Muir. 2005. Bioaccumulation factors for PCBs revisited. *Environ. Sci. Technol.*, 39: 4523-4532.
- Muir, D., Bidleman, T.F., Swackhamer, D.L. 2005. Toxaphene in the Great Lakes. In: POPs in the Great Lakes, ACS Books, RA Hites, Ed, Washington, D.C.
- Hornbuckle, K., Carlson, D., Swackhamer, D.L. Baker, J., Eisenreich, S.J. 2005. PCBs in the Great Lakes. In: POPs in the Great Lakes, ACS Books, RA Hites, Ed. Washington, D.C.
- Hudson, M. J., D. L. Swackhamer, and J. B. Cotner. 2005. Effect of microbes on contaminant transfer in the Lake Superior food web. *Environ. Sci. Technol.*, 39(24): 9500-9508.
- Wammer, K., T. LaPara, K. McNeill, W. Arnold and D. L. Swackhamer. 2005. Changes in antibacterial activity of Triclosan and sulfa drugs due to photochemical transformations. *Environ. Toxicol. Chem.*, 25: 912-920.
- Carlson, D. L. and D. L. Swackhamer. 2006. Bioaccumulative contaminants in Great Lakes fish: Effects of intra- and inter-lake processes. *J. Great Lakes Res.* In press.
- Summer S. Streets, Scott A. Henderson, Amber D. Stoner, Daniel L. Carlson, Matt F. Simcik, and Deborah L. Swackhamer. 2006. Partitioning and Bioaccumulation of PBDEs and PCBs in Lake Michigan. *Environ. Sci. Technol.* In press.

Anne R. Kapuscinski

TOPICS: Core Management Team

Education:

Oregon State University, Fisheries, Ph.D. 1984

Oregon State University, Fisheries, M.S. 1980 (Minor in Water Resources)

Weyerhaeuser Company, Aquaculture Research Technician, 1976-77

Swarthmore College, Biology, B.A. 1976

Positions:

University of Minnesota

- Professor, Dept of Fisheries, Wildlife and Conservation Biology, since 1994 (Associate Professor, 1989-1994, Assistant Professor 1984-1989).
- Graduate faculties in: Conservation Biology; Science, Technology and Environmental Policy; and Fisheries.
- Sea Grant Extension Specialist (environment and aquaculture), since 1984.
- Co-leader, Ecosystem Science and Sustainability Initiative, since 2004.
- Director, Institute for Social, Economic, and Ecological Sustainability (ISEES), since 1996.
- Associate Director, MacArthur Interdisciplinary Program on Global Change, Sustainability, and Justice, 1995-2005.

Oregon State University

- Fish Genetics Research Assistant / Aquaculture Instructor, 1981-1984.
- Project leader, experimental chum salmon hatchery, 1980-1983.
- Aquaculture Instructor/Project Leader, 1980-81 Salmon Culture Research Assistant, 1977-1980.

*Department of Fisheries, Wildlife and Conservation Biology
College of Food, Agriculture and Natural Resources Sciences
University of Minnesota*

Key Qualifications

Dr. Kapuscinski is Professor of Fisheries and Conservation Biology and co-leads the Ecosystem Science and Sustainability Initiative funded by the Bush Foundation. She has broad expertise on how technologies from dams to fish hatcheries to genetic engineering affect fish conservation and is active in analysis and formulation of policies fostering sustainability of aquatic biodiversity. She holds a Pew Marine Conservation Fellowship, the world's preeminent marine conservation award, has advised three past Secretaries of Agriculture and serves on advisory committees to the FDA and various agencies of the United Nations.

Selected Grants

- Reproductive success and survival comparisons of hatchery and wild Lake Superior steelhead. Minnesota. Sea Grant, 2003-2006.
- Environmental assessment tool for private aquaculture in the Great Lakes Basin. Great Lakes Fishery Commission, 2000 -2001.
- Improved decisions for walleye stocking. Legislative Commission on Minnesota Resources, 1997-99.
- Minnesota rare mussel conservation and the fish connection. Legislative Commission on Natural Resources, 1997-99.
- Model management program for oversight of private aquaculture in the Great Lakes Basin. Great Lakes Fishery Commission, 1997-99.

Selected Appointments

- National Academy of Science, Committee on Atlantic Salmon of Maine, 2001-2004.
- MN Department of Natural Resources, Citizens Advisory Committee on the Future of Minnesota's Fishing, Hunting, and Trapping Heritage, 1997-98.
- Great Lakes Fishery Commission, Board of Technical Experts, 1994-1999.
- Chair, MN Governor's Task Force on Aquaculture, 1987. Aquaculture Advisory Committee, 1988-1990.

Other Relevant Activities

- U.S. Congress, Three invited testimonies on fisheries issues, 1993 and 2000.
- Great Lakes Fishery Commission, Board of Technical Experts, 1994–1999.
- Minnesota Legislature. Eight presentations to Environment or Agriculture Committees, 1987-94.
- Minnesota Environmental Quality Board. Five presentations, 1991-1992.

Selected Publications:

- Bartley, D. and A. R. **Kapuscinski**. 2006. What makes fishery enhancements responsible? Proceedings of the Fourth World Fisheries Congress, May 2-6, 2004. Volume X: in press.
- Laikre, L., L.M. Miller, A. Palmé, S. Palm, A.R. **Kapuscinski**, G. Thoreson and N. Ryman. 2005. Spatial genetic structure of northern pike (*Esox lucius*) in the Baltic Sea. *Molecular Ecology* 14(7): 1955-1964.
- Kapuscinski**, A.R. and T. J. Patroski. 2005. Genetic methods for biological control of non-native fish in the Gila River Basin. Contract report to the US Fish and Wildlife Service. University of Minnesota, Institute For Social Economic And Ecological Sustainability. MN Sea Grant Publication F 20. 100 p. Available at www.seagrants.umn.edu
- Miller, L.M., T Close and AR **Kapuscinski**. 2004. Lower fitness of hatchery and hybrid rainbow trout compared to naturalized populations in Lake Superior tributaries. *Molecular Ecology* 13: 3379-3388.
- Scientific and Technical Advisory Panel (STAP) of the Global Environment Facility (GEF) (**Kapuscinski** one of 15 co-authors). 2004. A conceptual design tool for exploiting the interlinkages between the focal areas of the GEF (land degradation, persistent organic pollutants, biodiversity, global change). STAP Secretariat, Washington D.C. 47 pp.
- Ardren, W. R. and A. R. **Kapuscinski**. 2003. Demographic and genetic estimates of effective population size (N_e) reveals genetic compensation in steelhead trout. *Molecular Ecology* 12: 35-49.
- Eldridge, W. H., M.D. Bacigalupi, I.R. Adelman, L.M. Miller, and A. R. **Kapuscinski**. 2002. Determination of relative survival of two stocked walleye populations and resident natural-origin fish by microsatellite DNA parentage assignment. *Canadian Journal of Fisheries and Aquatic Sciences* 59:282-290.

Lance M. Neckar

TOPICS: Core Management Team Land

*Department of Landscape Architecture
Dayton Hudson Land Grant Chair Urban Design*

Education

Harvard University, Graduate School of Design, M.L.A, 1981

University of Wisconsin, M.A.L.A, 1981

Cornell College, B.A. 1969

Positions

University of Minnesota

- 2006-present, Dayton Hudson Land Grant Chair, Urban Design.
- 1998-2006, Associate Dean, College of Architecture and Landscape Architecture and Professor, Department of Landscape Architecture.
- 1997-98, Professor, Department of Landscape Architecture.
- 1994-97, Associate Professor, Department of Landscape Architecture.
- 1994, Acting Head, Director of Graduate Studies, and Associate Professor Department of Landscape Architecture.
- 1991-94, Director of Graduate Studies and Associate Professor, Department of Landscape Architecture.
- 1986-91, Assistant Professor, Landscape Architecture Program and present Department of Landscape Architecture.

Key Qualifications

Professor Neckar is a professor of landscape architecture responsible for all or portions of over \$2 million of funded applied research on the relationships between urban development and the sustainability of water and other resources. His current teaching focuses on sustainable infrastructure. He also brings over 20 years of experience as a registered landscape architect with several award-winning urban design projects.

Selected Grants

- Co-Principal Investigator. Community Enhancement Through Well-Designed Transportation Projects, Federal Highway Administration, (FHWA), with the Center for Transportation Studies with the American Institute of Architects (AIA), \$1 million grant to the University of Minnesota of \$1.6 total project. Robert Johns, Principal Investigator, 2006
- Principal Investigator. Transportation and Regional Growth Study, Report 13: Transportation, Urban Design & Environment, Highway 561/Red Rock Corridor, University of Minnesota, Center for Transportation Studies, \$170,000. 1999-2003.
- Co-Principal Investigator. Organic Infrastructure and City Rebuilding: Central Corridor, St. Paul, Legislative Commission on Minnesota Resources, with Mary Vogel, principal investigator, \$400,000 grant, 1998

Selected Awards

- Merit Award, MASLA Station Urban Design Issues: A Study of Hastings, Minnesota, 2003
- Roy Jones Distinguished Research Award, College of Architecture and Landscape Architecture, 2001
- Committee on the Urban Environment Award, University of Minnesota Preservation Plan, Minneapolis, 1999
- National Environmental Award, Boys and Girls Club, Sackett Park Teen Project, with Deborah Karasov, Kinji Akagawa, Seitu Jones, Boys and Girls Club of St. Paul, 1996

- Honor Award, MASLA, Sustaining the Spirit of the Avenue, Strategic Plan for Hennepin Avenue, with Martin & Pitz, Mary Vogel and Edwards & Kelcey, 1995
- Committee on the Urban Environment (CUE) Award, Sustaining the Spirit of the Avenue, Strategic Plan for Hennepin Avenue, with Martin & Pitz, Mary Vogel and Edwards & Kelcey, 1995
- Honor Award, Minnesota Chapter of American Society of Landscape Architects, An Interpretive Plan for Downtown Menomonie, Wisconsin, 1993
- Ralph Rapson Distinguished Teaching Award, College of Architecture and Landscape Architecture, 1992.

Recent Relevant Activities and Presentations

Over 30 presentations from 1998 to the present to various professional and citizen constituencies of the findings relative to the relationship between stormwater runoff and urban design best practices related to transit-oriented development in the Transportation and Regional Growth Study, Report 13: Transportation, Urban Design & Environment, Highway 561/Red Rock Corridor, sponsored by the Center for Transportation Studies.

Selected Publications:

Neckar, L. Sustaining Spectacle, *there*, College of Architecture and Landscape Architecture, University of Minnesota, 1:1, 2005

Neckar, Lance M. Transportation and Regional Growth Study, Report 13: Transportation, Urban Design & Environment, Highway 561/Red Rock Corridor, University of Minnesota, Center for Transportation Studies, 2003

Vogel, Mary and Lance Neckar. Organic Infrastructure and City Rebuilding: Central Corridor, St. Paul, Legislative Commission on Minnesota Resources/University of Minnesota Department of Landscape Architecture, 2000

Neckar, L., David Pitt, Robert Sykes.. Green Infrastructure as a Means to Civic Space. Proceedings of the American Society of Landscape Architects National Conference, 1997

Sykes, Robert, Lance Neckar, Mary Vogel. Preventing Stormwater Runoff Problems with Land Design, Legislative Commission for Minnesota Resources/University of Minnesota Department of Landscape Architecture, 1997



John Shardlow, AICP

Topics: Core Management Team

Planner

Education:

B.S. Landscape Architecture,
University of Minnesota

Mr. Shardlow has extensive and wide ranging project experience serving clients in both the public and private sectors. He has frequently been called upon to lead multi-disciplinary teams of consultants in completing large, complicated planning projects. His skills include comprehensive and community planning; project planning for residential, commercial, industrial, and institutional developments; and preparation of redevelopment plans, tax-increment financing plans, subdivision regulations, and environmental assessments.

He also frequently provides expert testimony on matters related to planning.

Project Experience

- Planning Consultant for the City of Burnsville and many others throughout Minnesota, responsible for a wide range of planning, zoning and development issues, including the award winning Burnsville Heart of the City project, all of the comprehensive planning, zoning, environmental review and testimony associated with the Black Dog Amphitheater.
- St. Cloud Area Joint Planning District Plan. Principal in charge of the landmark St. Cloud regional plan that resulted in a joint plan for the five cities and three counties surrounding St. Cloud.
- Primary author of "The High Cost of Sprawl: Urban Land Supply Analysis and Recommendations for Managing Growth", prepared for the Builders Association of the Twin Cities. Continuing efforts on behalf of the Builders Association in regard to future growth options for the Twin Cities, and expansion of the MUSA.
- NW Quadrant Redevelopment Project, City of St. Anthony Village. Principal in charge of this "smart growth" Twin Cities project. This is the first of the opportunity sites to be completed and it is the only one currently proceeding into the development stage.
- Project Manager for St. Cloud Comprehensive Plan which emphasized growth management, natural resource conservation, orderly extension of utilities,

coordination of multiple jurisdictions, and land use policies. Recipient of MnAPA Distinguished Planning Project Award, 1996.

- Twin Cities Army Ammunition Property. Led a team of consultants through the initial master planning stages for the largest undeveloped site in Ramsey County. This superfund site is being remediated and planned to accommodate a new sustainable, mixed use, transit oriented neighborhood in Arden Hills, Minnesota.
- Master Development Coordinator for Roseville School District 623. Infill development of a 78-acre site originally purchased for school use, but under development as 60 townhouses and 79 single family residences. Coordination of planning, design, environmental clean-up, construction, builder team, and project marketing.
- Gravel Mining Area Master Plan, Maple Grove. Project Manager responsible for coordinating a multi-disciplinary team in the preparation of a master plan and an Alternative Urban Areawide Review (AUAR) to guide the development of the 2,000 acre gravel mining area in Maple Grove. Project consists of 3.5 million square feet of commercial, 12.5 million square feet office industrial and over 5,000 housing units. Responsible for all environmental review, comprehensive planning, state and county approvals and permits, and designing and implementing the City's development review and approval process.
- Received the 2006 award of distinction from the Minnesota Chapter of the American Planning Association for an innovative community participation process called the Twin Lakes Stakeholder's Advisory Panel.
- Co-authored the Regional Conservation Design Framework for the greater 13 County Twin Cities metropolitan area and worked through the Minnesota Chapter of the Urban Land Institute to get it unanimously adopted by the Regional Council of Mayors.
- He served as part of the committee that wrote the White Papers in support of the Envision Minnesota Campaign.
- He is currently facilitating a major multi-jurisdictional visioning effort to guide the Dakota County comprehensive planning process. The process seeks to incorporate sustainability and a conservation ethic into all future decision making in the County.

Mr. Shardlow is also a faculty member of the Government Training Service, leading seminars in comprehensive planning, planned unit development, and advanced planning techniques. He is a member of the American Institute of Certified Planners, the American Planning Association, Minnesota Planning Association, and past president of the Minnesota chapter of the Community Association Institute.

He is a past President of the Sensible Land Use Coalition. He currently serves as the Chair of the Minnesota Chapter of the Urban Land Institute (ULI). At the National level, he is a member of the Sustainable Development Council of ULI National.

Paul J. Bockenstedt

TOPICS: Core Management Team

Senior Ecologist

Education:

University of Northern Iowa
M.A. Biology — 2002

University of Dubuque
B.S. Environmental Sciences —
1989

Professional Organizations:

- MN Regional Greenways Collaborative Committee Member
- Society for Ecological Restoration
- Natural Areas Association
- Illinois Native Plant Society
- Minnesota Native Plant Society
- Wetland Delineators Association, MN
- Iowa Native Plant Society
- Iowa Prairie Network

Panels/Committees:

Expert Botanist to determine
Coefficients of Conservatism (CoC)
for Wetland Flora of Minnesota

Minnesota Regional Greenways
Collaborative – Natural Resources
Management Committee

Training:

Calcareous Fens of SE MN, 2004
Technical Workshop — MN DNR

Plants for Stormwater Design 2003
— MECA/MPCA

Iowa *Carex* Workshop, 2002 —
Iowa State University

Carex of NW/NC Minnesota:
Taxonomy and Ecology, 2002 —
Bemidji State University

Riparian Management, 2001 —
Iowa State University

Mr. Bockenstedt is a Senior Ecologist on Bonestroo's Natural Resources Team. Paul has worked in the natural resource field since 1983 and, before joining Bonestroo, worked at the Minnesota DNR. At Bonestroo, Paul inventories, monitors, manages, and plans for natural areas across the Upper Midwest. He also provides public and professional education and training on a variety of natural resource-related topics.

Natural Resources Planning

- **Greenway/Conservation Corridor/Trails Plans**
 - Blue Earth County Conservation Corridors/Greenways Plan
 - Blaine Greenways & Trails Plan
 - Cedar Creek Greenway Corridor Anoka County
- **Natural Areas Inventories/Planning**
 - For cities, counties, DNRs, and watersheds, totaling over 1,000 square miles in Minnesota, Iowa and Wisconsin
- **Master Park & Natural Resource Planning**
 - For over 25 communities and counties in Minnesota and Iowa
- **Natural Resource Management Plans**
 - Over 75 plans created throughout Minnesota and Iowa for private and public lands, public agencies and non-profits
- **Wetland Inventories & Management Plans**
 - For over 20 communities & watersheds in Minnesota
- **Conservation Development & Low Impact Development**
 - Numerous sites in central and southern Minnesota
 - Environmental Review
 - Alternative Urban Areawide Review (AUAR)
 - Environmental Assessment Worksheet
 - Biological assessments
- **Transportation**
 - Olmsted County Natural Resource Corridors/CIP Bridge Replacement Plan
 - Dodge County Roadside Prairie Inventory/Management
 - Comprehensive biological surveys
 - Threatened & Endangered species searches

Inventory and Management of Natural Areas

- **Blue Earth County** — County-wide Conservation Corridors/ Greenways Plan (GIS Modeling and stakeholder facilitation).
- **MN DNR State Parks Natural Community Inventories, Prairie Stewardship Planning Assistance, and Wildlife Management Area inventories** throughout Minnesota.
- **Iowa DNR** — Crossman Prairie State Preserve 2003; Wapsipinicon River Corridor Botanical Survey, Clinton and Scott Counties 2002.
- **Goodhue County, MN** — Project manager, public meeting facilitation, and primary plant ecologist for countywide inventory of natural communities, rare plants, and sensitive resources.
- **Minnesota Land Cover Classification System** — Mapping and natural areas inventories of over 400 square miles, for more than 25 communities in Minnesota.

Iowa Ecotype Project

Paul was the project coordinator/manager for almost four years for this statewide Iowa project designed to increase the amount of commercially available native seed stock while preserving the genetic diversity of wild local populations (ecotypes). Included coordination and stakeholder meetings with multiple State and Federal agencies, including IA DOT, NRCS, Iowa Crop Improvement Association, Office for Integrated Roadside Vegetation Management, and others.

Relevant Presentations

- “Using Natural Resources Inventory Data in Conservation Development Design,” Urban Land Institute *Conservation Design: From Curiosity to Convention* Workshop; June 2006.
- “Finding and Using Natural Resource Data,” MNDNR/MetCouncil *Growing Green* Workshops (6); May-June 2006.
- “Natural Areas in Local Park Systems: Meeting the Challenge of Special Management Needs and Approaches”, MN Recreation & Parks Association Natural Resources Workshop; September 2005.
- “Natural Resources Inventory Provides Vital Information for Community Planning in Goodhue County, MN”, Long-term Management and Restoration of Hillslope Calcareous Fens Forum; April 2005.
- “Utilizing the Minnesota Land Cover Classification System (MLCCS) for Natural Areas Management and Protection at the Local Government Level”, 30th Natural Areas Conference; September, 2003.
- “Goodhue County Natural Community Inventory”, Keeping Nature in Your Community: Ecosystem Based Processes MN DNR Workshop; March 1999.

Recent Publications

- The Tallgrass Prairie Seedling & Seeding Evaluation Guide. 135-page full color guide Funded by LCMR, MN DNR, IA DOT, IA DNR, Pheasants Forever, Quail Forever, et al. August 2006.
- Floristic Survey of Lyle-Austin Wildlife Management Area, Mower County, Minnesota. Proceedings of the 19th North American Prairie Conference. June 2006

Elizabeth R. Gould

TOPICS: Core Management Team

Botanist/Plant Ecologist

Education:

University of Minnesota, Bachelor of Science – Botany/Plant Ecology, 1997

Professional Organizations:

- Minnesota Native Plant Society
- Society for Ecological Restoration
- Wisconsin Wetlands Association
- Wetland Delineators Association
- Vegetation Management Association of Minnesota
- Iowa Native Plant Society
- Prairie Enthusiasts

Training:

ArcVIEW 3.x, 2001

ArcGIS 9.x, 2006

Microsoft Access, 2003

MnRAM for Wetland Assessment, version 3.0, 2003

1987 COE Manual Wetland Delineation Training, MN Board of Water and Soil Resources, 2001

MLCCS Training, MN DNR 2002

Minnesota Asters and Goldenrods: Maplewood Nature Center, 2001

Iowa *Carex* Workshop, 2002- Iowa State University

Carex of North-western & North-central Minnesota, 2002—Bemidji State University

Grasses of Minnesota's Northern Forests and Prairies. 2003—Bemidji State University

Ms. Gould joined Bonestroo's Water and Natural Resources Group in 2001, with experience in natural resource inventories and plant taxonomy. She has worked as an ecologist in the private sector; in a laboratory specializing in environmental and restoration research; and as a natural history educator. Her past experience also includes technical writing and editing, where she worked to synthesize complex concepts into accessible language. At Bonestroo, Liza specializes in natural resource inventories, wetland plans, rare species work, Minnesota Land Cover Classification System (MLCCS) mapping, and related GIS/mapping/planning projects. She has a special interest in working with communities to help them use and implement the information generated during natural resource inventories.

Natural Resource Inventories and MLCCS Mapping

Liza uses her skills in GIS and plant ecology to conduct natural resource inventories and rare plant surveys in the major Minnesota vegetation communities including prairie, boreal forest and deciduous forest. She has managed and/or served as the lead ecologist on comprehensive natural resource inventories and MLCCS mapping projects on over 400 square miles of land in Minnesota, and has completed numerous additional inventory projects. Some examples of her recent work include:

- **Northfield, MN** – Natural Resource Inventory & MLCCS mapping.
- **Elk River, MN** – Natural Resource Inventory & MLCCS mapping.
- **Prior Lake, MN**—Combined Natural Resource Inventory & MLCCS mapping, with a wetlands function and value assessment.
- **Mn DNR--State Park Inventories and Management Plans** For Afton, Sakatah Lake, Nerstrand Big Woods, and Rice Lake State Parks.
- **Hennepin County**— Natural Resource Inventory and MLCCS mapping for 6 Townships/20 Cities in Hennepin County.
- **Elko-New Market Township, Scott County MN** – Natural Resources Inventory and MLCCS Mapping.

- **City of Roseville, MN** – Natural Resources Inventory and MLCCS Mapping.
- **Marine on St. Croix, MN** – Mill Stream Natural Resource Inventory for the Mill Stream WMO*.

Rare Plant Surveys

- Stone Bridge Development—Tuberclad Rein Orchid Survey.
- Metropolitan Council – Botanical and small mammal survey for Hastings Wastewater Treatment Plant Site.
- Trunk Highway 38 Improvement Project between Grand Rapids and Effie – Rare species search & relocation project and wetland delineation.
- Great Lakes Gas Transmission Line 2001 and 2002 recoat projects-Rare species search, Chequamegon National Forest.
- Wealthwood Estates, Mille Lacs, MN – Rare plant search .

Natural Resource Management Plans and Natural Area Restoration

- **Corcoran, MN**—Sari Woods management Plan.
- **Maplewood, MN** – Beaver Creek Corridor: Natural Resource Inventory and Management Plan, with MLCCS coverage, as part of the requirements for a DNR Conservation Easement.
- **Kingswood Camp** – Natural Resource Inventory and Management Plan, completed as part of a DNR conservation easement.
- **Hasenbank Woods** – On the ground restoration services.
- For private landowners in southern and eastern Minnesota - Prairie Stewardship Planning Assistance.

ArcView/GIS

Liza uses her knowledge of GIS to create maps and perform comprehensive data analysis for a variety of wetland and upland natural resource and MLCCS projects.

Wetland Inventories and Delineations

Liza has experience in wetland inventories, functions and value assessments, and delineations, including evaluating hydrology, soils, vegetation, habitat value, and restoration potential for various wetland communities using MnRam methodology. She recently developed a protocol for converting MnRam wetland types to MLCCS cover classes. She has recently conducted inventories for the nearly a dozen communities, and has completed several hundred wetland inventories.

* *while employed by others*

Matt F. Simcik

TOPICS: Air Team

Education:

Doctor of Philosophy,
Environmental Science, Rutgers
University, January 1998

Master of Science, Civil Engineering,
University of Minnesota, December
1994

Bachelor of Science, Chemistry,
Michigan State University, June 1992

Positions:

University of Minnesota

- Associate Professor, Division of Environmental Health Sciences, School of Public Health, since 2006 (Assistant Professor 1999-2006).

- Graduate faculties in: Water Resource Sciences, Civil Engineering,

Indiana University

- Post-Doctoral Fellow, School of Public and Environmental Affairs and Department of Chemistry.

Rutgers, the State University of New Jersey

- Research Assistant, Environmental Science Department, 1996-1997.
- Teaching Assistant, Environmental Science Department, 1996.

University of Minnesota

- Research Assistant, Civil Engineering, 1992-1995.

*Division of Environmental Health Sciences
School of Public Health
University of Minnesota*

Key Qualifications

Dr. Simcik is an Associate Professor of Environmental Health Sciences. He has broad expertise on air toxics and their interactions with aquatic and terrestrial systems.

Selected Grants

- Hydrophobic Organic Contaminants in Lake Michigan Water, USEPA, 2003-2007.
- Chemical Inventory and Database Development for Recycled Material Substitutes, University of Minnesota, Center for Transportation Studies, 2003-2005.
- Development and Evaluation of Chemical Indicators for Monitoring Ecological Risk, USEPA, 2001-2005.
- Fluorochemicals in Minnesota Waters: An Emerging Environmental Issue, USGS/Water Resources Center, 2002.

Honors and Awards

- Member, Delta Omega Honorary Society in Public Health, 2006.
- President, International Association of Great Lakes Research, 2006 – present.
- Member, Board of Directors, International Association of Great Lakes Research, 2004 – present.
- Member, Board of Directors, Midwest Chapter of Society of Environmental Toxicology and Chemistry, 2003 -2006
- Excellence in Review Award, Environmental Science & Technology, 2003.
- Camille and Henry Dreyfus Post-Doctoral Fellowship, Indiana University, 1997 -1999.

Other Relevant Activities

- Member, Scientific and Program Committee, 4th International Symposium on Environmental Monitoring, Jeju, South Korea, 2002.
- Human Risk Panel Member, Leech Lake Band of Ojibwe, May 13-15, 2002.
- Ecological Risk Panel Member, Leech Lake Band of Ojibwe, May 13-15, 2002.

- Invited speaker, National Park Service Air Toxics Workshop, Seattle, WA – NOAA, Sand Point, WA June 26, 2001.
- Invited participant, “Using Models to Develop Air Toxics Reduction Strategies: Lake Michigan as a Test Case” Joint Workshop Milwaukee, WI, in November, 8-9, 2000.

Selected Publications:

Matt F. Simcik and Kelly J. Dorweiler, A Ratio of Perfluorochemical Concentrations as a Tracer of Atmospheric Deposition to Surface Waters, *Environmental Science & Technology* 39:8678-8683 2005.

Matt F. Simcik, Global Transport and Fate of Perfluorochemicals, *Journal of Environmental Monitoring* 7:759-763 2005.

John Offenberg, Matt Simcik, Joel Baker and Steven J. Eisenreich. The Impact of Urban Areas on the Deposition of Air Toxics to Adjacent Surface Waters: A Mass Budget of PCBs in Lake Michigan in 1994. *Aquatic Sciences* 67:79-85 2005.

Matt F. Simcik, Air monitoring of persistent organic pollutants in the Great Lakes: IADN vs. AEOLOS. *Environmental Monitoring and Assessment*, 100:201-216 2005.

Matt F. Simcik, The importance of surface adsorption on the washout of semivolatile organic compounds by rain. *Atmospheric Environment*, 38(3):491-501 2004.

Matt F. Simcik, Raymond M. Hoff, William M. J. Strachan, Clyde W. Sweet, Ilora Basu, Ronald A. Hites, Temporal Trends in Semi-volatile Organic Contaminant Concentrations in Great Lakes Precipitation. *Environmental Science & Technology*, 34: 361-367, 2000.

Matt F. Simcik, Thomas P. Franz, Huixiang Zhang, Paul J. Lioy, Steven J. Eisenreich, Source/Sink Relationships of PAHs and PCBs in the Chicago Atmosphere and Lake Michigan. *Atmospheric Environment*, 33: 5071-5079, 1999.

A. G. Carlton, B. J. Turpin, W. Johnson, B. Buckley, M. Simcik, S. Eisenreich, R. Porcja, Micro-Analytical Methods for Characterization of Personal Aerosol Exposures. *Aerosol Science and Technology*, 31, pp. 66-80 1999.

Matt F. Simcik, Ilora Basu, Clyde W. Sweet, Ronald A. Hites, Temperature Dependence and Temporal Trends of Polychlorinated Biphenyl Congeners in the Great Lakes Atmosphere. *Environmental Science & Technology*, 33, pp. 1991-1995 1999.

Guruthy Ramachandran

TOPICS: Core Management Team, Air

*Division of Environmental Health Sciences
School of Public Health, University of Minnesota*

Education:

Ph.D. Environmental Sciences and Engineering. University of North Carolina at Chapel Hill, Chapel Hill, NC. 1988-1993.

M.S. Environmental Engineering. Virginia Polytechnic Institute and State University, Blacksburg, VA. 1986-1988.

Bachelor of Technology, Electrical Engineering. Indian Institute of Technology, Bombay, India. 1982-1986

Positions:

University of Minnesota

- Professor. Division of Environmental and Occupational Health. June 2005- present.
- Associate Professor. Division of Environmental and Occupational Health. January 2000- June 2005.
- Assistant Professor. Division of Environmental and Occupational Health. December 1994- December 1999.
- Director, Industrial Hygiene Program, Division of Environmental and Occupational Health, July 2004-present.
- Co-Director, Industrial Hygiene Program, Division of Environmental and Occupational Health, April 2001-June 2004.
- University of North Carolina
- Postdoctoral Research Associate. Department of Environmental Sciences and Engineering. May 1993 - November 1994.

Key Qualifications

Dr. Ramachandran is Professor of Environmental Health Sciences. His expertise is in the areas of assessment of human exposures to aerosols and volatile organic compounds (VOCs) in ambient, residential and occupational environments, measurement techniques for these air contaminants, and policy issues related to urbanization, air pollution, and public health infrastructure. He has served on several study sections for the National Institutes of Health (NIH) and the National Institute for Occupational Safety and Health (NIOSH).

Selected Grants

- "Evaluating Oversight Mechanisms for Active Nanostructures and Nanosystems: Learning from Past Technologies in a Societal Context" NIRT, National Science Foundation, 09/01/2006 - 08/31/2008.
- "Respiratory Health Effects of Community Asbestos Exposure". Centers for Disease Control and Prevention, Agency for Toxic Substances and Disease Registry. 9/30/05-09/29/08.
- Longitudinal Variability in Allergen Exposure in Inner City Homes: Baseline Data and Low Cost Interventions Strategies", U.S. Housing and Urban Development, 01/01/04 - 01/01/06.
- "Diesel Aerosol Exposure", Health Effects Institute (HEI) grant, 5/1/99 - 4/30/00.
- "Hazardous Air Pollutant Mixtures: Measuring and Modeling Complex Exposure", U.S. EPA, 10/1/99 - 10/1/02.
- "Measurement and Source Apportionment of Human Exposures to Toxic Air Pollutants in the Minneapolis-St. Paul Metropolitan Area", USEPA STAR grant, 1996-1999.
- "School-based Study of Complex Environmental Exposures in Children", USEPA STAR Grant, 1997-2001.

Selected Appointments

- Editorial Board, Journal of Occupational and Environmental Hygiene, 2004-present.

- Grant Reviewer, NIOSH/CDC Study Section (SOH-1). 2004-present.
- Grant Reviewer, NIH Center for Scientific Review Special Emphasis Panel on Bioengineering Applications (ZRG1 SSS-3 02 S), 2001-2003.

Book and Book Chapters

- Published book, Occupational Exposure Assessment for Air Contaminants. CRC-Lewis Publishers. 2005.
- Adgate, J.L. and Ramachandran, G., “Probabilistic Models for characterizing aggregate and cumulative risk”. Chapter 6 in Environmental Health Risk Assessment. Eds. Robson, M.G., Toscano, W.A., Association of Schools of Public Health, 2007.
- Logan, P.W. and Ramachandran, G., “Bayesian Decision Analysis for Industrial Hygiene”. A Strategy for Assessing and Managing Occupational Exposures, 3rd Edition. American Industrial Hygiene Association, 2007.

Selected Publications:

- Ramachandran, G., Adgate, J.L., Banerjee, S., Church, T.R., Jones, D., Sexton, K. “Indoor Air Quality in Two Urban Elementary Schools—Measurements of Airborne Fungi, Carpet Allergens, CO₂, Temperature, and Relative Humidity ” *Journal of Occupational and Environmental Hygiene*. 2: 553–566, 2005.
- Ramachandran, G., Watts, W.F., Kittelson, D. “Mass, surface area, and number metric in diesel occupational exposure assessment” . *Journal of Environmental Monitoring*. 2005, 7(7), 728 – 735.
- Rechkemmer, P., Ramachandran, G., Pai, P., Maynard, A. “Women’s personal and indoor exposures to PM_{2.5} in Mysore, India: Impact of domestic fuel usage” , *Atmospheric Environment*, 39:5500-5508, 2005.
- Ramachandran, G., Adgate, J.L., Pratt, G.C., and Sexton, K. “Characterizing indoor and outdoor 15-minute average PM_{2.5} concentrations in urban neighborhoods” , *Aerosol Science and Technology*, 37:33-45, 2003.
- Ramachandran, G., and Watts, W.F. “Statistical comparison of diesel particulate matter measurement methods” , *American Industrial Hygiene Association Journal*, 64:329-337, 2003.
- Adgate, J.L., Ramachandran, G., Pratt, G. C., Waller, L. A., and Sexton, K. “Longitudinal variability in outdoor, indoor, and personal PM_{2.5} exposure in healthy non-smoking adults” , *Atmospheric Environment*, 37:993-1002, 2003.
- Sexton, K., Adgate, J.L., Ramachandran, G., Pratt, G.C., Mongin, S.J., Stock, T.H., Morandi, M.T., “Comparison of personal, indoor, and outdoor exposures to hazardous air pollutants in three urban communities” , *Environmental Science and Technology*, 38:423-430, 2003.
- Adgate, J.L., Ramachandran, G., Pratt, G.C., Waller, L.A., and Sexton, K. “Spatial and temporal variability in outdoor, indoor, and personal PM_{2.5} exposure” , *Atmospheric Environment*, 36: 3255-3265, 2002.

Peter B. Reich

Topics: Land

Education:

Ph.D. (1983) Environmental Biology and Plant Ecology, Cornell University, Ithaca, NY

M.S. (1977) Forest Ecology, University of Missouri, Columbia, MO

B.A. (1974) Writing and Physics, Goddard College, Plainfield, VT

Positions:

- F.B. Hubachek, Sr., Professor, Dept Forest Resources, U. Minnesota, St. Paul, MN, 1991-present
- Assistant /Associate Professor, Dept Forestry, U. Wisconsin, Madison, WI, 1985-1991.
- Postdoctoral Associate, Boyce Thompson Institute; Ithaca, NY, 1982-1985.

Department of Forest Resources

College of Food, Agriculture and Natural Resources Sciences

University of Minnesota

Key Qualifications

Reich is Professor and F.B. Hubachek, Sr. Chair in Forest Ecology and Tree Physiology in the Department of Forest Resources, as well as a Distinguished McKnight University Professor. He co-leads the Ecosystem Science and Sustainability Initiative funded by the Bush Foundation. His research focuses on the impacts of global environmental change on terrestrial ecosystems. This includes effects of climate change, rising atmospheric carbon dioxide, management, and fire on health, biodiversity, and sustainability of forest and grassland ecosystems, both in Minnesota and globally. He has served on numerous editorial boards, as well as advised Minnesota and federal agencies on environmental issues.

Synergistic Activities, Honors, Recognition, and Service (selected recent)

- Invited speaker at more than 100 national/international symposium, research conferences, and university seminars; e.g., selected 2004-2006, Carnegie Institute of Washington at Stanford University; Duke University; Pennsylvania State University; Princeton University; Gordon Research Conference, Metabolic Basis of Ecology; University of Massachusetts Symposium on Plant Biology.
- U.S. GAO/National Academy of Sciences Workshop on Climate Change Effects on Federal Lands, November 2006, Washington, D.C.
- Department of Energy, National Institute on Climate Change Research, Midwestern Regional Panel, 2006.
- Institute for Scientific Information (ISI) Science Citation Index, One of Top 3 Papers in "Environment and Ecology" in the World, 2004-2006 (Wright, Reich, and GLOPNET, *Nature*, 2004).
- National Science Foundation, Biocomplexity and the Environment Program, Coupled Biogeochemical Cycles Panel member, 2004.
- Distinguished McKnight University Professorship, University of Minnesota, 2003- present.

- GLOPNET, Founder and co-leader, International Network of Global Plant Traits, 1998- present.
- Member of the Editorial Review Board (or equivalent) for the journals *Tree Physiology*, (1987-88, 1993-95,2004-) *Trees* (1991- 97), *Canadian Journal of Forest Research* (1992-98) and *Ecology/Ecological Monographs* (1995-99).
- Teaching- Dynamics of Global Change: Plant Ecology; Forest Ecology; Tree Physiology; Plant Physiological Ecology; Plant Responses to Air Pollution; Tropical Forest Ecology; Patch Dynamics Seminar; Climate Change Seminar.

Selected Grants

- USDA National Research Institute, "Managing for complex structure and wood productivity in Great Lakes pine ecosystems", 2006-2009 [B Palik, P Reich, R Montgomery, PIs], (\$400,000).
- National Science Foundation, Long-Term Ecological Research Program, " Biodiversity, Environmental Change and Ecosystem Functioning at the Prairie-Forest Border ", 2006- 2012 (D. Tilman, P. Reich and other co-PIs), \$4,920,000.
- National Institute for Climate Change Research, "Interactions of water, CO₂ and N in an experimental model system", 2006-2009 [P Reich PI], \$375,000.
- Bush Foundation, "University of Minnesota Ecosystem Science and Sustainability Initiative", 2004-2006 [A. Kapuscinski, P. Reich, D. Tilman, PIs], (\$700,000, 2006-09).
- National Science Foundation, Biocomplexity Program, "Interacting responses of C and N cycles to altered biodiversity, elevated CO₂, and N enrichment", 2003-2007 [P. Reich, S. Hobbie and others], \$1,800,000.
- U.S. Forest Service, "Functional responses to overstory retention and understory competition in red pine ecosystems", 2003-2007, [P. Reich]. \$169,000.
- National Science Foundation, Ecological and Evolutionary Physiology Program, " Natural Selection and Evolutionary Constraints in an Elevated CO₂ Environment", 2004- 2006, [P. Tiffin, P. Reich, R. Shaw, PIs], \$237,000.
- Wilderness Research Foundation, "Ecological Health and Change in Quetico-Superior forests", 2002- 2007 (P. Reich, PI), \$380,000.
- National Science Foundation, Ecology Program, "Ecological Consequences of Exotic Invaders: Interactions Involving European Earthworms and Native Plant Communities in Hardwood Forests", 2000-2004 (L. Frelich, P. Reich, PIs], \$318,000.
- National Science Foundation, Terrestrial Ecology and Global Change Program, "Forest change in a boreal transition region: productivity, nutrient cycling and biodiversity at multiple scales", 1995 - 98 (P. Reich, D. Grigal, P. Bolstad, M Bauer, PIs], \$428,000.

Selected publications (out of >250 in international peer-reviewed journals)

- Friedman, SK, PB Reich. 2005. Regional Legacies of Logging: Departure from Pre-settlement Forest Conditions in Northern Minnesota. *Ecological Applications* 15:726-744.
- Hale, C, L.E. Frelich, P.B. Reich. 2006. Changes in hardwood forest understory plant communities in response to European earthworm invasions. *Ecology* 87: 1637-1649
- Reich, PB , SE Hobbie, T Lee, DS Ellsworth, JB West, D Tilman, J Knops, S Naeem, J Trost. 2006. Nitrogen limitation constrains sustainability of ecosystem response to CO₂. *Nature* 440:922-925.
- Reich, P.B., P. Bakken, D. Carlson, S. Friedman, L. Frelich & D.F. Grigal,. 2001. Influence of logging, fire and forest type on biodiversity and productivity in southern boreal forests. *Ecology* 82: 2731-2748.
- Reich, P.B., D.A. Peterson, K. Wrage and D. Wedin. 2001. Fire and vegetation effects on productivity and nitrogen cycling across a forest-grassland continuum *Ecology* 82:1703-1719.

George E. Host

Topics: Land/Information Team

Education:

PhD, Forest Ecology, Michigan State University, East Lansing, Michigan. 1987

MS, Botany, Kent State University, Kent, Ohio. 1982

BS, Botany, Miami University, Oxford, Ohio. 1977

Positions:

- 2005 – Present, Graduate Faculty, Integrated Biosciences Program, University of Minnesota Duluth.
- 2003 – Present, Senior Research Associate and Director-Natural Resources Geographic Information System Laboratory. Natural Resources Research Institute, University of Minnesota Duluth.
- 2003 – Present, Senior Member, Water Resources Science Faculty, University of MN, St. Paul.
- 2001 – 2003, Senior Research Associate. Natural Resources Research Institute, University of Minnesota Duluth.
- 1989 – 2001, Biostatistician/Research Associate. Natural Resources Research Institute, University of Minnesota Duluth.
- 1991 – Present, Graduate Faculty, Department of Biology, University of Minnesota Duluth.
- 1987 – 1989, Research Plant Physiologist. North Central Forest Experiment Station, US Forest Service, Grand Rapids, MN.

*Center for Water and the Environment
Natural Resources Research Institute
University of Minnesota Duluth*

Key Qualifications

Dr. Host is a Senior Research Associate with the Natural Resources Research Institute and Director of the NRRI Geographic Information System Laboratory. His main areas of expertise are in computer simulation modeling and the applications of geographic information systems to landscape analysis and management.

His current work focuses on applying principles of landscape ecology to management of northern forests. In particular, he works with integrating ecological land classification systems in to management of public and private forest lands, and in developing management strategies that account for the spatial patterns of forest on the landscape.

He also works in the development of ecological indicators and identification of reference conditions, as well as in techniques to identify lands of high conservation value.

Selected Grants

- Development of environmental indicators of condition, integrity, and sustainability in the Great Lakes basin. US Environmental Protection Agency. Co-Principal Investigator. \$6,000,000.
- Protocols for selecting classification systems and reference conditions: a comparison of methods. US Environmental Protection Agency. Co-Principal Investigator. \$747,404.
- Development of sampling framework and key protocols for monitoring natural resources of the Great Lakes Network . National Park Service. Principal Investigator \$177,895.
- The Itasca Forest Legacy Project: Spatial Analysis for the Identification of Conservation Easement Sites. Blandin Foundation Principal Investigator. \$22,021.
- Aquatic and wetland ecosystem studies of a restored wild rice lake system. Fon du Lac Tribal Community College. Principal Investigator. \$96,000.

- Evaluation of DNR Aquatic Vegetation Surveys Data Summaries and Comparative Analysis. MN Department of Natural Resources. Co-Principal Investigator. \$50,000.
- Training water science technicians for the future - a national online curriculum using advanced technologies and real-time data. National Science Foundation. Co-Principal Investigator. \$600,000.

Selected Appointments

- MN Forest Resources Council Interagency Information Cooperative 1998-2000, 2005-2006
- MN Environmental Indicators Initiative Task Force 2000
- MN DNR Wildlife Resource Assessment Committee 2000
- MN Generic Environmental Impact Statement Implementation Strategy Roundtable (alternate) 1994-1995

Selected Publications:

Hollenhorst, T. P., **G. E. Host**, and L. B. Johnson. Scaling issues in mapping riparian zones with remote sensing data. 2006. In: (Wu, J., K.B. Jones, H. Li, and O.L. Loukes, eds) *Scaling and Uncertainty Analysis in Ecology: Methods and Applications*. Springer, p 271-291. *In Press*.

Johnson, L.B., **G. E. Host**, J. Olker, and C. Richards. 2006. . Landscape and local scale predictors of wood abundance in low-gradient streams. *American Fisheries Society Symposium 48:In Press*.

Host, G. E., J. Schuldt, J. J. Ciborowski, L. B. Johnson, T. Hollenhorst, and C. Richards. 2005. Use of GIS and remotely-sensed data for *a priori* identification of reference areas for Great Lakes coastal ecosystems. *International J. of Remote Sensing 26: 5325-5342*.

Danz, N. P., R. R. Regal, G. J. Niemi, V. Brady, T. Hollenhorst, L. B. Johnson, **G. E. Host**, J. M. Hanowski, C. A. Johnston, T. Brown, J. Kingston, and J. Kelly R. 2005. Environmentally stratified sampling design for the development of great lakes environmental indicators. *Environmental Monitoring & Assessment 102:41-65*.

Schomberg, J.D., **G.E. Host**, L.B. Johnson, and C. Richards. 2005. Evaluating the influence of landform, surficial geology and land use on streams using hydrologic simulation modeling. *Aquatic Sciences 67:393-548*.

Randy D. Neprash, PE

TOPICS: Water

Stormwater Regulatory Specialist

Education:

Ohio State University,
Columbus Bachelor of Civil
Engineering — 1992

Current Registration:

Minnesota

Mr. Neprash works as a project engineer, project manager, stormwater regulatory specialist, and hydrologist in Bonestroo's Water Resources Group. Randy is experienced in the following areas:

- Stormwater Regulations
- NPDES Permitting
- MS4 General Permit and Construction Activities Permit
- Surface Water Management Plans
- Hydrology Computer Modeling
- Construction Management and Inspection
- Flood Studies
- Public Education & Involvement
- Development Plan Reviews
- Site Development

NPDES Phase II – MS4 Permit

In the past three years, Randy Neprash has developed a unique set of skills and experience in the area of stormwater regulation in Minnesota. He is currently under contract as the technical/administrative consultant for the Minnesota Cities Stormwater Coalition (MCSC), an organization of more than 80 Minnesota cities regulated under the MS4 Permit. He has worked at multiple levels with all of the NPDES stormwater permitting programs implemented by the Minnesota Pollution Control Agency (MPCA). His depth of knowledge and experience with these new stormwater regulatory programs is unmatched in the consulting industry in Minnesota.

Randy has been involved in every stage of city and public involvement in developing the NPDES Phase II MS4 General Permit. He originated the concept for the League of Minnesota Cities (LMC) NPDES MS4 Guide Plan Project and led the effort to create and implement the Guide Plan for the mandatory MS4s. Since 2002, he has served as the technical advisor for the coalition of 119 MS4s (mostly cities) formed under the LMC. This work continues today with the Minnesota Cities Stormwater Coalition, also under the auspices of the LMC. He has represented cities on the Minnesota Stormwater Steering Committee since its inception.

Randy has served on the negotiating team for the LMC to develop nondegradation language for the revised MS4 General Permit. He prepared written comments for the LMC and the 30 nondegradation cities in response to the draft MS4 Permit released in February 2005. His comments were included as part of the LMC contested case hearing petition on this Permit. He also served on the four-person negotiating team for the LMC to work with the MPCA to revise the Permit draft language.

Randy is a recognized authority on current developments related to the MS4 Permit and the principles behind the Permit requirements. He speaks frequently to a wide range of types of audiences on these subjects.

NPDES Phase II – MS4 Permit & SWPPP Preparation for Cities

Randy has led Bonestroo's work to assist more than 20 cities with preparing Applications and SWPPPs for the NPDES MS4 Permit. He developed the template scope of work for the projects. He led a team of 10 people who worked with these cities to prepare their submittals for the March 10, 2003 deadline for the first round of mandatory MS4 cities. He is also serving as a technical advisor for the cities of Minneapolis and St. Paul, the only Phase I MS4s in Minnesota.

MPCA

Randy has worked closely with the MPCA in every stage of the public involvement in developing the NPDES Phase II MS4 General Permit. He attended the early stakeholder meetings and many of his written comments have been incorporated into the final version of the Permit. He was requested to serve on the planning group for stormwater track of the 2005 MPCA Air, Water, and Waste Environmental conference and is an invited speaker at the 2007 AWW Conference. Randy was one of only six parties invited by the MPCA to submit written comments on the draft Permit language on Outstanding Resource Value Waters.

Randy coordinated two major presentations on NPDES Phase II. One presentation was by invitation at the LMC Annual Conference in June 2002 for city decision-makers. The other was a half-day workshop for city staff offered by Bonestroo. At both of these workshops, representatives of the MPCA participated as speakers at Randy's invitation.

NPDES – Construction Activities Permit BATC/MPCA Construction Outreach Project

Randy is currently the project manager for an innovative partnership between construction industry professional organizations, led by the Builders Association of the Twin Cities (BATC), and the MPCA. The goals of this project include identifying and implementing new techniques and strategies to assist the construction industry in compliance with the NPDES Phase II Construction Activities Permit.

The project has developed a half-day training program, Stormwater Basics for Builders, designed for site superintendents and other industry personnel. The identification of additional strategies is based on Community-Based Social Marketing methodologies.

Mn/DOT Metro District – MS4 Permit Application & SWPPP

Randy was the project manager for the development of the MS4 Permit Application and SWPPP for the Mn/DOT Metro District. This SWPPP covered the most complex stormwater system in Minnesota and was designed to be implemented by a large bureaucratic structure. The SWPPP was developed through a multi-level approach that simultaneously involved both operational staff and upper-level management personnel.

Todd W. Arnold

TOPICS: Wildlife

Education:

University of Western Ontario,
Zoology, Ph.D. 1990

University of Missouri-Columbia,
Wildlife, M.S. 1986

University of Minnesota, Wildlife,
B.S. 1983

Positions:

University of Minnesota

- Associate Professor, Dept of Fisheries, Wildlife and Conservation Biology, since 2006 (Assistant Professor 2002-2006).
- Graduate faculties in: Wildlife Conservation; Conservation Biology; Water Resource Sciences.

Ducks Unlimited Canada

- Senior Scientist, Institute for Wetland and Waterfowl Research, 1999-2002.

Delta Waterfowl Foundation

- Scientific Director, 1997-1999.

Humboldt State University

- Assistant Professor, Wildlife Management, 1994-1997.
- Graduate faculty in Natural Resource Management (Wildlife).

*Department of Fisheries, Wildlife and Conservation Biology
College of Food, Agriculture and Natural Resources Sciences
University of Minnesota*

Key Qualifications

Dr. Arnold is an Associate Professor of Fisheries, Wildlife and Conservation Biology who specializes in waterfowl and other prairie- and wetland dependent wildlife. Before coming to the University of Minnesota he was Senior Scientist at Ducks Unlimited Canada's Institute for Wetland and Waterfowl Research, where he oversaw DU's research efforts on prairie-nesting waterfowl. He also served as Scientific Director of Delta Waterfowl Foundation, where he supervised and mentored a graduate research team drawn from over two dozen Canadian and American universities.

Selected Grants

- Effects of Competition and Predation on Survival of Mallard Ducklings. Delta Waterfowl Foundation, and UMN Grant-in-Aid of Research, Artistry and Scholarship, 2006-2007.
- Estimating Sightability for Waterfowl Pair and Brood Counts. Delta Waterfowl Foundation, and UMN Agriculture Experiment Station, 2006.
- Impact of Helminthic Parasites on Parental Body Condition and Chick Mortality in American Coots. Delta Waterfowl Foundation, American Museum of Natural History, and Dayton Research Fellowship, 2004-2005.
- Mallard Brood Movements and Habitat Selection, Ducks Unlimited Canada, 2002-2003.
- Prairie Habitat Joint Venture Assessment Study. Ducks Unlimited Canada, 2002.

Other Relevant Activities

- Invited speaker, Ducks in the Woods, Minnesota Forest and Wildlife Research Review, Duluth, 2006.
- Ecosystem Science and Sustainability Initiative, committee to develop a new undergraduate minor in Sustainability Studies, UMN, 2005-2006.
- Executive Board Member, Wild River Audubon, Chisago Co., 2005-2006.

- Habitat Needs of Migratory Waterfowl, a multi-agency (DU, DNR, USFWS, UMN) workshop to address waterfowl research and management needs in MN, 2005.
- Co-organized the MN Forest Waterfowl and Wetlands Symposium, Grand Rapids, 2003.
- Plenary lecture, Population Ecology of Prairie Nesting Ducks, 3rd North American Duck Symposium, Sacramento, 2003.
- Invited symposium speaker (2 talks), Science and Large-scale Conservation Planning for Northern Prairie Birds, The Wildlife Society 9th Annual Conference, Bismarck, 2002.

Selected Publications:

Carroll, LC, **TW Arnold**, and JA Beam. *In press*. Effects of rotational grazing on nesting ducks and wintering Sandhill Cranes. *Journal of Wildlife Management*.

Arnold, TW, LM Craig-Moore, LM Armstrong, DW Howerter, JH Devries, BL Joynt, RB Emery, and MG Anderson. *In press*. Waterfowl use of dense nesting cover in the Canadian Prairie Parklands. *Journal of Wildlife Management*.

Chouinard, MP, Jr. and **TW Arnold**. *In press*. Survival and habitat use of Mallard broods in the San Joaquin Valley, California. *Auk*.

Brasher, MG, **TW Arnold**, JH Devries, and RM Kaminski. 2006. Breeding-season survival of male and female mallards in Canada's prairie-parklands. *Journal of Wildlife Management* 70: 805-811.

Wells, AM, HH Prince, and **TW Arnold**. 2005. Incubation length in dabbling ducks. *Condor* 107: 928-931.

Martin, PA, **TW Arnold**, and RJ Forsyth. 2005. Use of agricultural fields by birds during canola planting in Saskatchewan: potential for exposure to pesticides. Canadian Wildlife Service Technical Report Series No. 358.

McPherson, R, **TW Arnold**, L Armstong, and CJ Schwartz. 2003. Estimating the number of nests initiated by radiomarked mallards. *Journal of Wildlife Management* 67:843-851.

Arnold, TW, MG Anderson, MD Sorenson, and RB Emery. 2002. Survival and philopatry of female redheads breeding in southwestern Manitoba. *Journal of Wildlife Management* 66: 162-169.

Arnold, TW, DW Howerter, JH Devries, MG Anderson, BL Joynt, and RB Emery. 2002. Continuous laying in mallards. *Auk*, 119: 261-266.

Artmann, MJ, IJ Ball, and **TW Arnold**. 2001. Influence of perennial upland cover on occupancy of nesting structures by mallards in northeastern North Dakota. *Wildlife Society Bulletin* 29:232-238.

Gerald J. Niemi

TOPICS: Wildlife

Education:

University of Minnesota, Biology, BS, 1974

University of Minnesota, Zoology, MS, 1977

Florida State University, Tallahassee, Biology, PhD, 1983

University of Helsinki, Ecology Pre-doctoral, Fulbright-Hays Scholarship 1981

Appointments:

- *Director:* Center for Water and the Environment, Natural Resources Research Institute, University of Minnesota Duluth, 1989-present.
- *Department Chairman:* Department of Biology, University of Minnesota Duluth, 1997-1998.
- *Professor:* Department of Biology, University of Minnesota Duluth, 1993 to present.
- *Associate Professor:* Department of Biology, University of Minnesota Duluth, 1989-1993.
- *Graduate Faculty Appointments:*
 - Biology (University of Minnesota Duluth), 1987 to present
 - Chemical Toxicology (UM), 1992 to present.
 - Conservation Biology Program (UM, TCI), 1996 to present.
- *Associate Director:* Center for Water and the Environment, Natural Resources Research Institute, University of Minnesota Duluth, 1987-1989.
- *Supervisory Research Ecologist, (GM-14)/Branch Chief in Hazardous Waste Division, Environmental Research Laboratory-Duluth, U.S. Environmental Protection Agency, 1987-1988*

Natural Resources Research Institute
University of Minnesota Duluth

Publications

Five publications closely related to the proposal project:

- 2005* Wolter, P.T., C.A. Johnston, **G.J. Niemi**. Mapping submergent aquatic vegetation in the U.S. Great Lakes using Quickbird satellite data. *International Journal of Remote Sensing* 26:5255-5274.
- 2005* Danz, N., R. Regal, **G.J. Niemi**, V.J. Brady, T. Hollenhorst, L.B. Johnson, G.E. Host, J. M. Hanowski, C.A. Johnston, T. Brown, J. Kingston, and J.R. Kelly. Environmentally stratified sampling design for the development of Great Lakes environmental indicators. *Environmental Monitoring and Assessment* 102:41-65.
- 2004* **Niemi, G.J.** and M. McDonald. Application of ecological indicators. *Annual Review of Ecology and Systematics* 35: 89-111. (Invited).
- 2004* **Niemi, G.J.**, D. Wardrop, R. Brooks, S. Anderson, V. Brady, H. Paerl, C. Rakocinski, M. Brouwer, B. Levinson, and M. McDonald. Rationale for a new generation of ecological indicators for coastal waters. *Environmental Health Perspectives* 112: 979-986.
- 2004* Venier, L.A, J. Pearce, J.E. McKee, D.W. McKenney, and G.J. Niemi. Climate and satellite-derived land cover for predicting breeding bird distribution in the Great Lakes basin. *J. Biogeography* 31:315-331.

Five other significant publications:

- 2006* Mattsson, B.J. and **G.J. Niemi**. Factors influencing predation on ovenbird (*Seiurus aurocapillus*) nests in northern hardwoods: interactions across spatial scales. *The Auk* 123:82-96.
- 2005* Hanowski, J., N. Danz, J. Lind, and **G.J. Niemi**. Breeding bird response to varying amounts of basal area retention in riparian buffers. *Journal of Wildlife Management* 69(2): 689-698.
- 2004* Price, S.J., D.R. Marks, R.W. Howe, J.M. Hanowski, and **G.J. Niemi**. The importance of spatial scale for conservation and assessment of anuran populations in coastal wetlands of the western Great Lakes, USA. *Landscape Ecology* 20:441-454.
- 2004* Knutson, M.G., M. Hammer-Friberg, **G.J. Niemi**, and W.E. Newton. Nest survival of forest birds in a forest/grassland transition zone. *The Condor* 106:116-130.

2003* Crozier, G.E. and **G.J. Niemi**. Using patch and landscape variables to model bird abundance in a naturally heterogeneous landscape. *Canadian Journal of Zoology* 81: 441-452.

Synergistic Activities

Development of stress-response relationships for the coastal region of the Great Lakes; integration of biotic communities including amphibians, birds, diatoms, fish, macroinvertebrates, and wetland vegetation in the development of response to disturbance and ecological indicator development; development of sustainability models of forest bird and impacts of forest management and forest harvesting; and statistical analyses of structure-activity relationships to predict the behavior of industrial chemicals with respect to toxicity, biodegradation, and chemical similarity.

Collaborators and Other Affiliations

Collaborators and Co-Editors

- Anderson, Susan - UC Davis
- Axler, Richard - NRRI, UMN
- Brady, Valerie - NRRI, UMN
- Brazner, John - US EPA, MED, Duluth
- Brouwer, Marius - Southern Mississippi U
- Brooks, Robert - Pennsylvania State U
- Brown, Terry - NRRI, UMN
- Crozier, Gaea - MN DNR
- Danz, Nicholas - NRRI, UMN
- Hammer-Friberg, Mary - USDA FS
- Hanowski, JoAnn - NRRI, UMN
- Hollenhorst, Thomas - NRRI, UMN
- Host, George - NRRI, UMN
- Howe, Robert - UWISC, Green Bay
- Johnson, Lucinda - NRRI, U MN
- Johnston, Carol - SD State U
- Kelly, John R. - US EPA - MED, Duluth
- Kingston, John - NRRI, UMN
- Knutson, Melinda - USGS-BRD
- Levinson, Barbara - US EPA, Washington DC
- Lind, James - NRRI, UMN
- McDonald, Michael - US EPA - RTC, NC
- Marks, David - UWISC, Green Bay
- Mattsson, Brady - U of Georgia
- Mladenoff, David - UWISC, Madison
- Newton, Wes - USGS-BRD
- Paerl, Hans - U of North Carolina
- Price, Steven - UWISC, Green Bay

- Rakocinski, Chet - Southern Mississippi U
- Reavie, Euan - NRRI, UMN
- Regal, Ronald - UMN
- Trebitz, Anett - US EPA- MED, Duluth
- Wardrop, Denise – Pennsylvania State U
- Wolter, Peter - NRRI, UMN

Graduate and Post Doctoral Advisors

- Ph.D. Advisor - Frances James, Florida State University (retired)

Thesis Advisor and Postgraduate-Scholar Sponsor

- Chris Burdett - Current Ph.D. UMN
- Nicholas Danz - Current Ph.D. UMN
- Nicholas McCann - Current MS, UMN
- Eric Jensen - Current MS, UMN
- David Grosshuesch - Current, MS UMN
- Julie Palakovich - Current, MS UMN
- Anna Peterson - MS, Current - HawkWatch International, Utah
- Lisa Belmonte - MS, Bureau of Land Management, Colorado
- David Grandmaison - MS, Arizona Fish and Game Department
- Christie Miller - MS, Metropolitan Community College

Dorothy H. Anderson

TOPICS: Parks, Trails, & Recreation

Education:

Ph.D. Human Dimensions of Natural Resource Mgt.; Colorado State University, 1980

M.A. Geography: Land Use Planning; University of Minnesota, 1976

B.A. Geography: Physical Geography and Climatology; University of Minnesota, 1973

Positions:

University of Minnesota

- Professor in Department of Forest Resources since 1999, H.T. Morse Distinguished Professor since 2000 (Associate Professor 1995-1999; Assistant Professor 1990-1995).
- Graduate faculty in: Natural Resources and Science Management; Parks, Recreation and Leisure Studies; Conservation Biology.

U.S. Agency for International Development

- Social and Community Forestry Advisor from 1986-1989; U.S. Embassy, New Delhi India.

USDA Forest Service

- Research Social Scientist—1977-1986, North Central Forest Experiment Stn., St. Paul, MN.
- Recreation Technician—1974-1976, North Central Forest Experiment Stn., St. Paul, MN.

Department of Forest Resources

College of Food, Agricultural, and Natural Resource Sciences

Key Qualifications

Dr. Anderson is H.T. Morse Distinguished Professor of Recreation Resource Management and Director of the Great Lakes-Northern Forest Cooperative Ecosystems Studies Unit. She has broad expertise in planning and managing lands for recreational use. Her research focuses on developing the benefits based approach to public land management, especially lands with recreational value. Federal agencies [National Park Service, the USDA Forest Service, the Bureau of Land Management, and the U.S. Army Corps of Engineers] and the Minnesota Department of Natural Resources Division of Parks and Recreation have adopted the benefits approach recreational lands management. She has worked with government officials in Thailand, People's Republic of China, and Australia in their efforts to adopt parts of the benefits approach to land management.

Special Honors and Recognition

- 1990, MN DNR - Excellence in Performance Award for "outstanding service to the public and state park system".
- 1998, Richard C. Newman Art of Teaching Award; College of Natural Resources
- 1998, Alumni Award for Outstanding Contributions to Undergraduate Education: College of Natural Resources
- 1999-2000, Horace T. Morse Alumni Undergraduate Teaching Award; Univ. of MN
- 2001, National award: USDA North Central Region for Excellence in College & University Teaching
- Tate Award for Undergraduate Advising; Univ. of MN

Selected Publications

Davenport, M.A., D.H. Anderson, P.J. Jakes, and J.E. Leahy. Accepted for publication 2006. Reflections from USDA Forest Service Employees on Institutional Constraints to Engaging and Serving Local Communities. *Journal of Forestry*.

Davenport, M.A., J.E. Leahy, D.H. Anderson, and P.J. Jakes. Accepted for publication 2006. Building Trust in Natural Resource Management within Local Communities: A Case

- Study of the Midewin National Tallgrass Prairie. *Environmental Management*
- Hong, A. and D.H. Anderson. 2006. Barriers to Participation for Latino People at Dodge Nature Center. *Journal of Environmental Education*, 37(4):33-44.
- Payton, M., D.C. Fulton, and D.H. Anderson. 2005. Influence of Place Attachment and Trust on Civic Action: A Study at Sherburne National Wildlife Refuge. *Society and Natural Resources*, 18(6): 511-528
- Davenport, M. and D.H. Anderson. 2005. Getting from Sense of Place to Place-based Management: An Interpretive Investigation of Place Meanings and Perceptions of Landscape Change. *Society and Natural Resources*, 18(7):625-641.
- Pierskalla, C.D. , M.E. Lee, T.V. Stein, D.H. Anderson, and R. G. Nickerson. 2004. Understanding Relationships Among Recreation Opportunities: A Meta-Analysis of Nine Studies. *Leisure Sciences* 26:163-180.
- Jakes, P.J., C. Schlichting, and D.H. Anderson. 2003. A Framework for Profiling a Lake's Riparian Area Development Potential. *Journal of Environmental Management*.
- Dougherty, E., D. C. Fulton, and D.H. Anderson. 2003. The Influence of Gender on the Relationship between Wildlife Value Orientations, Beliefs, and the Acceptability of Lethal Deer Control in Cuyahoga Valley National Park. *Society and Natural Resources* 16(7):603-624.
- Wang, G.A., D.H. Anderson, and P. J. Jakes. 2002. Heritage management in the U.S. Forest Service: A Mount Hood National Forest Case study. *Society and Natural Resources* 15(4):359-370.
- Stein, T.V. and D.H. Anderson. 2002. Combining benefits-based management with ecosystem management for landscape planning: Leech Lake watershed, Minnesota. *Landscape and Urban Planning*, 60:151-161.
- Anderson, D.H., R. Nickerson, T.V. Stein, and M.E. Lee. 2000. Planning to provide community and visitor benefits. Pg. 197-212. In: Gartner, W.C. and D.W. Lime (eds.) Trends in Outdoor Recreation, Leisure and Tourism. Wallingford, UK: CAB International.
- Jakes, P. and D.H. Anderson. 2000. Diverse perspectives on community. *Society and Natural Resources*, 13(5):395-398.
- Wang, T. L., D. H. Anderson, and D. W. Lime. 2000. Protecting resources and visitor opportunities: A decision process to help managers maintain the quality of park resources and visitor experiences. *Park Science*, 20(2):23-27.

Other Relevant Information

Since 1990 I have been awarded 73 research grants or cooperative agreement awards totaling \$3,500,000. I am or have served as the principal investigator on the majority of these grants and agreements.

Since 1990 I have been major advisor for 19 masters and 16 doctoral students who have successfully completed their programs. Currently I advise 6 masters and 3 doctoral students.

Ingrid E. Schneider

TOPICS: Other

Education:

Ph.D. Parks, Recreation & Tourism Mgmt; Clemson University, 1995

M.S. Forestry Recreation Resource Management; University of Minnesota, 1992

B.S. Agriculture Scientific & Technical Comm.; University of Minnesota, 1990

Professional Experience:

University of Minnesota

- Associate Professor, Department of Forest Resources (2005-present; Research Associate 2001-2005; position changed to Associate with tenure Feb 2005).
- Director, Tourism Center (2003-present).

Arizona State University

- Associate Professor, Department of Parks, Recreation & Tourism Management_ (Assistant professor 1995-2000; promoted & tenured 2000).

Clemson University

- Research Assistant, Department of Parks, Recreation & Tourism Management (1993-1995).

University of Minnesota

- Research Assistant, Department of Forest Resources (1990-1992) Bureau of Land Mgmt.
- Planner Intern, Grand Junction, Colorado (1993).

Dept of Natural Resources

- Planner Intern, St. Paul, Minnesota (1992).

Department of Forest Resources

College of Food, Agriculture & Natural Resources Sciences

University of Minnesota

Key Qualifications

Dr. Schneider is an Associate Professor in Forest Resources and Director of the University's Tourism Center. She has broad experience in visitor behavior in outdoor recreation management and sustainable tourism with particular emphasis in visitor attitudes, conflict and constraints. She is a member of the Governor's Council on Tourism.

Recognition and Awards

- 1999-2000, ASU Faculty Achievement Award: *Research*
- 1997-1998 ASU Faculty Achievement Award: *Research*
- 1996-1997 ASU Faculty Achievement Award: *Service*
- 1996, CU Dwight Holder Award, Hartzog Lecture Series
- 1991, Future Scholars Recipient. Academy of Leisure Sciences

Select Journal Articles

Schneider, I.E., & Wilhelm, S. (accepted). Coping: An alternative conceptualization for constraint negotiation and accommodation. *Leisure Sciences*.

Schuster, R. M., Hammitt, W. E., Moore, D., & Schneider, I. E. (2006). Coping with stress resulting from social value conflict: Non-hunter's response to social interaction with hunters. *Human Dimensions of Wildlife Management*, 11(2), 101-113.

Wilhelm, S., & Schneider, I.E. (2005). The meaning of nature to diverse urban youth. *Applied Environmental Education*, 4, 103-113.

Dustin, D. L., & Schneider, I.E. (2005). The politics of science/the science of politics: Examining the snowmobile controversy in Yellowstone National Park. *Environmental Management*, 34(6), 761-767.

- Hendricks, W., Schneider, I.E., & Budruk, M. (2004). Extending importance-analysis with benefits-based segmentation. Journal of Park & Recreation Administration.
- Dyck, C., Schneider, I.E., Thompson, M., & Virden, R.J. (2003). Mountaineering specialization and its relationship to environmental attitudes. Journal of Park and Recreation Administration, 21(2), 44-62.
- Budruk, M., Schneider, I.E., Virden, R.J. & Andereck, K.A. (2002). Crowding and satisfaction among visitors to a built desert attraction. Journal of Park and Recreation Administration, 20(3) 1-17.
- Dustin, D.L., Schneider, I.E., McAvoy, L., & Frakt, A. (2002). Cross-cultural claims on Devils Tower National Monument: A case study. Leisure Sciences, 24(1): 79-88.
- Garst, B., Schneider, I.E., & Baker, D. (2001). Outdoor adventure program participation impacts on adolescent self-perception. Journal for Experiential Education, 24(1): 41-49.

Second Page Heading 3

Second page normal text

- Second page bullet

Katherine Klink

TOPICS: Air

Education:

University of Delaware, Ph.D. in
Climatology, 1992

University of Delaware, M.S. in
Geography, 1987

University of Wisconsin-
Milwaukee, B.S. in Atmospheric
Science, 1982

Positions:

University of Minnesota

- Associate Professor,
Department of Geography,
since 1991 (Teaching Specialist,
1991-1992, Assistant Professor
1992-1999).
- Graduate faculties in:
Conservation Biology;
Quaternary Paleoecology;
Water Resources Science.

*Department of Geography
College of Liberal Arts
University of Minnesota*

Key Qualifications

Dr. Klink is an Associate Professor of Geography and has specific expertise in climatology. Her current work investigates variability in atmospheric circulation and near-surface wind patterns, and she has applied some of her research in the area of wind power generation. She also has experience using regional-scale climate models to study how land surfaces can affect local climates.

Select Grant Activity

- *Surface Wind Variability in the Great Lakes Region and its Relation to Large-Scale Atmospheric Forcing*. Graduate Research Partnership Program, College of Liberal Arts, University of Minnesota. K. Klink and G. Force, co-PIs.
- *Spatial and Temporal Variability of Wind Speed and Solar Radiation in the Central United States*. Graduate Research Partnership Program, College of Liberal Arts, University of Minnesota. K. Klink and M. Wienert, co-PIs.

Select Professional Activities

- Member of the Editorial Board for the journal *Physical Geography*, 2002-present.
- University of Minnesota member representative to the University Corporation for Atmospheric Research (UCAR), 2002-present.
- Steering Committee member for the Minnesota Climate Change Science Symposium. Symposium sponsor: Minnesota Pollution Control Agency, 2002-2003.

Other Relevant Activities

- Secretary of the Association of American Geographers, 2002-2003.
- Regional Councillor for the West Lakes Division of the Association of American Geographers, 2000-2003.
- Secretary/Treasurer for the Climate Specialty Group, Association of American Geographers, 1994-1996.

Select Publications

- Klink, K. Atmospheric circulation effects on wind speed variability at turbine height. Accepted for publication in *Journal of Applied Meteorology and Climatology*.
- Klink, K., H.D. Fisher, G.K. Force, J.L. Thorpe, and J.M. Young (2003) Interannual variability of wind speed and wind power at five tall-tower sites in Minnesota (1996-2001). *Physical Geography* 24:183-195.
- Klink, K. (2002) Trends and interannual variability of wind speed distributions in Minnesota. *Journal of Climate* 15:3311-3317.
- Klink, K. (1999) Climatological mean and interannual variance of United States surface wind speed, direction, and velocity. *International Journal of Climatology* 19:471-488.
- Klink, K. (1995) Temporal sensitivity of regional climate to land surface heterogeneity. *Physical Geography* 16:289-314.
- Klink, K. (1995) Surface aggregation and subgrid-scale climate. *International Journal of Climatology* 15:1219-1240.
- Klink, K. and C.J. Willmott (1994) Influence of soil moisture and surface roughness heterogeneity on modeled climate. *Climate Research* 4:105-118.

Steven J. Taff

TOPICS: Air

Education:

1985: Ph.D., Agricultural Economics,
University of Wisconsin - Madison

1974: M.S., Urban and
Regional Planning,
University of Wisconsin -
Madison

1969: B.A., Psychology (with
Honors), Macalester College,
St. Paul, Minnesota

Prior Positions:

- 1985-1990: Assistant Professor and Extension Economist, Department of Agricultural and Applied Economics, University of Minnesota.
- 1981-1985: Research Assistant, Department of Agricultural Economics, University of Wisconsin – Madison.
- 1978-1980: Resource Agent, La Crosse County and University of Wisconsin – Extension.
- 1974-1978: Area Community Development Agent, Mississippi River Regional Planning Commission and University of Wisconsin – Extension.
- 1969-1971: US Army Translator (Vietnamese).

*Department of Applied Economics
University of Minnesota*

Key Qualifications

Steven J. Taff is an associate professor and extension economist with the Department of Applied Economics and an Adjunct Professor with the Department of Forest Resources, both at the University of Minnesota. A former county extension agent and regional planner, Taff holds advanced degrees in urban and regional planning (M.S.) and in agricultural economics (Ph.D.) from the University of Wisconsin.

At Minnesota since 1986, he specializes in the economics of agricultural and natural resource policies, with special emphasis on land management decisions in both rural and urban settings. Taff is widely known for his attempts to bring economic science to bear on practical policy making. Some of his recent research examines the economics of conservation easements, the fiscal implications of preferential property tax programs, alternative energy systems, and performance measures in landscape design.

Current Positions:

- Associate Professor and Extension Economist, Department of Applied Economics and Adjunct Professor, Department of Forest Resources
- Graduate faculties in Applied Economics, Forest Resources, Water Resources Science, and Conservation Biology

Selected Publications:

Updegraff, K., M. J. Baughman, and S. J. Taff. Environmental Benefits of Cropland Conversion to Hybrid Poplar: Economic and Policy Considerations. *Biomass and Bioenergy*. 27(2004):411-428. December 2004.

Shultz, S. and S. J. Taff. Implicit Prices of Wetland Easements in Areas of Production Agriculture. *Land Economics*. 80(4):501-512. November 2004.

Shultz, S. and S. J. Taff. Calculating Wetland Easement Payments Using Alternative Land Value Data: A Case Study of the USFW Small Wetland Acquisition Program in the Prairie Pothole Region. *Journal of Soil and Water Conservation*. 59(3): May 2004.

- Taff, S. J. and N. Senjem. Increasing Regulators' Confidence in Point-Nonpoint Pollutant Trading Schemes. *Water Resources Bulletin* . v.32,no.6, December 1996, pp.1187-94.
- Doss, C.R., and S. J. Taff. The Influence of Wetland Type and Wetland Proximity on Residential Property Values . *Journal of Agricultural and Resource Economics* . v.21, no.1, July 1996, pp.120-129.
- Kozloff, K., S. J. Taff, and Y. Wang. Micro-Targeting the Acquisition of Cropping Rights to Reduce Nonpoint Source Water Pollution. *Water Resources Research*, v.28, no.3, March 1992, pp.623-28.
- Jones, K., B. Jordan, K. H. Keller, and S. J. Taff. *Pathways to a Reduced Carbon Energy System for the Upper Midwest*. University of Minnesota Department of Applied Economics. Staff Paper P06-10. June 2006.
- Viaggi, D. and S. J. Taff. Public Acquisitions of Property Rights To Serve Agriculture/Conservation Policy: Lessons from Italy and the US. In **Food, Agriculture and the Environment: Economic Issues**. E. Defrancesco, L. Galletto, and M. Thiene, eds. Dipartimento Territorio e Sistemi Agroforestali - Università di Padova; Fondazione Casa di Risparmio di Padova e Rovigo. FrancoAngeli s.r.l., Milano, Italy. pp.341-354. 2005.
- Taff, S. J. and J. Leitch. Valuation of Nonmarket Goods and Services for Environmental Assessment . in *Environmental Methods Review: Retooling Impact Assessment for the Next Century* . A.L. Porter and J. J. Fittipaldi, eds. Army Environmental Policy Institute. Atlanta. March 1998.
- Helmberger, J. M. and S. J. Taff. Transfer of Consolidated Conservation (Con-Con) Land Administration from the Department of Natural Resources to the Counties: Analysis of Fiscal Impacts. Pinnacle Consulting Group for Minnesota Department of Natural Resources. April 2000.
- Taff, S. J. and P. Glewwe. The 1999 Agricultural Assistance Program: A Preliminary Evaluation. Minnesota Department of Revenue. February 2000.

Mark W. Seeley

TOPICS: Air

*Soil, Water, and Climate
University of Minnesota*

Education:

B.A. University of California,
Berkeley, CA 1969 (pre-law)

M.S. Northern Illinois
University, DeKalb, IL 1975
(meteorology/climatology)

Ph.D. University of Nebraska,
Lincoln, NE 1977 (agricultural
climatology)

Positions:

- Principal Scientist, 1977-1978, Lockheed Electronics, NASA, Johnson Space Center, TX.
- Assistant Professor, 1978-1982 (100 pct Extension)
- Associate Professor, 1983-1989 (80 pct Extension, 20 pct Research).
- Professor, 1989-present (80 pct Extension, 20 pct Research).
- Visiting Scientist, UK Meteorological Office, England 1989-1990.
- NOAA Partnership Fellow, 2002, Climate Prediction Center, Wash. D.C.
- Full member of Soil, Water, and Climate Graduate Faculty 1979.
- Full member of Graduate School Faculty since 1982.
- Member of Water Resources Graduate Faculty since 1994.

Key Qualifications

Extension Meteorologist and Climatologist; responsible for education and outreach programs on weather and climate through the Extension Service. Dr. Seeley has contributed to enhanced knowledge of weather and climate variations and predictions for applications to agricultural and natural resource management, health care, transportation, energy use, construction trades, and overall risk assessment. He has collaborated with numerous state and federal agencies including the NOAA-National Weather Service, DNR, MPCA, MDA, EPA, USGS, Army Corps of Engineers, and NASA. He has represented the University of Minnesota on Minnesota Public Radio broadcasts for 15 years.

Awards

- Dean and Director's Award to Distinguished Extension Faculty, 2006
- Mn/DOT Center for Transportation Studies Research Partnership Award, 2003
- Scientific Communication and Education Award, Sigma Xi, 2001
- University of Minnesota Certificate of Appreciation, 1998, Faculty Ambassador Program

Teaching/Advising Activities

Dr. Seeley has taught atmospheric science to school science teachers for the past 12 years; he has taught a variety of graduate level colloquia; and he has frequently taught evening classes for the College of Continuing Education. He has served on 25 graduate committees for M.S. student (five as major advisor), and 28 graduate committees for Ph.D. students (four as major advisor). He teaches regularly in the NASA sponsored Earth Science Teacher Institute hosted by the Science Museum of Minnesota and the Earth Science Museum Curator Workshop each fall.

Extension Activities

Extension teaching (some of which is for continuing education credits, CEUs) includes workshops, short courses (included at various times Crop Pest Management, Fertilizer Dealers, Forage and Grassland Council, Corn Growers, Soybean Growers, Grass Seed Institute, Canola Council, Wheat Growers, Irrigation Association), certified crop advisor training (CCA credits), pesticide applicator training, Midwest Natural Gas Suppliers Annual Conference, Road Design and Snow Control Conference (Mn/DOT), outlook briefings for agricultural lenders and bankers, and various university field days.

Other extension responsibilities have included statewide dissemination of agricultural weather information, including the Minnesota weekly crop-weather report (for 29 years). I have contributed content and design ideas to numerous internet web sites on weather and climate analyses, including those managed by Extension, USDA and Minnesota Department of Agriculture, Minnesota Public Safety, Minnesota DNR, MPCA, National Weather Service (NOAA), Minnesota Regional Network, Minnesota Public Radio, and the joint Minnesota-Wisconsin Ag-Weather Network. Training and educational materials have been developed for extension programs in crop and livestock systems, natural resources, horticulture, water quality, energy conservation, and sustainable agriculture. In addition, I have represented extension on the Minnesota Drought Task Force (1980, 1984, 1988, 2006), the Flood Response Task Force (1989, 1991, 1993, 1997, 2001), and the Interagency Flood Outlook Coordination Team (since 1979).

Research Activities

Research activities emphasize applications of climatological data and networks; regional climate trends and climate change, remote sensing technologies; landscape analyses of boundary layer processes; automated field measurement systems; meteorological probabilities and weather forecasting applications to precision agriculture; and temporal and spatial climatic probabilities for engineering design and risk management, most recently the design and deployment of living snow fences.

Recent Grants And Funded Research Projects

- Enhanced Snow and Precipitation Monitoring within Minnesota Portions of Watersheds Draining to Lake Superior, NOAA-SEA Grant under the Minnesota Lake Superior Coastal Program, \$10,000, Nov, 2002 to Dec 2004.
- Implementation of Climatological Summaries for snow Fence Design Training and Web Site Development with Mn/DOT, July, 2001 to June, 2002, \$ 30,000 cost-shared (\$17,200 Mn/DOT, \$13,000 AES).
- Climatological Characterization of Snowfall and Snowdrift Along Minnesota Highways and Roads, and Development of Online Database, with MNDOT, St Paul, MN (May, 1999 to March, 2002), \$94,000 administrated through the University of Minnesota Center for Transportation Studies.
- Forecasting Potato Late Blight (with Roger Jones in Plant Pathology), MAES Rapid Agricultural Response Fund: 2001@ \$150,000, 2002@ \$90,000, and 2003 @ \$75,000.

Recent Selected Publications

- Seeley, M.W., 2006, Minnesota Weather Almanac, Minnesota Historical Society Press, 294 pp.
- Zin, Min, Ragsdale, D., Radcliffe, T, McCrae, I., and M. Seeley. 2005. Weather patterns that influence seasonal abundance of green peach aphid (*myzus persicae*) and spread of potato leaf roll virus in the northern Great Plains. *Agric and Forest Meteorology*, vol. 1, pp 1-11.
- Seeley, M.W. "Great Lakes Climate and Meteorology (Parts I and II)", 2005 European Meteorological Society, ISBN 3-928903-33-0 Calendar, Berlin, Germany.
- Seeley, M. W., 2004. Mother Nature Smiled: The Grand Excursion of 1854. Minnesota History, vol. 59:1 pp: 36-38.
- Shulski, M.D. and M.W. Seeley. 2004. Application of snowfall and wind statistics to snow transport modeling for snowdrift control in Minnesota. *J. App. Met.* Vol 43: 1711-1721.
- Medina, H. and M. Seeley, 2003. Avian pneumovirus (APV) and other respiratory challenges in turkeys in the Midwest: An examination of environmental factors that induce a higher incidence in the Spring and Fall of the year. *Proceedings of the Western Poultry Disease Conference*, March 8-11, Sacramento, CA.
- Seeley, M.W., 2002. Full Frontal Climatology: A Review of The Little Ice Age: How Climate Made History 1300-1850 by Brian Fagan (Basic Books, 246 pp), appeared in *Borealis* magazine, vol 1. no. 2, 32-34.
- Seeley, Mark. 2001. Derecho Science Bulletin. American Museum of Natural History, Central Park, NY. Video and display, traveling exhibit.

Nicholas Jordan

TOPIC: Land

*Department of Agronomy and Plant Genetics
University of Minnesota*

Education:

Duke University, 1980-1986, Ph.D.,
Botany and Genetics

Harvard College, 1974-1979, A.B.,
Biology, High Honors

Positions:

University of Minnesota

- Assistant, Associate and Professor, Department of Agronomy & Plant Genetics, 1994-present.
- Director of Graduate Studies, Sustainable Agriculture Systems Minor, 1999-present.

Truman State University

- Assistant and Associate Professor, Division of Science, Truman State University, 1986-1994.

Key Qualifications

Dr. Jordan is Professor of Agroecology and co-leads the Green Lands, Blue Waters project and a consortium of land-grant universities non-profit groups working on sustainable development of new agricultural enterprises including renewable biomass energy systems and 'working landscapes' that provide ecological services to society. He has expertise in agricultural ecology and agricultural development, with emphasis on participatory methods for sustainable rural development.

Selected Grants

- Leafy Spurge Eradication and Post-Eradication Restoration. Larson and Jordan, U.S. Dept. of Interior, Geological Survey, Biological Resources Div., 2006-2008 (funded, \$300,000).
- Supporting Meat and Dairy Production from Sustainable, Perennial-based Grazing Systems in the Chippewa River Watershed: A Green Lands and Blue Waters Enterprise-Development Pilot Project. Jordan, West Central Regional Partnership (funded, \$20,000).
- Building Capacity in COAFES Faculty and Curricula To Support Innovative Development of Agriculture and Food Systems. Jordan, Sheaffer and White COAFES Faculty Development Grants, (funded, \$12,000).
- Testing a Novel Mechanism for Sustainable Development of Agriculture, Jordan, Manson and Nelson. Graduate School Intercollegiate Research Network Program, (funded, \$10,000).

Selected Appointments

- NRC Panel developing report on Environmental Impacts Associated with Commercialization of Transgenic Plants (2002), focusing on systems approaches for addressing this complex scientific/regulatory problem.
- Steering Committee for "Green Lands, Blue Waters" (GLBW). GLBW is a consortium of land-grants in the upper Midwest developing a joint R&D program to support technical and social/economic innovations needed

to establish new economic enterprises such as grassland agroecosystems for biofuel production; 2003-date.

- Steering Committee for Minnesota Center for Community Genetics, 1994-date.
- Conservation Biology Graduate Program Steering Committee 2003-2006.

Other Relevant Activities

- Developed and taught (1999-date) graduate course in methods for systems analysis and improvement of complex problems in agriculture "Ecology of Agricultural Systems".
- Co-editor of book on public scholarship in sustainable food-system development (*Engaging Campus and Community: Public Scholarship in the State and Land-Grant University System*, Kettering Foundation Press, 2005).

Selected Publications:

- Jordan, N.**, Zhang, J. and Huerd, S 2000. Arbuscular-mycorrhizal fungi: potential roles in weed management. *Weed Research* 40:397-410.
- Jordan, N.** 2002. Agroecological Restoration: Sustaining Production with Biodiversity. Pages 155-168 in Jackson, D. and Jackson, L., eds. *The Farm as a Natural Habitat*, Island Press, Covelo, CA.
- Blumenthal, D. M., **N. R. Jordan**, and E. L. Svenson. 2003. Weed control as a rationale for restoration: the example of tallgrass prairie. *Conservation Ecology* 7(1):6 [online] URL: <http://www.consecol.org/vol7/iss1/art6>.
- Blumenthal, D, N. Jordan, M. Russelle. 2003. Soil carbon addition controls weeds and facilitates prairie restoration. *Ecological Applications* 13:605-613.
- Jordan, N.R.**, Vatovec, C.M., 2004. Agroecological benefits from weeds. Pp. 137-158 in: Inderjit (Ed.), *Weed Ecology and Management*, Kluwer Academic Publishers.
- Blumenthal, D. M., **N. R. Jordan**, and E. L. Svenson. 2005. Prairie restoration inhibits weed invasion. *Agriculture, Ecosystems and Environment* 107 (2-3): 221-230.
- Vatovec, C., **N. Jordan**, and S. Huerd. 2005. Mycorrhizal responsiveness among certain agronomic weed species. *Renewable Agriculture and Food Systems* 20:181-189.
- Jordan, N.**, D. Andow, and K. Mercer. 2005. Ecology of Agricultural Systems: A service learning course in agroecology. *Journal of Natural Resource and Life Sciences Education*. 34:83-89.
- Clements D., DiTommaso, A., **Jordan, N.**, Booth B.D., Cardina J, Doohan, D., Mohler, C., Murphy, S. and C. Swanton. 2005. Adaptability of plants invading north american cropland. *Agriculture, Ecosystems and Environment* 104:379-398.
- De Bruin, J.L, **Jordan, N**, Porter, P.M., and S.C Huerd. 2006. Soil Microbiota Effects on Rye Growth: Implications for Integration of a Rye Cover Crop into Temperate Cropping Systems. In press, *Renewable Agriculture and Food Systems* (9/06).

Alan R. Ek

TOPICS: Land

Education:

University of Minnesota, Forestry,
B.S. 1964

University of Minnesota, Forestry,
M.S. 1965; Minors - Statistics,
Business

Oregon State University, School of
Forestry Ph.D. Forestry 1969;
Minors - Biometry, Silviculture

Positions:

*University of Minnesota –
Department of Forest Resources*

- July, 1984 - Present. Professor and Department Head.
- August 1983-June 1984 Professor and Acting Department Head.
- Professor, 1979 – present.
- Associate Professor (1977-1979).

*University of Wisconsin-Madison –
Department of Forestry*

- Associate Professor, 1975-1979
- Assistant Professor, 1969-1977

*Canada Department of Fisheries and
Forestry,*

- Sault Ste Marie, Ontario
Research Officer, 1966-1969.

*Oregon State University – School of
Forestry & Forest Research Laboratory*

- Research Assistant, 1966.

*University of Minnesota – School of
Forestry*

- Research Assistant, 1964-1965.

Department of Forest Resources

College of Food, Agriculture and Natural Resources Sciences

University of Minnesota

Key Qualifications

Alan R. Ek is Professor and Head, Department of Forest Resources, University of Minnesota, St. Paul. He joined the faculty in 1977, after serving on the forestry faculty of the University of Wisconsin, Madison, since 1969. From 1966 to 1969, he was a research officer with the Canada Department of Fisheries and Forestry. Earlier he served as a research assistant at Oregon State University and the University of Minnesota. Ek is the author of more than 150 technical publications on forest growth and ecosystem modeling, forest monitoring system design, remote sensing applications, and planning methodology. He is a member of Xi Sigma Pi, the American Society of Photogrammetry and Remote Sensing and the Society of American Foresters (SAF).

He also served as chair of the SAF Forest Science and Technology Board (1989-90). He was elected a Fellow of the SAF in 1993. He has served as a science advisor to the USDA Forest Service Global Change Program. From 1990-94 he served as the Study Group Coordinator for the *Generic Environmental Impact Study (GEIS) on Timber Harvesting and Forest Management in Minnesota*. In 1997 he served as a Fulbright Scholar in environmental sciences and forestry in Finland at the Universities of Helsinki and Joensuu. He is a consultant on forest resource inventory design, resource analysis and research planning in the U.S. and worldwide.

Selected Grants

- Web based Forest Management Guides. B. Palik, A. Ek, and M. Kilgore. USDA Forest Service North Central Research Station. 2004-2007.
- Develop analysis tools and provide ecosystem based reports on status, change, and trends in forest health in Minnesota and Lake States Ecosystems. A. Ek. USDA Forest Service State & Private Forestry. 9/10/01-9/10/03.
- Upper Great Lakes Regional Earth Sciences Applications Center. M. Bauer, T. Burk, A. Ek, S. Daley Laursen, P. Bolstad, P. Brezonik, and others from Univ. of Wisconsin and Michigan State. Univ. NASA Office of Earth Science, Applications Program. 2/3/99-2/2/02.

- Impacts of present and potential road systems on timber, tourism, wildlife and aesthetic resources. 1989-91. D. Rose, A. Ek, L. Queen, P. Jordan. D. Lime with MN DNR. Legislative Commission on Minnesota Resources.
- Future timber supply scheduling techniques. 1987-89. D. Rose, A. Ek, T. Burk. LCMR

Selected Appointments

- Governor's Task Force on the Forest Products Industry, 2006.
- Science Advisory Board, Centers of Excellence in Forest Ecology and Management, Academy of Finland, 1999-2004.
- Trustee, Great Lakes Forestry Alliance, 2001-present, appointed by Governor of Minnesota
- Elected Chair, USDA Forestry Research Advisory Committee, 1998-99, appointed to Committee by Secretary of Agriculture.
- UN FAO Consultant on forest inventory and planning to P.R. China, 1986.

Selected publications

Schwalm, C. R. and A. Ek. 2004. A process-based model of forest ecosystems driven by meteorology. *Ecological Modeling* 179:317-348.

Schwalm, C.R. and Ek, A.R., 2001. Climate change and site: relevant mechanisms and modeling techniques. *Forest Ecology and Management* 150(3):241-258.

Puettmann, K. J. and A. R. Ek. 1999. Status and trends of silvicultural practices in Minnesota. *Northern Journal of Applied Forestry* 16(4) 203-210.

Bauer, M. E., T. E. Burk, A. R. Ek, P. R. Coppin, S. D. Lime, T. A. Walsh, D. K. Walters, W. Befort, and D. F. Heizen. 1994. Satellite inventory of Minnesota Forest Resources. *Photogrammetric Engineering and Remote Sensing* 60(3):287-298.

Hasse, W. D., and A. R. Ek. 1981. A simulated comparison of even- versus uneven-aged management of northern hardwood stands. *Journal of Environmental Management* 12:235-246.

Other Relevant Activities

- Core Team member, Study Group Coordinator, and researcher for the Generic Environmental Impact Study (GEIS) on Timber Harvesting and Forest Management in Minnesota, 1990-94.
- Research Chair, National Association of Professional Forestry Schools and Colleges, 1994-97 & 2001-02.
- Consultant on resource analysis and environmental review of forestry projects

David J. Mulla

TOPICS: Land, Water

Education:

Purdue University, Agronomy
(Soil Physics), Ph.D. 1983

Purdue University, Agronomy
(Soil Chemistry), M.S. 1981

University of California
Riverside, Earth Sciences
(Geophysics), B.S. 1979

Positions:

University of Minnesota

- Professor. Division of Environmental and Occupational Health. June 2005- present.
- Associate Professor. Division of Environmental and Occupational Health. January 2000- June 2005.
- Assistant Professor. Division of Environmental and Occupational Health. December 1994- December 1999.
- Director, Industrial Hygiene Program, Division of Environmental and Occupational Health, July 2004-present.
- Co-Director, Industrial Hygiene Program, Division of Environmental and Occupational Health, April 2001-June 2004.

University of North Carolina

- Postdoctoral Research Associate. Department of Environmental Sciences and Engineering. May 1993 - November 1994.

Department of Soil, Water & Climate

College of Food, Agriculture and Natural Resources Sciences

University of Minnesota

Key Qualifications

Dr. Mulla is Professor and W.E. Larson Chair for Soil and Water Resources at the University of Minnesota. His research emphasizes (1) measurement, modeling, and management of uncertainty and risk for non-point source pollution of surface and groundwater by nitrogen, phosphorus and sediment; (2) characterization and estimation of field-scale variability for precision farming; (3) evaluation of alternative farm management strategies for improved soil and water quality and sustainability; and (4) evaluation of policies for soil and water quality protection.

Selected Grants

- Integrated modeling and management of agriculturally impacted watersheds: Issues of spatial and temporal scale. N.S.F./E.P.A. P. Brezonik, J. A. Perry, D. J. Mulla, and W. K. Easter - Co PI's. 1996-1999. \$813,085.
- Development of a phosphorus index for Minnesota animal agriculture. MN Environ. Quality Board. J. Moncrief, P. Bloom, N. Hansen, and D. Mulla. 2000-2002. \$220,000.
- Paired watershed studies for nutrient reductions in the Minnesota River Basin. USDA-CSREES-IREE Water Quality Grant. D. Mulla, M. Renwick, J. Anderson, and M. Hanks. 2001-2004. \$539,000.
- Nonpoint source pollution and TMDLs in a geographically diverse watershed. USDA-CSREES-IREE Water Quality Grant. J. Strock, D. Mulla, and P. Gowda. 2001-2004. \$525,500.
- Coupled biogeochemical cycles in human ecosystems. NSF. P. Brezonik, L. Baker, S. Hobbie, and D. Mulla Co-PIs. 2003-2006. \$355,317.

Recognition

- Best Water Quality Research Project, USDA-CSREES, Washington, DC. Aug. 2005
- Best Research Paper in 2001, J. Soil Water Conservation, July, 2002
- Minnesota Governor's Commendation for Lake Pepin Phosphorus Study, 2000
- Fellow Am. Soc. of Agronomy, 1999; Fellow Soil Science Soc. of America, 1997

Other Relevant Activities

- Member, Scientific Advisory Panel for Lake Pepin TMDL, St. Paul, MN. (2005-present)
- Team Leader Environ. Qual. Board GEIS Animal Ag. Water Quality Study (99-2001)
- Member, Gulf of Mexico Hypoxia Task Force for White House Committee on Environment and Natural Resources, (1998)

Selected Publications:

- Brezonik, P. L., V. J. Bierman, R. Alexander, J. Anderson, J. Barko, M. Dortch, L. Hatch, G. L. Hitchcock, D. Keeney, D. Mulla, V. Smith, C. Walker, T. Whitley, and W. J. Wiseman. 1999. Effects of reducing nutrient loads to surface waters within the Mississippi River Basin and the Gulf of Mexico. Topic 4 Rept. Integrated Assess. Hypoxia Gulf of Mexico. NOAA Dec. Anal. Series No. 18. NOAA, Silver Spring, MD.
- Brezonik, P., K. W. Easter, L. Hatch, D. Mulla, and J. Perry. 1999. Management of diffuse pollution in agricultural watersheds: Lessons from the Minnesota River basin. *Wat. Sci. Tech.* 39:323-330.
- Randall, G. W. and D. J. Mulla. 2001. Nitrate-N in surface waters as influenced by climatic conditions and agricultural practices. *J. Environ. Qual.* 30:337-344.
- Hatch, L. K., A. P. Mallawatantri, D. Wheeler, A. Gleason, D. J. Mulla, J. A. Perry, K. W. Easter, P. Brezonik, R. Smith, and L. Gerlach. 2001. Land management at the major watershed - agroecoregion intersection. *J. Soil Water Conservation* 56:44-51.
- Sekely, A. C., D. J. Mulla, and D. W. Bauer. 2002. Streambank slumping and its contribution to the phosphorus and suspended sediment loads of the Blue Earth River, Minnesota. *J. Soil Water Conservation.* 57(5):243-250.
- Birr, A. S. and D. J. Mulla. 2002. Relationship between lake and ground water quality patterns and Minnesota agroecoregions. *Hydrological Sci. Tech.* 18(1-4):31-41.
- Updegraff, K., P. Gowda, and D. J. Mulla. 2004. Watershed scale modeling of the water quality effects of cropland conversion to short rotation woody crops. *Renewable Agric. Food Systems* 19(2):1-11.
- Dalzell, B. J., P. H. Gowda, and D. J. Mulla. 2004. Modeling sediment and phosphorus losses in an agricultural watershed to meet TMDLs. *J. Am. Water Resour. Assoc.* 40:533-543.
- Strock, J. S., D. Bruening, J.D. Aplan, and D.J. Mulla, 2005. Farm nutrient management practices in two geographically diverse watersheds in the Cottonwood River Watershed of Minnesota. *J. Water Air Soil Pollution* 165:211-231.
- Mulla, D. J., A. Sekely, A. Birr, J. Perry, B. Vondracek, E. Bean, E. MacBeth, S. Goyal, B. Wheeler, C. Alexander, G. Randall, G. Sands, and J. Linn. 1999. A summary of the literature related to the effects of animal agriculture on water resources. Final Report to the Environmental Quality Board. St. Paul, MN.
- Mulla, D. J., P. H. Gowda, G. Wilson, and H. Runke. 2004. Estimating phosphorus losses from agricultural lands for MPCA's detailed assessment of phosphorus sources to Minnesota watersheds. A report to the MN state legislature. MPCA. St. Paul, MN.

Mark D. Wallis, PE

TOPICS: Water

Education:

University of Wisconsin –
Platteville Bachelor of Civil
Engineering, 1983

Professional Organizations:

- American Water Works Association
- National Society of Professional Engineers
- Construction Specifications Institute
- American Society of Testing and Materials

Current Registration:

Minnesota

Professional Training:

RAM-W Certified

Mr. Wallis serves as a senior project engineer/manager for water system analysis, wells, water booster stations and sanitary sewer lift stations. He has 21 years of engineering experience with Bonestroo. Mark is proficient in using WaterCAD software to perform computer hydraulic analyses for water distribution systems and lift station and pumphouse design.

Mark is currently working on Phase I of the water supply plan for the Twin Cities metropolitan area. Mark is the project manager for Bonestroo's portion of this project which includes evaluating water demands, groundwater availability, groundwater limitations, and surface water limitations. Mark was also involved in describing regional and local safety and security programs for the region's water suppliers

Relevant Experience:

Water Supply and Distribution Plans

He has prepared comprehensive water supply and distribution plans for more than 20 Minnesota cities and townships.

Representative examples include:

- Annandale, MN
- Albany, MN
- Belle Plaine, MN
- Brooklyn Center, MN
- Cambridge, MN
- Carver, MN
- Chanhassen, MN
- Cottage Grove, MN
- Dayton, MN
- Eagan, MN
- Farmington, MN
- Forest Lake Twp., MN
- Inver Grove Heights, MN
- Little Falls, MN
- Maple Grove, MN
- Maple Plain, MN
- Melrose, MN
- Minnetonka Beach, MN
- Oak Park Heights, MN
- Pipestone, MN
- Plymouth, MN
- Ramsey, MN
- Rosemount, MN
- Sartell, MN
- Sauk Centre, MN
- Savage, MN
- Winona, MN
- Woodbury, MN

Wells, Pumphouses, Water Booster Stations, Well Pump Repairs

- Albany, MN
- Cambridge, MN
- Carver, MN
- Chaska, MN
- Cokato, MN
- Cottage Grove, MN
- Eagan, MN
- Fergus Falls, MN
- Hector, MN
- Onamia, MN
- Sartell, MN
- Walker, MN
- Windom, MN
- Woodbury, MN

Water Treatment Plants

- Camp Ripley, MN
- Champlin, MN
- Chaska, MN
- Cokato, MN
- Forest Lake, MN
- Hector, MN
- Little Falls, MN
- Sartell, MN
- Sauk Centre, MN
- Walker, MN

Water Conservation and Emergency Preparedness Plans

Mark has prepared more than 20 Water Supply Plans to meet Met Council and DNR requirements for the following Minnesota communities:

- Andover, MN
- Cambridge, MN
- Carver, MN
- Champlin, MN
- Chanhassen, MN
- Chaska, MN
- Cimarron Park, MN
- Cottage Grove, MN
- Dayton, MN
- Farmington, MN
- Forest Lake Twp., MN
- Inver Grove Heights, MN
- Maple Grove, MN
- Medina, MN
- Oak Park Heights, MN
- Pipestone, MN
- Plymouth, MN
- Ramsey, MN
- Sartell, MN
- Sauk Centre, MN
- Savage, MN
- Spring Lake Park, MN
- Stacy, MN
- Woodbury, MN

Additional Experience

Woodbury, MN – East AUAR (2002)

Mark worked as part of a team to prepare an AUAR of eastern Woodbury. Since potential groundwater issues were a major part of the AUAR, we helped facilitate meetings with City staff, agencies, and neighboring communities to help resolve those issues. As representatives of the City we worked to find an environmental solution that best fit Woodbury's needs, while still meeting regulatory agency requirements. We also evaluated numerous alternative well fields and well layouts. The resulting Mitigation Plan and Monitoring Plan, which was acceptable to all parties, was published in the AUAR

Presentations

Mark has presented at a number of different conferences. His presentations include:

- Lift Station Design Considerations, April 27, 2000, MWOA
- Wellhead Protection in Minnesota, June 16, 1999, LMC Conference
- Water System Planning Briefing, June 15, 1994
- Municipal Water Supply Systems, April 21, 1998, MnDNR Conference

Benjamin L. Meyer

TOPICS: Water

Wetland Scientist

Education:

Northland College, Ashland, WI
Bachelor of Science, Biology — 1995
Emphasis in Natural Resource
Management

University of MN
Master of Biological Science —
Emphasis in Soils Science
(currently enrolled)

Professional Organizations:

- Society of Wetland Scientists
- President: MN Wetland Professionals Association, 2006
- Wisconsin Wetlands Association

Certifications:

- Certified Wetland Delineator – MN

Training:

- BWSR Wetland Delineation
- BWSR WCA Administration for LGU's
- BWSR WCA Rule Changes
- BWSR Wetland Banking
- DNR Rule Changes
- WTI Plant Identification

Mr. Meyer has over 10 years experience in wetland research, delineations, natural resource inventories/assessment, and Wetland Conservation Act technical support. He works with regulatory agencies to obtain permits, and is knowledgeable in Section 404 and 401 of the Clean Water Act, Minnesota Department of Natural Resources, and Minnesota Wetland Conservation Act Regulations.

State Wetland Policy Experience

Ben has been a Board Member of the MN Wetland Professionals Association (formerly Wetland Delineators Association) for the past four years and is the current president of the organization. This organization, with over 140 members, serves to establish educational and training opportunities for wetland professionals and provide a forum for the exchange of wetland research and current topics in wetland science and policy.

As part of Ben's involvement as the current president of the MN Wetland Professionals Association, he has been the organization's representative at the 2006 Wetland Conservation Act (WCA) Assessment Stakeholder meetings, Board of Water and Soil Resources Wetland Committee, and the November 2006 WCA Assessment Roundtable.

These series of meetings are being held to address the Governor's February 3, 2006 Wetland Visions and Strategies letter as part of his Clean Water Initiative.

Wetland Conservation Act Administration

Ben is responsible for administering the Wetland Conservation Act for seven communities in the metro area. This work involves review of wetland delineations, proposed development plans, applying the WCA Rules, and working with other agencies to review projects that may involve impacts to wetlands.

- Forest Lake, MN
- Oak Park Heights, MN
- New Hope, MN
- Cokato, MN
- New Prague, MN
- Farmington, MN
- Spring Lake Township, MN

Wetland Permitting

Ben has been involved in over 100 projects including many large projects that involve the coordination of the applicant, local, state and federal agencies to obtain approvals for project that impact wetlands. His broad knowledge in regulations and experience in permitting has helped secure approvals of projects through his work with watershed districts, the DNR, Corps of Engineers, cities, and other agencies.

- **Winona, MN** – The state-aid Pelzer Road project, which called for the construction of a bridge over a railroad, was a crucial safety concern for the City. Because of the need to raise the road for the approaches for the bridge, wetlands associated with the Mississippi River were impacted. Ben worked with and organized meetings between the US Fish and Wildlife, MN DNR, MN Board of Water and Soil Resources, County and City to come up with a plan to mitigate the wetland impacts.
- **Cottage Grove, MN** – Repeated flooding of two roadways leading to Grey Cloud Island led the City to reconstruct the roadways to provide flood protection for the roads and safe passage for island residents. Ben worked with numerous state and federal agencies to obtain the permits to allow this project to be completed.
- **Rochester, MN** – The future abandonment of a large gravel and sand quarrying operation led the City to pursue the site as a future park. Ben helped secure permits for the creation of a large lake on the site, along with the realignment of a large portion of a creek and creation of a wetland mitigation site.

Carrie E. Jennings

TOPICS: Water

*Minnesota Geological Survey, School of Earth Sciences
University of Minnesota*

Education:

B.A. Geology, Northwestern University, 1984

M.S. Geology, University of Minnesota, 1989

Ph.D. Geology, University of Minnesota, 1996

Positions:

- Senior Scientist, Minnesota Geological Survey, University of Minnesota, Minneapolis, 1989-2000 and 2001-present.
- Visiting Assistant Professor, Macalester College, 2000-2001.
- Associate Graduate Faculty, Department of Geology and Geophysics, University of Minnesota, 1996-present.
- Visiting Asst. Prof., Carleton College, 1996, 1999.
- Project Geologist, Foth and Van Dyke, Eden Prairie, Minn., 1988-1989.
- Instructor, St. John's University, Collegeville, Minn., 1987-1988.
- Instructor, St. Cloud State University, 1986-1988.
- Assistant Geologist, Harza Engineering Company, Chicago, Illinois, 1984.

Key Qualifications

Dr. Jennings is Senior Scientist at the Minnesota Geological Survey. She is a glacial geologist with background in glaciology and geomorphology and an interest in the processes that result in the geologic record that is preserved. She has mapped extensively in Minnesota and works in modern glaciated settings. She studies how glaciers respond to a variety of forcing factors, how that affects the final sediment record in Minnesota, and how this helps us predict the behavior of modern ice sheets to climate change. She is also studying how the distribution of glacial sediment in Minnesota affects the distribution and quality of surface and ground water and to that end, is conducting research to better define the sources of sediment to Minnesota River.

Selected Grants

- Research Experience for Undergraduates. Co-P.I. with Dr. James Cotter, Univ. Minn. Morris, 1999-2006. An NSF-sponsored program for those under-represented in the earth sciences. 12-15 women/year. Glacial mapping in Minnesota; modern glaciers in Canada; Permo-Carboniferous glacial deposits in Brazil.
- NERC Research Grant, 1999. P.I., Dr. Peter Knight, Keele Univ., England. Field study of the Russell Glacier, outlet of the Greenland Ice Sheet, West Greenland.

Selected Appointments

- Associate Editor, GSA Bulletin, 2000-ongoing. Choose reviewers for articles, review them myself, recommend action on paper acceptance.
- USGS EdMap Grant Review Panel, 2000-2003. Review proposals from academic institutions for geologic mapping, quad-scale, both surficial and bedrock, graduate and undergraduate.
- Quaternary Geology and Geomorphology Division, GSA, Panel Member, 2000-2002. Evaluate candidates for various division awards (e.g. Kirk Bryan award for best paper in Geomorphology; Don Easterbrook award; Career Award)
- Chair, N. Central Section, Geological Society of America 2004 - 2005, in charge of in charge of all aspects, scientific

and logistic, of annual, regional meeting, Minneapolis, May, 2005. Five-year planning period.

Other Relevant Activities

- Journal Reviews: Journal of Glaciology, Geological Society of America Bulletin, and Special Papers, Sedimentary Geology, Geomorphology, Quaternary Science Reviews
- Grant Reviews: NSF, NERC (U.K.)
- Technical Reviews: Dept. of Health and Human Services, Toxic Substances and Disease Registry; Minn. Polln. Control Agency; Minn. Dept. of Health; Minn. Dept. of Natural Resources, Minerals Division, Waters Division, Non-game Wildlife Biological Heritage Division; Wisc. Geol. and Natural History Surv.; Natural Resources and Conservation Service (County soil reports).

Selected Publications

- 2006, Hooke, R. LeB. and C. E. **Jennings**, On the formation of Tunnel Valleys, *Quaternary Science Reviews*, v. 25, 1364 – 1372.
- 2006, **Jennings**, C.E. Middle Pleistocene Glaciations in North America, P. Gibbard and J. Ehlers, eds., Encyclopedia of Quaternary Science, History of Quaternary Glaciations, Elsevier, Amsterdam.
- 2006, **Jennings**, C.E. Terrestrial ice streams-a view from the lobe. *Geomorphology*, 75, 100 –24.
- 2005, Balco, G., J.O.H. Stone and C.E. **Jennings**. Dating Plio-Pleistocene glacial sediments using the cosmic-ray-produced radionuclides ¹⁰Be and ²⁶Al. *American Journal of Science* v. 305, p. 1 – 41.
- 2004, **Patterson**, Carrie **Jennings** and Mark D. Johnson. The status of glacial mapping in Minnesota. In, J. Rose, series ed., *Developments in Quaternary Science 2*, Part II, North America, J. Ehlers and P.L. Gibbard, eds, *Quaternary Glaciations - Extent and Chronology*, Elsevier, Amsterdam.
- 2002, **Patterson**, C.J. and Knaeble, A.R. History of Glaciation in Pine County, Minnesota. In, Boerboom, T.J. project manager, *Contributions to the Geology of Pine County, Minnesota: Minnesota Geological Survey Report of Investigations 60*, p. 21 – 41.
- 2000, Knight, P.G., **Patterson**, C.J., Waller, R.I., Jones, A.P. and Robinson, Z.P. Preservation of basal-ice sediment texture in ice-sheet moraines. *Quaternary Science Reviews* 19 (13), 1255-1258.
- 1999, **Patterson**, C.J. and T.J. Boerboom, The significance of pre-existing, deeply weathered crystalline rock in interpreting the effects of glaciation in the Minnesota River Valley. *Annals of Glaciology*, 28, 53-58.
- 1998, **Patterson**, C.J., Laurentide glacial landscapes: The role of ice streams. *Geology*, 26, (7), 643-646.
- 1998, **Patterson**, C.J., and H.E. Wright Jr., editors. *Contributions to Quaternary Studies in Minnesota: Minnesota Geological Survey Report of Investigations No. 49*, 208 p.

James L. Anderson

TOPICS: Land, Water

Education:

Bachelor of Natural Resources (Honors), emphasis in Soil Science, University of Wisconsin, Madison, 1971

Master of Science in Soil Genesis, Classification, and Morphology, University of Wisconsin, Madison, 1972

Doctor of Philosophy, Soil Genesis, Classification, and Morphology, University of Wisconsin, Madison, 1976

Positions:

University of Minnesota

- Professor, Dept of Soil, Water & Climate, since 1991 (Associate Professor 1985–1991, Assistant Professor 1983–1985).
- Co-director, Water Resources Center, since 1997. This is an integrated research, extension and education center. It is the result of combining the Water Resources Research Institute with the Center for Agricultural Impacts on Water Quality, Extension Water Quality Program and the Water Resources Sciences Graduate Program.
- Extension Soil Scientist since 1983.
- Director, Center for Agricultural Impacts on Water Quality (1/2-time assignment) since 1986.

*Professor and Co-Director, Water Resources Center
College of Agricultural, Food and Natural Resources Science and UM
Extension Service
University of Minnesota*

Key Qualifications

Dr. Anderson has made major contributions in environmental quality research, education and Extension. Since 1971, Dr. Anderson has conducted research and education programs on soil treatment of septic tank effluent. He has been invited to present workshops in over 20 states, 3 provinces in Canada, and for the National Association Wastewater of Transporters.

He writes a monthly column for the Onsite Installer magazine, which reaches approximately 27,000 industry professionals. Since 1986, he has been responsible for overseeing research and education on agricultural water quality impacts.

Selected Grants

- USDA Regional Water quality Leadership project to coordinate water quality research, education.
- and outreach in USEPA Region 5. USDA 09/15/04- Present.
- Developing Social Indicators for NPS Evaluation in Minnesota. MPCA/ USEPA 07/15/06- 09/30/07.
- Impact of Subsurface Tile drainage on Freshwater Aquatic Species. USDA-NRCS 06/01/05-09/30/06.
- Impaired Waters: Conservation Drainage Research. MDA 07/01/06-06/30/08.

Selected Awards

- 2003 National Association of Wastewater Transporters Man of the Year.
- 1999 National Association of Wastewater Transporters Award of Appreciation presented at the 1999 Pumpers Show in Nashville, Tennessee.
- 1999 National Partnership for Reinventing Government: Hammer Award.
- 1997 USDA Distinguished Service, Farm*A*Syst/Home*A*Syst Program.
- 1997 USDA Group Honor Award, Farm*A*Syst/Home*A*Syst , Group Leader.

- 1997 USDA Group Honor Award, Management Systems Evaluation Areas, Principal Investigator.
- 1994 Special Act Award for Distinguished Service, U.S. Department of Agriculture for the development of the Farmstead Assessment System (Farm*A*Syst).
- 1989 Fellow, Soil and Water Conservation Society.

Other Relevant Activities

- Presented a basic workshop to Wastewater Environmental Contractors Association in Georgetown, Delaware January 29 and 30, 2005.
- National Association of Waste Transporters training workshops February 19–22, 2005, Nashville, Tennessee. Provided in conjunction with the 25th Annual Pumpers Environmental Exposition.
- Presented two-day workshop on the basics of onsite sewage treatment to the California Onsite Wastewater Recycling Association, May 20 and 21, 2005, in Sacramento, California.
- Presented two-day workshop on the basics of on-site wastewater treatment in Rio Rico, Arizona for Environmental Health participants from Arizona, California and Nevada, November 16–18, 2005.
- Conducted three-day workshop on the basics of on-site wastewater treatment at New Mexico Environmental Health Association Annual Conference, October 30–November 1, 2005, in Albuquerque, New Mexico.
- Presented a one-day seminar on operation and maintenance of alternative systems for the Ohio Association of Waste Haulers in Columbus, Ohio, November 4–5, 2005.

Relevant Publications

- Christopherson, S. H., J. L. **Anderson**, and D. M. Gustafson. 2001. Evaluation of Recirculating Sand Filters in Minnesota. *In: Proceedings of the Ninth National Symposium on Individual and Small Community Sewage Systems*, March 11–14, 2001, Fort Worth, Texas. American Society of Agricultural Engineers, St. Joseph, Michigan, pp207–214.
- J. Henneck, R. Axler, B. McCarthy, S. Monson-Geerts, S. H. Christopherson, J. **Anderson**, J. Crosby. 2001. Onsite Treatment of Septic Tank Effluent in Minnesota using SSF Constructed Wetlands; Performance, Costs and Maintenance. *In: Proceedings of the Ninth national Symposium on Individual and Small Community Sewage Treatment Systems*, March 11-14, Fort Worth, Texas. American Society of Agricultural Engineers, St. Joseph, Michigan, pp 650-662.
- J. D. Miersch, J. C. Bell and J. L. **Anderson**. 2001. Out of the Creek: A Wastewater Treatment Decision Case. *Journal of Natural Resources and Life Sciences Education*, Volume 30: 93–96.
- Gustafson, D. M., J. L. **Anderson** and Sara Heger-Christopherson. 2001. Aerobic Treatment Unit. University of Minnesota Extension Service FO-07667-S. 4p.
- Gustafson, D. M., J. L. **Anderson** and Sara Heger-Christopherson. 2001. Drip Distribution. University of Minnesota Extension Service FO-07668-S. 4p.
- Gustafson, D. M., J. L. **Anderson** and Sara Heger-Christopherson. 2001. Peat Filters. University of Minnesota Extension Service FO-07669-S. 4p
- Gustafson, D. M., J. L. **Anderson** and Sara Heger-Christopherson. 2001. Recirculating Media Filter. University of Minnesota Extension Service FO-07670-S. 4p.
- Gustafson, D. M., J. L. **Anderson** and Sara Heger-Christopherson. 2001. Constructed Wetlands. University of Minnesota Extension Service FO-07671-S. 4p.
- Gustafson, D. M., J. L. **Anderson** and Sara Heger-Christopherson. 2001. Single-Pass Sand Filters. University of Minnesota Extension Service FO-07672-S. 4p.
- **Anderson**, Jim and David Gustafson. 2004–2005. Basic Training. Parts 1–19. *Onsite Installer*. Cole Publishing, Inc, Three Lakes, Wisconsin.

Bruce N. Wilson

TOPICS: Water

Education:

Ph.D, University of Kentucky,
Agricultural Engineering (1984)

M.Sc., University of Minnesota,
Agricultural Engineering (1979)

B.Sc, University of Minnesota,
Agricultural Engineering (1976)

Professional Experience:

- 1983-1991: Assistant and Associate Professor, Agricultural Engineering Department, *Oklahoma State University.*
- 1991- present: Assistant, Associate and Full Professor, Biosystems and Agricultural Engineering Department, *University of Minnesota.*

*Department of Bioproducts and Biosystems Engineering
College of Food, Agriculture and Natural Resources Sciences
University of Minnesota*

Key Qualifications

Bruce Wilson is a Professor in the Department of Bioproducts and Biosystems Engineering at the University of Minnesota and is a Center-for-Transportation-Studies. He was a member of the faculty at Oklahoma State University for eight years and has been a member of the faculty at the University of Minnesota since 1991. Bruce Wilson has extensive modeling and experimental background in erosion mechanics and in hydrologic/water quality processes of watersheds. He has authored or coauthored more than one-hundred technical publications. Five of these publications have received recognition for meritorious research.

His hydrologic and sedimentologic model for surface mined lands has been widely used in the design of sediment control plans. He has served as a lead or co-investigator on more than thirty-four research project receiving more than seven million dollars of external support. Bruce Wilson is a registered Professional Engineer and is a certified Professional Hydrologist.

Selected Awards

- Semi-finalist for Oklahoma State University's Outstanding Graduate Teaching Award (1988).
- Technical Paper Award by the American Society of Agricultural Engineering (1989).
- Honorable Mention Technical Paper Award by the American Society of Agricultural Engineering (1986, 1987, 1991).
- Outstanding Technical Reviewer for the American Society of Agricultural Engineering (1990, 1991, 1994, 2002)
- Distinguished Contribution to Undergraduate Education, ASAE Student Branch (1997).
- Outstanding Contribution Advancing the State of the Art of Controlling Erosion. Minnesota Erosion Control Association (1998).
- Research Partnership Award, Center for Transportation Studies (2000).

- Professor of the Year, Department of Biosystems and Agricultural Engineering, The Institute of Technology Student Board (2002).

Selected Funded Research Projects as Lead Investigator:

- Risk Assessment Tool for the Selection of Erosion Control Practices. From Local Roads Research Board and Mn/DOT. Grant amount: \$100,000, Completion Date: 6/04.
- Stream Classification for TMDL Assessment Using a Dimensionless, Reference Reach Approach. From USEPA STAR program, Grant amount: \$770,000, Project duration: 3 years. Co-investigators: J. Nieber, J. Perry, and B. Vondracek.
- Quantifying the Variability of Stream Health Indicators for TMDL Assessment. From Minnesota Pollution Control Agency, Grant amount: \$124,000, Project duration: 2 years. Co-investigators: J. Nieber, G. Sands, J. Perry, and B. Vondracek.
- An Evaluation of Storm Water Management in a Watershed of Minnesota Valley National Wildlife Refuge. From US Fish and Wildlife Service, Grant amount: \$77,000, Project duration: 3 years.
- Evaluation of Alternative Designs for Surface Tile Inlets Using Prototype Studies. From Minnesota Department of Agriculture, Grant amount: \$100,000. Project duration = 2 years.
- Characteristics of Erosion Control Measures and Their Impact on Erosion. From Minnesota Department of Transportation, Grant amount = \$100,000, Project duration = 2 years.
- Evaluation and Design of Blind Inlets. From Minnesota Pollution Control Agency, Minnesota Department of Agriculture, and the Center for the Agricultural Impacts on Water Quality. Grant amount = \$60,000, Project duration = 3 years.

Selected Publications:

- Thompson, A.M. and B.N. Wilson. 2003. Drag on elements representative of vegetation on overland flow. *Transactions of the ASAE*, Vol. 46(2): 295-302.
- Burt, E.A. and B.N. Wilson. 2003. Sediment control practices for surface tile inlets. *Applied Engineering in Agriculture*, Vol. 19(1): 161-169.
- Benik, S.R., B. N. Wilson, D. D. Biesboer, B. Hansen, and D. Stenlund. 2003. Evaluation of erosion control products using natural rainfall events. *Journal of Soil and Water Conservation*, Vol. 58(2): 98-104.
- Benik, S.R., B. N. Wilson, D. D. Biesboer, B. Hansen, and D. Stenlund. 2003. Performance of erosion control products on a highway embankment. *Transactions of the ASAE*. Vol. 46(4): 1113-1119.
- Wilson, B.N. and P. Oduro. 2004. Sensitivity coefficients for the GAML infiltration model. *Transactions of the ASAE*, Vol. 47(2): 479-484.
- Thompson, A.M. and B.N. Wilson. 2004. Calibration accuracy for a constant temperature thermal anemometer. *Journal of Hydraulic Engineering, ASCE*, Vol. 130(8):833-836.
- Thompson, A.M., B.N. Wilson, and B.J. Hansen. 2004. Shear stress partitioning for idealized vegetated surfaces. *Transactions of the ASAE*, Vol. 47(3): 701-709.
- Wilson, B.N. and J.C. Hayes. 2004. Modeling Erosion and Transport of Sediment from Urbanizing Landscapes. *Proceedings of the 6th International Conference on Hydro-Science and - Engineering*, Brisbane, Australia.
- Wilson, B.N. and Aleksey Y. Sheshukov. 2006. A Process Based Erosion and Sediment Model for Construction Sites. *Conference of World Environmental and Water Resources Congress*. Omaha, NE.

Lucinda B. Johnson

TOPICS: Water

*Natural Resources Research Institute
University of Minnesota Duluth*

Education:

Michigan State University, Zoology,
Ph.D. 1999

State University of New York, College of
Env. Science and Forestry, Entomology,
M.S. 1984

Duke University, Botany. B.A. 1976

Positions:

University of Minnesota Duluth

- Associate Director and Senior Research Associate, Center for Water and the Environment: Natural Resources Research Institute, 2002 to present.
- Acting Director, Center for Water Center for Water and the Environment: Natural Resources Research Institute, 2002-2003.
- Assistant Director, Center for Water and the Environment: Natural Resources Research Institute. 1990 - 2002.
- Graduate Faculty, Department of Biology, University of Minnesota Duluth, 1999- present.
- Graduate Faculty, Water Resources Program, University of Minnesota, 2000- present.
- GIS Manager, Natural Resources Research Institute, Duluth, MN. 1987 - 1991.

Illinois Natural History Survey

- Assistant Research Biologist, Illinois Natural History Survey, Champaign, IL. 1985 - 1987.

Colgate University

- Research Assistant, Project Coordinator, Department of Biology, Colgate University, Hamilton, NY. 1982 - 1985.
- Laboratory Coordinator, Department of Biology, Colgate University, Hamilton, NY. 1980-1982.

Key Qualifications

Dr. Johnson is a Senior Research Associate and Associate Center Director at the Natural Resources Research Institute. She is an aquatic and landscape ecologist with broad expertise in quantifying interactions between aquatic and terrestrial ecosystems. Dr. Johnson has been a leader in watershed science and indicator development in streams and wetlands and has consulted with the Environmental Protection Agency in the development of methods for assessing disturbance regimes in rivers. Dr. Johnson is the elected Secretary of the North American Benthological Society, the leading organization representing stream ecologists in the world.

Selected Grants

- Restoring Instream and Riparian Habitat in Lake Superior's Lester-Amity Watershed National Fish and Wildlife Federation (Great Lakes National Program Office, Environmental Protection Agency is prime). \$35,000. 1/2006-12/2008.
- Effects of multiple stressors on aquatic communities. Environmental Protection Agency, STAR Program 2003-2006. Co-Principal Investigator with Patrick Schoff, and Glenn Guntenspergen. \$746,433.
- Testing Indicators of Coastal Ecosystem Integrity Using Fish and Macroinvertebrates, Environmental Protection Agency, 2001-2005. Principal Investigator with C. Richards, J. Schuldt, J Ciborowski. \$893,628. Subproject of: Development of Environmental Indicators of Condition, Integrity, and Sustainability in the Great Lakes Basin, G. Niemi, P.I. \$6,000,000.
- Protocols for Selecting Classification Systems and Reference Conditions: A Comparison of Methods. Environmental Protection Agency. 2001-2004. Co-PI with J. Schuldt, J. Ciborowski, G. Host, C. Richards. \$747,404 (plus \$250,000 cash university match).

Selected Appointments

- Secretary, North American Benthological Society, 2002-present.
- Forest Resources Council appointment to the Riparian Science Technical Committee, 2004-2006. (ongoing).
- National Science Foundation Review Panel, Field Station and Marine Lab Facilities, 2005.

Other Relevant Activities

- MN Legislature, Energy Committee, Testimony of effects of climate change in Minnesota, 2004.
- MN Department of Natural Resources and MN Pollution Control Agency, four briefings on climate change impacts in Minnesota- May, August, September, October 2006.
- Environmental Protection Agency's Office of Water, Experts Committee on Quantifying the Human Disturbance Gradient. 2004-2006 (ongoing).

Selected Publications:

Johnson, L. B., G.E. Host, C. Richards, J. H. Olker. 2006. Landscape and local scale predictors of wood abundance in low gradient streams. Pages 151-174, In: Hughes, R.M., L. Wang, P.W. Seelbach, editors. Landscape Influences on stream habitats and biological assemblages. American Fisheries Society Symposium 48, Bethesda, Maryland.

Host, G.E., J.A. Schuldt, J.J.H. Ciborowski, **L. B. Johnson**, T.P. Hollenhorst, and C. Richards. 2005. Use of GIS and remotely sensed data for *a priori* identification of reference areas for Great Lakes coastal ecosystems. International Journal of Remote Sensing (Special Issue on Estuarine Ecosystem Analysis) 26(23):5325-5342.

Kling, G., Hayhoe, K. **L. B. Johnson**, J. Magnuson, S. Polasky, S. Robinson, B. Shuter, M. Wander D. Wubbles, D. Zak. 2003. *Confronting Climate Change in the Great Lakes Region. Sustaining the Ecology and Well Being of Our North American Heartland*. Union of Concerned Scientists and Ecological Society of America.

Peterson, G. S., **L. B. Johnson**, R. P. Axler, and S. A. Diamond. 2002. Assessment of the Risk of Solar Ultraviolet Radiation to Amphibians II: *In Situ* Characterization of Exposure in Amphibian Habitats. Environmental Science and Technology 36:2859-2865.

Schoff, P. K., C. M. Johnson, A. M. Schotthoefer, C. Leiske, **L. B. Johnson**, and V. R. Beasley. 2003. Current prevalence of malformed frogs: estimations based on collections from randomized sites. *Journal of Wildlife Diseases* 39:510-521.

Robert W. Sterner

TOPICS: Water

*Department of Ecology, Evolution and Behavior
University of Minnesota*

Education

University of Minnesota, Ecology,
Ph.D. 1986

University of Illinois, Biology, B.S.
1980

Positions

University of Minnesota

- Professor, Dept of Ecology, Evolution and Behavior, since 1994 (Associate Professor, 1994-1999, Professor 2003-Present, Head 199-2003).
- Graduate faculties in: Ecology, Evolution and Behavior, Conservation Biology; Water Resources Science.

University of Texas at Arlington

- Assistant Professor, 1988-1992.
- Associate Professor, 1992-1994.

*Max Planck Institute for Limnology,
Germany*

- Postdoctoral Research Fellow, 1986-1987.

Key Qualifications

Dr. Sterner is Professor of Ecology, Evolution and Behavior and member of Graduate Programs in EEB, Water Resources Science and Conservation Biology. He has broad expertise on aquatic ecosystem function, biological responses to nutrients, and ecological stoichiometry. His research concerns both small lakes and Lake Superior. He has served on numerous State and Federal committees dealing with aquatic conservation and management.

Selected Grants

- **Minnesota Sea Grant, 2007-2009.** Primary Production and Grazing Dynamics in the Ultra-Oligotrophic Waters of Lake Superior. \$224, 220 for two years. RWS sole PI.
- **National Science Foundation – Chemical Oceanography, 2003-2006** – “Collaborative Research: The nitrifying of Lake Superior” with two other Co-PI’s at Minnesota and two Co-PI’s at other institutions. RWS Project Director. 3 years. Total project \$375,971, RWS portion \$176,391.
- **National Science Foundation – Division of Environmental Biology, 2003-2006** – “Element linkages and ecological tradeoffs in growth and competitive ability” 3 years; \$337,076. Sole PI.
- **USGS, Water Resources Center, North Central Region, 2002-2004** - “Biodiversity in urban ponds and lakes: human effects on plankton populations.” \$50,000. 3/02-2/04. RWS sole PI.

Selected Appointments

- Chair, Gordon Research Conference on Metabolic Ecology, 2008 meeting.
- Member of the Ecology Institute (ECI, www.int-res.com).
- Member of Scientific Advisory Panel to MPCA, Lake Pepin Watershed TMDL Project.
- Member of Faculty of 1000.
- Past Member at Large, American Society of Limnology and Oceanography.
- Member of NRC review committee on adaptive management at the Army Corps of Engineers.

Selected Publications (out of 60+):

- Hendrixson, H. A., Sterner, R. W. & Kay, A. D. Elemental stoichiometry of freshwater fish in relation to phylogeny, allometry and ecology. *Journal of Fish Biology* in press.
- Sterner, R.W., Smutka, T.M., R.M.L. McKay, Xiaoming, Q., Brown, E.T., Sherrell, R.M. 2004. Phosphorus and trace metal limitation of algae and bacteria in Lake Superior. *Limnology and Oceanography* 49: 495-507.
- Sterner, R. W. and J.J. Elser. 2002. Ecological Stoichiometry: The Biology of Elements from Molecules to the Biosphere. Princeton University Press, Princeton, NJ. 439 pp.
- Sterner, R.W., and M. Schwalbach. 2001. Diel integration of food quality by Daphnia: luxury consumption by a freshwater planktonic herbivore. *Limnology and Oceanography* 46: 410-416.
- Elser, J. J., Fagan, W. F., Denno, R. F., Dobberfuhl, D. R., Folarin, A., Huberty, A., Interlandi, S., Kilham, S. S., McCauley, E., Schulz, K. L., Siemann, E. & Sterner, R. W., 2000. Nutritional constraints in terrestrial and freshwater food webs. *Nature* 408: 578-580.
- Elser, J.J., T.H. Chrzanowski, R.W. Sterner, K.H. Mills. 1998. Stoichiometric constraints on food-web dynamics: a whole-lake experiment on the Canadian Shield, *Ecosystems*: 1: 12-136.
- Sterner, R.W. and D.O. Hessen. 1994. Algal nutrient limitation and the nutrition of aquatic herbivores. *Annual Review of Ecology and Systematics* 25: 1-29.
- Sterner, R.W., Hagemeier, D.D., Smith, W.L., and R.F. Smith. 1993. Phytoplankton nutrient limitation and food quality for *Daphnia*. *Limnology and Oceanography* 38: 857-871.

Richard P. Axler

TOPICS: Water

*Natural Resources Research Institute
University of Minnesota Duluth*

Education:

Temple University, Physics, B.S. 1970

University of California-Davis
Ecology/Limnology, .D. 1979

Positions:

- Senior Research Associate (since '97).
- Director of Central Analytical Laboratory, NRRI.
- Graduate Faculty (Biology UM-Duluth; Water Resources Science UM; 1988-04.
- Assistant Director, Lake Mead Limnological Research Center, U. of Nevada, Las Vegas, NV, 1986-88.
- Co-Director, Interagency Tahoe Monitoring Program, U. Calif-Davis 1982-1984.
- Staff Research Scientist, Institute of Ecology/ Div. Environmental Studies, U. Calif- Davis, 1979-1986.

Research Interests

Lake and water quality management and restoration; aquatic ecosystem responses to pollutants; nutrient cycling and food web dynamics; web-based environmental education using real-time data; constructed treatment wetlands.

Selected Publications since 1996

(131 total, 68 peer-reviewed; www.nrri.umn.edu/cwe)

Axler, R., C. Hagley, G. Host and Jesse Schomberg. 2006.

LakeSuperiorStreams.org: Making stormwater and stream data come alive for citizens, students, teachers, contractors, resource agencies, decision makers and scientists. Proc. USDI/USGS 5th National Water Quality Monitoring Conference, San Jose, CA May 2006.

Lonsdale, M., T. Carlson, R. Axler, J. Walker, C. Hagley, J. Schomberg, M. Granley and G. Host, Linking data, public outreach and education: The City of Duluth Stream Outreach Program www.lakesuperiorstreams.org. Water Environment Federation Proc, WEFTEC.06 79th Annual WEF Conference, Dallas, TX Oct 2006.

Reavie, E., R. Axler, G. Sgro, A. Kireta, T. Brown and N. Danz. 2006. Diatom-base weighted-averaging models for Great Lakes coastal water quality: Relationships to watershed characteristics. *J. Great Lakes Research*. In Press.

Trebitz, A.S., J.C. Brazner, V. J. Brady, R.P. Axler, and D.K. Tanner. 2006. Turbidity tolerances of Great Lakes coastal wetlands fishes. *North Amer. J. Fish. Manage.* In Press.

Danz, N.P., G.J. Niemi, R. R. Regal, T. Hollenhorst, L. Johnson, J. Hanowski, R. Axler, J. Ciborowski, T. Hrabik, V.J. Brady, J.R. Kelly, J.C. Brazner, and R.W. Howe. 2006. Integrated Measures of Anthropogenic Stress in the U.S. Great Lakes. *Environ. Management*. In Press.

Pundsack, J., R. Hicks and R. Axler. 2005. Effect of alternative on site wastewater treatment on the culturability and viability of *Salmonella choleraesuis*. *J. Water and Health*. 3:1-13.

- Olson, M.R., R.P. Axler, R.E.Hicks, J.R. Henneck and B.J.McCarthy. 2005. Seasonal virus removal by alternative wastewater treatment systems. *J. Water and Health*. 3(2):139-55.
- Olson, M.R., R.P. Axler and R.E.Hicks. 2004. Effects of Freezing and Storage Temperature on MS2 Viability. *J. Virological Methods* 122:147-152.
- Axler, R.P. and M. Lonsdale. 2003. Understanding Water Quality and Stormwater Impacts at the Head of the Great Lakes. EPA Coastlines Issue 13.1 (February 2003); <http://www.epa.gov/owow/estuaries/coastlines>).
- Munson, B., R. Huber, R. Axler, G. Host, C. Hagley, C. Moore and G. Merrick. 2003. Investigating water quality through the Internet. *The Science Teacher* 70(1): 44-49.
- Axler, R.P., J.R. Henneck and M.E. McDonald. 2001. Mine Pit Aquaculture in Minnesota: Perspectives on the Environmental & Regulatory Issues, 1988-1999. North Central Region Aquaculture Center: Spec. Symp. on Environmental Strategies for Aquaculture, Minneapolis, MN, December 2000.
- Peterson, G.S., L. Johnson, R. Axler and S. Diamond. 2002. In situ characterization of solar ultraviolet radiation in amphibian habitats. *Environ. Science & Technol.* 36:2859-2865.
- Peterson, G.S., R.P. Axler, K.B. Lodge, J.A. Schuldt and J.L. Crane. 2002. Evaluation of a fluorometric screening method for predicting total PAH concentrations in contaminated sediments. *Environ. Monitoring and Assessment*. 78(2): 111-129.
- Axler, R., J.Henneck and B. McCarthy. 2001. Residential subsurface flow treatment wetlands in northern Minnesota. *Water Science & Technology* 44: 345-352.
- Pundsack, J., R. Axler, R. Hicks, J. Henneck, D. Nordman and B. McCarthy. 2001. Seasonal pathogen removal by on site alternative wastewater treatment systems. *Water Environment Research* 73:204-212.
- Host, G.E., B. H. Munson, R. P. Axler, C. A. Hagley, G. Merrick and C. J. Owen. 2000. Water on the Web: Students monitoring Minnesota rivers and lakes over the Internet. AWRA Spec. Symp. *Water Resources & World Wide Web*. Seattle, WA, Dec. 1999.
- Host, G. E., N. R. Will, R. P. Axler, C. J. Owen and B. H. Munson. 2000. Interactive technologies for collecting and visualizing water quality data. *J. Urban and Regional Information Systems Association (URISA)* 12:39-45.
- Axler, R., S.Yokom, C.Tikkanen, M.McDonald, H.Runhie, D.Wilcox, B.Cady. 1998. Restoration of a mine pit lake from aquacultural nutrient enrichment. *Restoration Ecology* 6:1-19.
- Axler, R. and J.Reuter.1996. Nitrate uptake by phytoplankton and periphyton: Whole-lake enrichments and mesocosm-15N experiments in an oligotrophic lake. *Limnol.Ocean*.41: 659-71.
- Axler, R., C. Larsen, C.Tikkanen, P. Aas, and M.McDonald. 1996. Water quality issues associated with aquaculture: A case study in minepit lakes. *Wat. Env. Res.* 68:1-17.

Water Science Education Websites (3): www.WaterontheWeb.org, www.LakeSuperiorStreams.org, and www.LakeAccess.org. These three websites collectively are now generating ~2.5 million hits and ~300,000 page requests per month.

Additional Synergistic Activities

Directs NRRI's Central Analytical Laboratory; collaborates with local, state, federal agencies, development agencies, consulting firms, other university scientists. Activities: monitoring and assessing water/sediment quality in lakes, streams and wetlands; assessing exotic species impacts, environmental sensors & indicators; characterizing UV radiation exposure in upper Midwest frog habitats. Participatory grants and contracts have totaled >\$12 million at NRRI since 1988.

John R. Baker

TOPICS: Water

Education:

B.S. in Agronomy (Soil Science) the Ohio State University, 1983

M.S. in Soil & Crop Sci, Texas A&M University, 1985

Ph.D. in Soil & Crop Sci., Texas A&M University, 1987

Positions:

- 1987- present, Soil Scientist, USDA-ARS, St. Paul, MN.
- 2001-present, Research Leader, USDA-ARS Soil & Water Management Unit, St. Paul, MN.
- 1987-present, Adjunct Assistant, Associate, and Full Professor, Dept. Of Soil, Water & Climate, University of Minnesota.

Research Leader, USDA-ARS

and Adjunct Professor

Dept. of Soil Water & Climate, University of Minnesota

Memberships in Professional Organizations

- American Society of Agronomy
- Soil Science Society of America
- American Meteorological Society
- American Geophysical Union

Disciplinary Expertise

- Micrometeorology, Soil Physics

Peer-Reviewed Publications

- Baker, J.M., and J.M. Norman. 2002. Evaporation from natural surfaces. Pp. 1047-1074 in "Methods of Soil Analysis, 3rd edition", J. Dane and G.C.Topp (eds). Amer. Soc. Agron., Madison, WI
- Spaans, E.J.A., and J.M. Baker. 2002. Determination of soil moisture characteristic by freezing. Pp. 704-709 in "Methods of Soil Analysis, 3rd edition", J. Dane and G.C.Topp (eds). Amer. Soc. Agron., Madison, WI.
- Baker, J.M. 2002. Water Relations of Frozen Soil. Pp. 1390-1392 in Encyclopedia of Soil Science, Rattan Lal (ed.). Marcel Dekker, N.Y.
- Baker, J.M., and D.G. Baker. 2002. Long-term ground heat flux and heat storage at a mid-latitude site. Climatic Change 54:295-303.
- Cobos, D.R., J.M. Baker, and E.A. Nater. 2002. Conditional sampling for measuring mercury vapor fluxes. Atmospheric Environment 36(27): 4309-4321.
- Baker, J.M. 2003. Water movement in frozen soil. Pp. 314-316 in Encyclopedia of Water Science, T.A. Howell and B.A. Stewart (eds.). Marcel Dekker, N.Y.
- Cobos, D.R., and J.M. Baker. 2003. Evaluation and modification of a domeless net radiometer. Agron. J. 95:177-183.

- Cobos, D.R., and J.M. Baker. 2003. In Situ Measurement of Soil Heat Flux with the Gradient Method. *Vadose Zone J* 2003 2: 589-594.
- Gollany, H.T., J.A.E. Molina, C.E. Clapp, R.R. Allmaras, M.F. Layese, J.M. Baker, and H.H. Cheng. 2003. Nitrogen leaching and denitrification in continuous corn as related to residue management and nitrogen fertilization. *Environ. Management* 33, suppl. 1: S289-S298.
- Baker, J.M. 2003. Recalcitrant problems in environmental instrumentation. *Agron J.* 95: 1404-1407.
- Masarik, K.C., J.M. Norman, K.R. Brye, and J.M. Baker. 2004. Improvements to measuring water flux in the vadose zone. *J. Env. Qual.* 33: 1152-1158.
- Griffis, T.J., J.M. Baker, S.D. Sargent, B.D. Tanner, and J. Zhang. 2004. Measuring field scale isotopic CO₂ fluxes with tunable diode laser absorption spectroscopy and micrometeorological techniques. *Agric. Forest Meteorol.* 124:15-29.
- Baker, J.M., and T.J. Griffis. 2005. Examining Strategies to Improve the Carbon Balance of Corn/Soybean Agriculture using eddy covariance and mass balance techniques. *Agric. Forest Meteorol.* 128:163-177.
- Griffis, T.J., J.M. Baker, and J. Zhang. 2005. Seasonal dynamics of isotopic CO₂ exchange in a C₃/C₄ managed ecosystem. *Agric. Forest Meteorol.* 132:1-19.
- Baker, J.M. 2005. Humidity. Pp. 31-42 in *Micrometeorology in Agricultural Systems*, J.L. Hatfield and J.M. Baker (eds.). American Society of Agronomy, Madison, WI.
- Hatfield, J.L., and J.M. Baker (eds.) 2005. *Micrometeorology in Agricultural Systems*. American Society of Agronomy, Madison, WI. 584 pp.
- Griffis, T.J., X. Lee, J.M. Baker, and J.Y. King. 2005. Feasibility of quantifying ecosystem-atmosphere C¹⁸O¹⁶O exchange using laser spectroscopy and the flux-gradient method. *Agric. Forest Meteorol.* 135:44-60.
- Dolan, M. D., C.E. Clapp, R.R. Allmaras, J.M. Baker, and J.A.E. Molina. 2006. Soil organic carbon and nitrogen in a Minnesota soil as related to nitrogen, tillage, and residue management. *Soil Tillage Res.* 89:221-231.
- Dobermann, A., J. M. Baker and D. T. Walters. 2006. Comment on "Carbon budget of mature no-till ecosystem in North Central Region of the United States". *Agric. Forest Meteorol.* 136:83-84.
- Zhang, J., T.J. Griffis, and J.M. Baker. 2006. Using continuous stable isotope measurements to partition net ecosystem CO₂ exchange. *Plant, Cell, and Environment* 29:483-496.
- Venterea, R.T., J.M. Baker, M.S. Dolan, and K.A. Spokas. 2006. Carbon and nitrogen storage are greater under biennial tillage in a Minnesota corn-soybean rotation. *Soil Sci. Soc. Amer. J.* (in press).
- Baker, J.M., T.E. Ochsner, R.T. Venterea, and T.J. Griffis. 2006. Tillage and carbon sequestration- What do we really know? *Agric. Ecosyst. Environ.* (in press).
- Griffis, T.J., J. Zhang, J.M. Baker, N. Kljun, and K. Bilmark. 2007. Determining carbon isotope signatures from micrometeorological measurements: implications for studying biosphere-atmosphere exchange processes. *Boundary Layer Meteorol.* (in press).

Raymond M. Newman

TOPICS: Fish, Water

Education:

University of Minnesota, Ph.D
Fisheries 1985, T.F. Waters, advisor

University of Minnesota, M.S.
Fisheries 1982 (Minor: Applied
Statistics), T.F. Waters, advisor

Slippery Rock University, B.S.
Biology 1978 Magna cum laude

Florida Institute of Technology, (Fall
Quarter, Marine Biology, 1975)

Positions:

University of Minnesota

- Professor, Dept of Fisheries, Wildlife and Conservation Biology, since 2002 (Associate Professor, 1995-2002, Assistant Professor 1988-1995); Interim Head, Aug 2006.
- Graduate faculties in: Conservation Biology; Ecology, Evolution and Behavior; Water Resources Science.
- Director of Graduate Studies, Water Resources Science 2003-present.

Elsewhere:

- Guest Scientist, Max Planck Institute of Chemical Ecology 2002.
- Visiting Scientist, Inst. Freshwat. Ecol., River Lab, Dorset, UK April-May 1997.
- Investigator, NETP, University of Michigan Biological Station, Summer 1987, 1988.
- Postdoctoral Fellow, Renewable Natural Resources, University of Connecticut 1986-1988.

*Department of Fisheries, Wildlife and Conservation Biology
College of Food, Agriculture and Natural Resources Sciences
University of Minnesota*

Key Qualifications

Dr. Newman is Professor of Fisheries and Director of Graduate Studies of the Water Resources Science Graduate Program. He is an aquatic ecologist with extensive experience in the ecology of streams and lake littoral zones. His research has focused on the biology and control of invasive aquatic species and the effects of forest harvest on stream habitats and communities.

Selected Grants

- Evaluating Riparian Timber Harvesting Guidelines: Phase II. Legislative Commission on Minnesota Resources, 2005-2008, Co-PI with J. Hanowski, B. Palik; C. Blinn, PI (\$333,000).
- Comparison of effects on stream habitat and fish nine years after harvest treatments. National Council for Air and Stream Improvement 2006-2007, co-PI with B. Vondracek (\$20,000).
- Assessment of the effects of whole lake treatments to control nuisance aquatic plants Minnesota Dept. Nat. Res. 2006-2009, PI (\$120,000).
- Legislative Commission on Minnesota Resources, 2006-2009, Co-PI with H. Steffan, V. Card, R. Skaggs; L. Johnson, PI (\$250,000). Impacts on Minnesota's aquatic resources from climate change.

Selected Appointments

- Member, Eurasian Watermilfoil/Exotics Task Force, Lake Minnetonka Conservation District, 1992- present.
- Member, Peer Review Team, Forest Management Guidelines for Forest Riparian Areas and Seasonal Ponds, MN Forest Resources Council, 2000.
- Member, Minnesota Invasive Species Advisory Council Expert Groups (Aquatic Plants; Aquatic Animals) 2003-present.

Other Relevant Activities

- Invited participant, Houghton Lake Eurasian watermilfoil Workshop, sponsored by the US Army Corps of Engineers, MacMullan Conference Center, Roscommon, MI, 2001.

- Invited participant, Workshop to develop research priorities for invasive aquatic plants, Western Regional Panel on Aquatic Nuisance Species, La Jolla, CA 2005.

Selected Publications:

- Stauffer, J.C., R.M. Goldstein and R.M. Newman. 2000. Relationship of wooded riparian zones and runoff potential to fish community composition in agricultural streams. *Canadian Journal of Fisheries and Aquatic Sciences* 57(2): 307-31.
- Henson, F.G. and R.M. Newman. 2000. Effect of temperature on growth at ration and gastric evacuation rate of ruffe (*Gymnocephalus cernuus*). *Transactions of the American Fisheries Society* 129(2): 552-560.
- Newman, R.M. 2004. Invited Review – Biological control of Eurasian watermilfoil by aquatic insects: basic insights from an applied problem. *Archiv für Hydrobiologie* 159 (2): 145 - 184. <http://dx.doi.org/10.1127/0003-9136/2004/0159-0145>.
- Ruetz, C.R., B. Vondracek and R.M. Newman. 2004. Weak top-down control of grazers, and periphyton by slimy sculpins in a coldwater stream. *Journal of the North American Benthological Society* 23(2): 271-286. [http://dx.doi.org/10.1899/0887-3593\(2004\)023<0271:WTCOGA>2.0.CO;2](http://dx.doi.org/10.1899/0887-3593(2004)023<0271:WTCOGA>2.0.CO;2).
- Marko, M. D., R. M. Newman and F. K. Gleason. 2005. Chemically mediated host-plant selection by the milfoil weevil: a freshwater insect-plant interaction. *Journal of Chemical Ecology* 31 (12): 2857-2876. <http://www.springerlink.com/openurl.asp?genre=article&id=doi:10.1007/s10886-005-8399-7>.
- Hemstad, N.A. and R.M Newman. 2006. Local and landscape effects of past forest harvest on stream habitat and fish assemblages. Pages 413-427 in R. M. Hughes, L. Wang, and P. W. Seelbach, editors. *Influences of landscape on stream habitats and biological assemblages*. American Fisheries Society, Symposium 48, Bethesda, Maryland.
- Roley, S.S. and R.M. Newman. 2006. Developmental performance of the milfoil weevil, *Euhrychiopsis lecontei* (Coleoptera: Curculionidae) on northern watermilfoil, Eurasian watermilfoil, and hybrid (northern x Eurasian) watermilfoil. *Environmental Entomology* 35(1): 121-126. <http://hermia.esa.catchword.org/vl=14125878/cl=14/nw=1/rpsv/cw/esa/0046225x/v35n1/s14/p121>.
- Ward, D.M. and R.M. Newman. 2006. Fish predation on Eurasian watermilfoil herbivores and indirect effects on macrophytes. *Canadian Journal of Fisheries and Aquatic Sciences* 63(5): 1049-1057. http://pubs.nrc-cnrc.gc.ca/cgi-bin/rp/rp2_abst_e?cjfas_f06-010_63_ns_nf_cjfas5-06.
- Newman, R.M., E. M. Gross, W. Wimmer and P. Sprick. 2006. Life history and developmental performance of the Eurasian milfoil weevil, *Eubrychius velutus* (Coleoptera: Curculionidae). *The Coleopterists Bulletin* 60(2): 170-176.

Ira R. Adelman

TOPICS: Fish

Education:

University of Vermont, B.A., 1963,
Psychology

State University of New York at New
Paltz, 1964, Zoology

University of Minnesota, Ph.D., 1969,
Fisheries

U. of Texas, Institute for Higher
Education Management, *Management
Workshop for Academic Department and
Division Heads*, 1984 (2 wk)

Carnegie Mellon University, School
of Urban and Public Affairs, *College
Management Program*, 1989 (3 wk)

Penn State University, College of
Business Administration,
*Management Program for Natural
Resource Managers*, 1989 (2 wk)

Positions:

University of Minnesota

- Head, Dept of Fisheries, Wildlife and Conservation Biology, 1982 – 2000.
- Professor, Dept of Fisheries, Wildlife and Conservation Biology, since 1982 (Associate Professor, 1978-1982, Assistant Professor 1974-1978), Research Associate, 1969 – 1974.
- Graduate faculties in:
Conservation Biology and Fisheries.

*Minnesota Department of Natural
Resources*

- Special Assistant to the Director, Division of Fish & Wildlife, 1990 (sabbatical position).

*Department of Fisheries, Wildlife and Conservation Biology
College of Food, Agriculture and Natural Resources Sciences
University of Minnesota*

Key Qualifications

Dr. Adelman is professor of fisheries, wildlife, and conservation biology. He has broad expertise on fisheries management, water quality, and effects of pollution on fish. For 18 years prior to 2000 he served as head of the Department of Fisheries, Wildlife, and Conservation biology and served on many University-wide committees dealing with the role of the University in conservation of natural resources. He served as president of the 9,000 member American Fisheries Society in 2004.

Selected Grants

- Ammonia, nitrite, and nitrate toxicity to the endangered Topeka shiner and implications for Iowa's critical habitat, U.S. Fish and Wildlife Service, 2006-2008.
- Use of fathead minnow cDNA microarrays to screen for estrogenic and androgenic chemicals in surface waters, National Sea Grant, Biotechnology Program, 2003-06.
- Improved decisions for walleye stocking and special regulations, Legislative Commission on Minnesota Resources, 1997-2000.
- Ecological impact of releasing genetically engineered fishes, Legislative Commission on Minnesota Resources, 1993-95 (with A. Kapuscinski).

Selected Relevant Activities

- American Fisheries Society, President 2004 and Governing Board 2001 – 2005
- MN Department of Natural Resources, Citizen's Oversight Committee, 1995 – 2002, chair 2001 - 2002
- MN Department of Natural Resources, 1837 Treaty Consultation Forum, 1995 – 1996
- MN Department of Natural Resources, Wildlife Species Database Advisory Committee, 1999
- Minnesota Pollution Control Agency, Toxics Technical Advisory Committee, 1988
- Minnesota Pollution Control Agency, Air Quality Ecological Effects Committee, 1990-1991
- Minnesota Aquaculture Commission, 1990 - 1995

Selected Publications:

- Adelman, I.R. 2005. Leopold's legacy for fisheries. *Fisheries* 30 (1):20-21.
- Burkett, D.P. and I. R. Adelman. 2004. Establishing a North American agenda for aquatic resources – Bringing science, policy and management together. *Fisheries* 29 (3): 4.
- Levitt, J.T., H. Schoenflug, and I.R. Adelman. 2001. Possible effects of endocrine disrupting compounds on walleye near the Metro Sewage Treatment Plant, St. Paul, MN. Pages 191-202 in R. Masters, ed. *Proceedings 2nd International Conference on Pharmaceuticals and Endocrine Disrupting Chemicals in Water*. National Ground Water Assoc. Westerville, OH.
- Eldridge, W.H., M.D. Bacigalupi, I.R. Adelman, L.M. Miller, and A.R. Kapuscinski. 2002. Determination of relative survival of two stocked walleye populations and resident natural origin fish by microsatellite DNA parentage assignment. *Canadian Journal of Fisheries and Aquatic Sciences* 59: 282-290.
- Ji, Y. Q., J. J. Warthesen, and I. R. Adelman. 1998. Thiamin nutrition, synthesis, and retention in relation to lake trout reproduction in the Great Lakes. *American Fisheries Society Symposium* 21: 99-111.
- Ji, Y. Q. and I. R. Adelman. 1998. Thiaminase activity in alewives and smelt in Lakes Huron, Michigan, and Superior. *American Fisheries Society Symposium* 21: 154-159.
- Li, J, Y. Cohen, D. H. Schupp, and I. R. Adelman. 1996. The effects of walleye stocking on population abundance and fish size. *North American J. Fish. Management* 16: 830-839.
- Li, J, Y. Cohen, D. H. Schupp, and I. R. Adelman. 1996. Effects of walleye stocking on year class strength. *North American J. Fish. Management* 16: 840-850.

Karen S. Oberhauser

TOPICS: Fish and Wildlife

Education:

Harvard University 1974 - 79. A.B. Biology, cum laude

University of Wisconsin, Madison 1980 - 81. B.S. Natural Science Education

University of Minnesota 1984 - 1989. Ph.D., Ecology and Behavioral Biology, Genetics Minor. Thesis advisors, Drs. P.A. Abrams and J.W. Curtsinger

Positions:

- Assistant Professor. University of Minnesota, Department of Fisheries, Wildlife and Conservation Biology. 2003 – present. Member of the Fisheries, Wildlife & Conservation Biology; Conservation Biology; Ecology; and Natural Resources Science & Management graduate faculties.
- Outreach/Teaching Assistant Professor. 2002 – 2003. University of Minnesota, Department of Ecology, Evolution and Behavior.
- Director of Monarchs in the Classroom. 1995 - present.
- Research Associate and Adjunct Assistant Professor, University of Minnesota. Member of Ecology and Conservation Biology Graduate Faculties. 1991 - 2002.
- Onalaska High School, Onalaska, Wisconsin. Biology, Chemistry and Earth Science Teacher. 1981 - 84.

*Department of Fisheries, Wildlife and Conservation Biology
College of Food, Agriculture and Natural Resources Sciences
University of Minnesota*

Key Qualifications

Karen Oberhauser has been studying monarch butterflies since 1984, and is the director of the Monarchs in the Classroom and Monarch Larva Monitoring programs. She is an assistant professor in the Department of Fisheries, Wildlife and Conservation Biology at the University of Minnesota. Karen works with teachers and pre-college students in Minnesota and throughout the United States using monarchs to teach about biology, conservation, and the process of science, and distributes monarch eggs and larvae to hundreds of teachers each summer and fall. Over 500 citizen volunteers participate in the Monarch Larva Monitoring project.

She and her graduate and undergraduate students have studied monarch reproduction, disease dynamics, overwintering biology, larval nutritional requirements, and larval ecology. Some of their more applied work has included a risk assessment of the potential impacts of genetically modified corn and insecticides on monarchs.

Selected Grants

National Science Foundation. DGE-0440517. \$1,857,847. Track 1 GK-12: Graduate Fellows and Environmental Biology. 2005-2008. K. Oberhauser, PI. Co-PI's F. Lawrenz, L. Covington Clarkson, S. Lanyon, S. Weller.

Northern Environmental Support Trust. \$30,000. Schoolyard Outdoor Learning Labs. 04/15/2005-04/14/2007.

National Science Foundation. \$1,712,504. Model Master Naturalist Programs: A Minnesota/Florida Collaboration. 2006-2010. R. Blair, PI. Co-PI's M. Main, K. Oberhauser, A. Rager.

Medtronic Foundation, Minneapolis MN. \$91,763. *Monarchs in the Classroom*: Student Research and Research Fair. 2006-2009. K. Oberhauser, PI.

Improving Teacher Quality Program. \$43,456. *Schoolyards, Science and Sustainability* Summer Workshop. 2006-2007. K. Oberhauser and R. Blair, co-PIs.

Improving Teacher Quality Program. \$47,963. *Monarchs and More: Insect Ecology for Elementary School Teachers* Summer Workshop. 2006-2007. K. Oberhauser, PI.

Selected Appointments

Minnesota Environmental Education Advisory Board Member: Representative of Congressional District 4. Fall 2001-present.

United States Environmental Protection Agency Workshop on the Monarch Butterfly, Milkweed and Tropospheric Ozone Air Pollution. December 2001.

Advisor at the First North American Capacity Building Workshop for Biodiversity Conservation: Monitoring of Species, Spaces and Threats of Common concern. 18-22 April 2005, La Primavera, Jalisco Mexico.

Reviewer of Science Live Programs for the Science Museum of Minnesota. Fall 2005.

Scientific advisor for IMAX film: Monarch Migration. 2006.

Scientist-Teacher Partnerships. Selected as one of 12 individuals from throughout the US to write a partnership handbook. Organized by Katherine Nielsen, Co-Director, Science & Health Education Partnership, UC San Francisco. 2006-2007.

Selected Publications:

- Oberhauser, K.S., Prysby, M.D., Mattila, H.R., Stanley-Horn, D.E., Sears, M.K., Dively, G., Olson, E., Pleasants, J.M., Lam, W.F. & Hellmich, R. 2001. Temporal and spatial overlap between monarch larvae and corn pollen. *Proc. Nat. Acad. Sci.* 98 (21): 11913-11918.
- Oberhauser, K.S. and T. Peterson. 2003. Modeling Current and Future Potential Wintering Distributions of Eastern North American Monarch Butterflies. *Proc. Nat. Acad. Sci.* 100:14063-14068.
- Oberhauser, K.S. and E.R.L. Rivers. 2003. Monarch Butterfly (*Danaus plexippus*) Larvae & Bt Corn Pollen: A Review of Ecological Risk Assessment for a Non-Target Species. *AgBiotechNet.* 5:1-7.
- Oberhauser, K.S. and M.J. Solensky. 2004. *The Monarch Butterfly: Biology and Conservation.* Cornell University Press, Ithaca NY.
- Szymanski, J., J.A. Shuey, K. Oberhauser. 2004. Population structure of the endangered Mitchell's Satyr, *Neonympha mitchellii mitchellii* (French). *Am. Midl. Nat.* 152(2):304-322.
- Jeanpierre, B., K. Oberhauser, C. Freeman. 2005. Change in Secondary Science Teachers' Classroom Practices: A Professional Development Model That Works. *J. Res. Sci. Teaching.* 42(6):668-690.
- Oberhauser, K. S., S. J. Brinda, S. Weaver, R. D. Moon, S. A. Manweiler, N. Read. 2006. Growth and survival of monarch butterflies (Lepidoptera: Danaidae) after exposure to permethrin barrier treatments. *Environmental Entomology.* In press.

Francesca J. Cuthbert

TOPICS: Wildlife

Education:

University of Minnesota, Ph.D.
Ecology

Northern Illinois University, M.S.
Biology

University of Michigan, B.A.
Conservation

Positions:

University of Minnesota

- Professor and Interim Head, Dept of Fisheries, Wildlife and Conservation Biology.
- Graduate faculties in: Conservation Biology; Natural Resources Sciences and Management.

University of Michigan

- Adjunct Professor, University of Michigan Biological Station.

*Department of Fisheries, Wildlife and Conservation Biology
College of Food, Agriculture and Natural Resources Sciences
University of Minnesota*

Key Qualifications

Dr. Cuthbert is Professor of Wildlife and Conservation Biology and is currently Interim Head, Department of Fisheries, Wildlife and Conservation Biology and President of the Waterbird Society, an international organization that promotes research and conservation of aquatic birds. She has broad expertise on the biology and conservation of waterbirds, particularly in upper Midwestern U.S. She was awarded the 2003 Minnesota Award from the Minnesota Chapter of The Wildlife Society. She has served on advisory boards for the U.S. Fish and Wildlife Service, Minnesota Department of Natural Resources and Michigan Department of Natural Resources.

Selected Grants

- Long-Term Monitoring of Colonial Waterbird Populations in the Great Lakes (2005-2010). US Fish and Wildlife Service.
- Estimating Detectability Rates for Colonial Waterbirds in the U.S. Great Lakes (2005-06). U.S. Geological Survey.
- Estimation and Evaluation of Demographic Parameters Required for Recovery of the Endangered Great Lakes Piping Plover Population. (2005-06).
- US Geological Survey. Monitoring, Research, and Management to Assess the Status of an Urban Population of Colonial Waterbirds. (2004-05). MN DNR (with Anoka County Parks).
- The Double-crested Cormorant and American White Pelican in Minnesota: A Statewide Status Assessment. (2004-05). MN DNR.
- Framework for Binational Conservation of Great Lakes Islands. (2003-04). U.S. Environmental Protection Agency (Great Lakes National Program Office). (with The Nature Conservancy, Nature Conservancy Canada, Northeast-Midwest Institute).

Selected Appointments and Relevant Activities

- Minnesota Pollution Control Agency, Deformed Frogs Advisory Committee 1999-00
- Minnesota Chapter of the Nature Conservancy, Board of Trustees 1985-91
- Minnesota Department of Natural Resources (5 Advisory Committees 1989-present)
- Upper Great Lakes Biodiversity Committee 1992-95
- Minnesota Forest Resources Council, Forest Wildlife Habitat Technical Team 1996-1998
- International Piping Plover Recovery Coordinating Team 1996-present
- National Research Council, Committee on Endangered Species and the Platte River 2003
- Waterbird Council for the Americas, Council Member 2003-present
- Minnesota Audubon, Minnesota Important Bird Areas (IBA) Committee 2004-present
- President, Waterbird Society 2006-present.

Selected Publications:

- LeDee, O. and F.J. Cuthbert (In Press). A Remote Sensing Analysis of Coastal Habitat Composition for a Threatened Shorebird, the Piping Plover (*Charadrius melodus*). *J. of Coastal Research*.
- Adkins-Geise, C. and F. J. Cuthbert, (In Press) Woodpecker nest site selection in Upper Midwest forests. *Canadian Field Naturalist*.
- Wires, L.R., K. Haws, F.J. Cuthbert, N. Drilling, and A.C. Smith. 2006. The Double-crested Cormorant and American White Pelican in Minnesota: First Statewide Census. *The Loon*: Fall 06.
- Wires, L.R. and F.J. Cuthbert. 2006. Historical populations of the Double-crested Cormorant: Implications for conservation and management in the 21st century. *Waterbirds* 29 (1): 9-37.
- National Research Council. 2005. *Endangered Species and the Platte River*. National Academy of Sciences Press, Washington, D.C. (Cuthbert one of 15 authors). (Book awarded 2006 Meredith F. Burrill Award from Association of American Geographers for exceptional merit and quality at intersection of geography and policy).
- Haig, S., C. Ferland, F. J. Cuthbert, J. Dingleline, P. Goossen, A. Hecht, and N. McPhillips. 2005. A complete species census and evidence for regional declines in Piping Plovers. *J. Wildlife Management*. 69 (1): 160-173.

Selected Technical Publications:

- 2003. L.R. Wires and F.J. Cuthbert. Fish-eating bird predation at aquaculture facilities in Minnesota: a first step towards bridging the information gap. Report to Minnesota SeaGrant.
- Wires, L.R., F.J. Cuthbert, D. Trexel, and A.R. Joshi. 2001. Status assessment of the Double-crested Cormorant in Central and Eastern North America. USFWS.
- Minnesota Forest Resources Council (Cuthbert was one of authors on Forest Wildlife material). 1999. *Sustaining Minnesota Forest Resources: Voluntary Site-Level Forest Management Guidelines for Landowners, Loggers and Resource Managers*. Minnesota Forest Resources Council, St. Paul, MN.
- Hoganson, H. M., T. E. Burk and F. J. Cuthbert. 1990. Timber harvesting technical report for proposed Potlatch Corp. Pulpmill project. MN Pollution Control Agency.

L. David Mech

TOPICS: Wildlife

Education:

B.S. Degree, Conservation, Cornell University, 1958, Ithaca, NY

Ph.D. Degree, Wildlife Ecology, Purdue University, 1962, Lafayette, IN

Positions:

University of Minnesota

- Adjunct Professor, Department of Ecology and Behavioral Biology, University of Minnesota, 1979 to present.
- Adjunct Professor, Department of Fisheries and Wildlife - 1981 to present (Graduate Faculty).

USGS Northern Prairie Wildlife Research Center

- Senior Research Scientist, Biological Resources Division of the U.S. Geological Survey, GM-16, 1999 to present.
- Wildlife Research Biologist (GS 12-GM 15), 1969 to 1999.
- Assistant Professor and Research Associate, Macalester College, 1966-1968.
- Research Associate, University of Minnesota, 1963-1966.
- Research Assistant, Purdue University, 1958-1962.

*Department of Ecology, Evolution, and Behavior
Department of Fisheries, Wildlife, and Conservation Biology
University of Minnesota*

Key Qualifications:

Dr. Dave Mech is a wildlife biologist who has studied large carnivores, especially wolves and their prey, for over 40 years. He is a world-renowned wolf expert and most recently authored a definitive book on the species, *Wolves: Behavior, Ecology, and Conservation* published in 2003. Mech has guided wolf management and reintroduction efforts in Minnesota and throughout the US. He is currently a Senior Scientist with the Biological Resources Division, U.S. Geological Survey and an Adjunct Professor in the Departments of Fisheries, Wildlife and Conservation Biology, and Ecology, Evolution and Behavior.

Primary Research:

On-going studies of:

- Wolf population trends and wolf-deer co-actions in the Superior National Forest, Minnesota, 1968 to present.
- Wolf social behavior and prey interactions on Ellesmere Island, Canada, 1986 to present.
- Wolf-elk interactions in Yellowstone National Park, 1997 to present.

Selected Appointments:

- Founder, Board of Directors & Vice Chairman, International Wolf Center, Ely, MN, 1985 to present.
- Board of Directors, Minnesota Zoological Society, 1972-1980.
- Board of Directors, Springbrook Nature Center, 1973-1976.

Movie Films and Audio Visual Presentations:

- Chief consultant and contributed footage to "Following the Tundra Wolf" Peace River Films, Inc. 1974.
- "Techniques of Animal Immobilization" by U. S. Seal and L. D. Mech. 24 min., sound, color. Sponsored by World Wildlife Fund International and Project Tiger --India. 1983.
- "Animal Immobilization --Techniques of Drug Delivery" by U. S. Seal and L. D. Mech. 1984. 20 min., sound color. Sponsored by World Wildlife Fund International and Project Tiger --India

- Co-Narrator, Scientific Consultant, and participant in "Brother Wolf" multi-projector, sound, slide presentation. (Gold Award winner, 1987 N.Y. Film and TV Festival)
- Scientific consultant and participant in "White Wolf," BBC/National Geographic TV documentary, 1988.
- Chief consultant and participant in "Wolves, with Timothy Dalton," PBS TV Special, Fall 1993

Selected Publications:

- *The Wolves of Isle Royale*, 1966. U. S. Govt. Printing Office, 210 pp.
- *The Wolf: Ecology and Behavior of an Endangered Species*. 1970. Doubleday, 384 pp. Reprinted in paperback by University of Minnesota Press, 1981.
- *Handbook of Animal Radio-Tracking*. 1983. University of Minnesota Press. 108 pp.
- *The Arctic Wolf: Living With the Pack*. 1988. Voyageur Press, Stillwater, MN. 128 pp. (English, French, Italian, German)
- *The Way of the Wolf*. 1991. Voyageur Press, Stillwater, MN. 120 pp. (English, German).
- *Wolves of the High Arctic*. 1992. Voyageur Press, Stillwater, MN 127 pp.
- *The Arctic Wolf: Ten Years With the Pack*. 1997. Voyageur Press, Stillwater, MN. 144pp. (English, Hungarian).
- *The Wolves of Denali*. 1998. University of Minnesota Press. (Mech, Adams, Meier, Burch, and Dale).
- *The Wolves of Minnesota: Howl in the Heartland*. 2000. Voyageur Press, Stillwater, MN. (Editor, and author of 6 chapters).
- *Wolves: Behavior, Ecology, and Conservation*. 2003. University of Chicago Press. (co-editor of book, and co-author of three chapters). 448 pp.
- Approximately 280 scientific, and 110 popular articles on wolves, deer, raccoons, ecology, predation, radio-tracking, and conservation.

Ciara Schlichting, AICP

TOPICS: Other

Planner

Education:

M.S. Natural Resource Science and Management, University of Minnesota, Twin Cities

B.S. Natural Resources and Environmental Studies, University of Minnesota-College of Natural Resources

Professional Organizations:

- American Institute of Certified Planners
- American Planning Association
- Sensible Land Use Coalition

Volunteer Organizations:

- Above the Falls Citizen Advisory Committee
- Chair, Project Review Subcommittee
- advisory committee to the Minneapolis Park and Recreation Board and Minneapolis City Council
- Columbia Park Neighborhood Association, Secretary

Ms. Schlichting joined DSU in 2001 after working as a Planner for the Metropolitan Council's department of comprehensive planning/technical assistance. Ms. Schlichting is a member of the American Institute of Certified Planners (AICP) and the American Planning Association (APA). At DSU, Ms. Schlichting assists communities with a broad range of planning projects. Examples of projects in which she has been involved with include:

- **Environmental and Natural Resource Planning:** Ciara brings a variety of natural resource planning experience to clients. She has conducted natural resource-related planning for numerous entities including St. Cloud, Hutchinson, Lino Lakes, Martin County, Anoka County, the USDA Forest Services and the Center for Urban and Regional Affairs.
- **Environmental Review:** Project coordinator for and contributor to numerous environmental review documents including the Hutchinson Alternative Urban Areawide Review (AUAR), which was the first AUAR based on a community's Comprehensive Plan that covered 17,000 acres. AUAR processes review the cumulative impact of development on resources including wildlife habitat, fisheries, water resources, air quality, soil resources, and recreation resources. She has taught class sessions at the University of Minnesota regarding Minnesota's Environmental Review Program.
- **River Corridor Planning:** Assisted local communities in updating Mississippi River Critical Area Corridor Plans and creating plans that conformed to the Mississippi National River and Recreation Area Comprehensive Management Plan in the Twin Cities Metropolitan Area
- **Wetland Planning:** Assisted Martin County with developing a wetland function and values assessment methodology and a Comprehensive Wetland Protection and Management Plan.
- **Lake Management Planning:** Assisted five lake associations in greater Minnesota in the development of comprehensive lake management plans. Authored the

“Conducting a Property Owners Survey” chapter of the publication, Sustainable Lakes Planning Workbook: A Lake Management Model (2000).

- ***Open Space Planning:*** Assisted Anoka County in assessing the intrinsic suitability of large undeveloped open spaces for natural resource preservation or development.
- ***Comprehensive Planning:*** Assisted local communities in preparing Comprehensive Plans and Comprehensive Plan amendments. She assisted the City of Crosslake with updating the Environmental and Lake Management components of its Comprehensive Plan and conducted an intrinsic suitability analysis of St. Cloud’s growth areas as part of its Comprehensive Plan. She is currently assisting several communities in updating their Comprehensive Plans as part of the 2008 updates required by the Metropolitan Council’s.
- ***City Planning:*** Assisted the City of Vadnais Heights, City of Columbia Heights, and City of Lilydale with day-to-day planning activities. Reviewed planned unit developments, site plans, variances, plats, and lot split applications.

Mary Vogel

TOPICS: Geographic Information Systems, Land

*Co-Director, Center for Changing Landscapes
College of Design*

*College of Food, Agriculture, and Natural Resources Sciences
University of Minnesota*

Education:

Master of Architecture, University of Minnesota

Select Positions:

University of Minnesota

- Co-Director, Center for Changing Landscapes, College of Architecture and Landscape Architecture, College of Natural Resources (now College of Design & College of Food, Agriculture, and Natural Resources Sciences) 2002-Present.
- Statewide Director, University of Minnesota Regional Development Partnerships, 2002-2005.
- Extension Collegiate Program leader, College of Architecture and Landscape Architecture, 1994-2002.
- Senior Research Fellow, Department of Landscape Architecture 1995-2002.
- Research Coordinator, College of Architecture and Landscape Architecture 1985-94.

Key Qualifications

Mary Vogel is the co-director with Alan Ek of the Center for Changing Landscapes and has led a broad range of community engaged research projects that have focused on the intersection of natural resource preservation, resource management, and sustainable development issues throughout the State of Minnesota.

She has been a leader at the University and in her college in interdisciplinary efforts to connect University expertise to applied research efforts that address important Minnesota issues. She is skilled at producing usable project work that informs public and private decision makers at the state, regional, and local levels.

She has extensive experience in engaging citizens in research efforts. Her research is community engaged and for three years she was the statewide director of the University of Minnesota's Regional Sustainable Development Partnerships, a citizen driven program that focuses on natural resources, sustainable agriculture, and natural resource based tourism.

She is very familiar with both the LCMR and the LCCMR and has led many research projects funded by the LCMR.

Partial List of Sponsored Research

- *Red Lake River Enhancement Project*, with Roger Martin, Carlos Fernandez Center for Changing Landscapes, University of Minnesota, 2005, principal investigator.
- *Linking Communities Along the Minnesota River Trail*, with Roger Martin, Carlos Fernandez Center for Changing Landscapes, University of Minnesota, 2005, principal investigator. Funded by the Minnesota State Legislature through the Legislative Commission on Minnesota Resources.
- *Linking Communities Along the Gitchi Gami Trail*, with Roger Martin, Carlos Fernandez Center for Changing Landscapes, University of Minnesota, 2005, principal investigator. Funded by the Minnesota State Legislature through the Legislative Commission on Minnesota Resources.

- *Beaver Bay Community Design Framework*, with Roger Martin, Carlos Fernandez Center for Changing Landscapes, University of Minnesota, 2005, principal investigator.
- *The North Shore Scenic Drive: All American Road*, with Roger Martin, Carlos Fernandez, Center for Changing Landscapes, University of Minnesota, 2004, principal investigator.
- "Green Infrastructure As Civic Amenity and Environmental Resource" funded by the Minnesota State Legislature through the Legislative Commission on Minnesota Resources, 1999-2001, principal investigator & project manager.
- "Preventing Storm water Runoff Problems Through Watershed Land Design" funded by the Minnesota State Legislature through the Legislative Commission on Minnesota Resources 1997-9. project manager.
- "Central Corridor Conceptual Master Plan Study" funded by the Minnesota State Legislature, 1999-2000, principal investigator.
- "Linking Light Rail to the City: Six Neighborhood Station Districts" Minnesota Department of Transportation and Federal Highway Administration, 1998-2000, principal investigator.
- "Central Corridor Study: Pierce Butler Industrial Redevelopment Parkway" funded by the Center for Transportation Studies, 1997-8, principal investigator.
- "Linking Freeway Bus Service to Freeway Routes," funded by Minnesota Department of Transportation, 1998, principal investigator.
- "Using Transportation to Recycle, Revitalize, and Reconfigure the Post Industrial City" funded by the Center for Transportation Studies, 1997-8, principal investigator.
- "Retrofitting Bus Lines on Urban Highways: Designing a Place for Transit in an Automobile Dominated Realm" funded by the Center for Transportation Studies, 1996-97, principal investigator.
- "Amenity Bus Lines as Community Builders: The Application of Principles and Strategies to Increase Ridership and Make Communities More Livable," funded by the Center for Transportation Studies, 1995-96, principal investigator.
- "Wetland Restoration and Enhancement to Create Community Amenity and Form," funded by the Minnesota State Legislature through the Legislative Commission on Minnesota Resources 1995-97, project manager.

Partial List of Appointments

- Council on Public Engagement University of Minnesota, steering committee, 2002-present.
- Rural Development Council, University of Minnesota, 1996-2000.
- Committee on Research, University of Minnesota 1994-95.
- Metropolitan Council's Minneapolis/St. Paul Airport Reuse Task Force, member, 1991-92.
- Governor's Energy and Environmental Planning Management Team, member, 1990-92.
- Mississippi National River and Recreation Area Commission, commissioner, 1990-93.
- Upper Landing Task Force, City of St. Paul, member 1991.
- Governor's Commission on Cold Climate Research. State of Minnesota, member, 1988.

Publications

- Some publications at <http://ccl.gis.umn.edu>.

Steven M. Manson

TOPICS: Land, Information Systems

*Department of Geography
College of Liberal Arts
University of Minnesota*

Education:

University of Victoria, Geography,
B.A. Honours (1995)

Clark University, Geography, Ph.D.
(2002)

Positions:

- 2002 – present: Assistant Professor, Department of Geography, University of Minnesota.
- 2006 – 2008: McKnight Land-Grant Professor, University of Minnesota.

Key Qualifications:

Dr. Manson is an assistant professor and McKnight Land-Grant Professor of Geography at the University of Minnesota. He combines environmental research, social science approaches, and geographic information science to understand changing urban and rural landscapes in the United States and Mexico. This work is part of his longer term research on global environmental change, decision making, and understanding complex human-environment systems.

Among other things, Dr. Manson was a NASA Earth System Science Fellow, received the Young Scholar Award from the University Consortium for Geographic Information Science, and is a NASA New Investigator in Earth-Sun System Science.

Selected Grants:

- National Aeronautics and Space Administration. North American Land Change: Integrated Research and Education on Decision Making in Coupled Human-Environment Systems, 2006-2009.
- University of Minnesota. Does sprawl beget sprawl? Urbanization in the Twin Cities of Minnesota, 2006-2008.
- University of Minnesota. Testing a Novel Mechanism for Sustainable Development of Agriculture, 2005-2007.
- National Institutes of Health. Population, Land Use and Health in Frontier Regions, 2005-2007.
- Center for Urban and Regional Analysis. Assessing and Forecasting Land Use and Land Cover Change in the Twin Cities Metropolitan Area, 2005-2007.

Selected Publications:

- Manson, S. M. (2006). Bounded rationality in agent-based models: experiments with evolutionary programs. *International Journal of Geographic Information Science* 20(9): 991-1012.
- Manson, S. M. (2006). Land use in the Southern Yucatan Peninsular Region of Mexico: scenarios of population and institutional change. *Computers, Environment, and Urban Systems* 30(3): 230-253.
- Manson, S. M., J. Geoghegan and B. L. Turner, II (2006). State of the art in describing future changes in ecosystem services: forecasting land cover change. In *Millennium Ecosystem Assessment: Scenarios*. H. Mooney and A. Cropper (eds). Geneva, Switzerland: Island Press (In press).
- Manson, S. M. (2006). Challenges to Evaluating Models of Geographic Complexity. *Environment and Planning B* (In press).
- Manson, S. M. and D. O'Sullivan (2006). Complexity theory in the study of space and place. *Environment and Planning A* 38(4): 677-692.
- Manson, S.M. (2005). Agent-based modeling and genetic programming for modeling land change in the Southern Yucatan Peninsular Region of Mexico. *Agriculture, Ecosystems and Environment* 111(1): 47-62.
- Brown, D. G., R. Walker, S. M. Manson and K. Seto (2004). Modeling land use and land cover change In *Land Change Science: Observing, Monitoring, and Understanding Trajectories of Change on the Earth's Surface*. G. Gutman, A. Janetos, C. Justice, E. Moran, J. Mustard, R. Rindfuss, D. Skole and B. L. Turner II. (eds). Dordrecht, Netherlands: Kluwer Academic Publishers, pp. 395-409.
- Parker, D. C., S. M. Manson, M. Janssen, M. J. Hoffmann and P. J. Deadman (2003). Multi-agent systems for the simulation of land use and land cover change: a review. *Annals of the Association of American Geographers* 93(2): 316-340.
- Manson, S. M. (2003), Validation and verification of multi-agent models for ecosystem management, M. Janssen (ed), *Complexity and Ecosystem Management: The Theory and Practice of Multi-Agent Approaches*, Northampton, Massachusetts: Edward Elgar Publishers, pp. 63-74.
- Manson, S. M., S. J. Ratick and A. R. Solow (2002). Decision making and uncertainty: Bayesian analysis of potential flood heights. *Geographical Analysis* 34(2): 112-129.

Marvin E. Bauer

TOPICS: Information Systems

Education:

University of Illinois, Ph.D.,
Agronomy, 1970

Purdue University, M.S., Agronomy,
1967

Purdue University, B.S.A.,
Agriculture, 1965

Positions:

University of Minnesota

- Professor, Department of Forest Resources, 1983-present.

NASA Goddard Space Flight Center

- Visiting Scientist, Biospheric Sciences Branch, Laboratory for Terrestrial Physics, 1994-95.

Purdue University

- Research Agronomist, Department of Agronomy and Laboratory for Applications of Remote Sensing, 1970-83.

Department of Forest Resources

College of Food, Agricultural and Natural Resource Sciences

University of Minnesota

Key Qualifications

Dr. Bauer is professor of remote sensing, director of the Remote Sensing and Geospatial Analysis Laboratory (<http://rsl.gis.umn.edu/>), and an affiliate of the Center for Changing Landscapes. His current research emphasizes the development of quantitative applications of satellite remote sensing for forest inventory, monitoring lake water quality, impervious surface mapping, and land cover change detection and analysis.

Recent accomplishments include, statewide classifications of lake clarity, a key indicator of water quality, have been completed for 1985, '90, '95, '00, and '05 for more than 10,000 lakes (<http://water.umn.edu/>), along with land cover classifications for 2000 and impervious surface area classifications for 1990 and 2000 (<http://land.umn.edu/>). Together they provide an unprecedented database for analysis of temporal and geographic patterns and trends and relationships to land cover and other lake characteristics.

Selected Grants

- Accelerating and enhancing surface water monitoring for lakes and streams. Legislative Commission on Minnesota Resources / Minnesota Pollution Control Agency, 2003-07.
- Impervious surface classification and mapping by satellite remote sensing. Minnesota Pollution Control Agency, 2004-06.
- Assessing and forecasting land use and land cover change in the Twin Cities Metropolitan Area. Center for Urban and Regional Affairs, University of Minnesota, 2004-06.
- Remote sensing applications for annual forest inventories. USDA Forest Service, 1999- 2004.
- Land cover classification of Twin Cities Metropolitan Area. Metropolitan Council, 2001-02.
- Estimation and mapping of impervious surface area in the Twin Cities. Metropolitan Council, 2001-03.
- Advanced applications of satellite imagery for lake quality assessments. Minnesota Department of Natural Resources, 2001-03.

Other Activities and Awards

Bauer is a fellow and national director of the American Society of Photogrammetry and Remote Sensing. In 1996 he was awarded the Distinguished Public Service Medal by NASA, recognizing outstanding scientific contributions over the past 25 years to NASA's terrestrial remote sensing programs, and in 2006 received the Lifetime Achievement Award from the Minnesota GIS/LIS Consortium. Since 1980 he has served as editor-in-chief of Remote Sensing of Environment journal.

Selected Publications

- Yuan, F. and **M.E. Bauer**. 2006. Comparison of impervious surface area and normalized difference vegetation index as indicators of surface urban heat island effects in Landsat imagery, *Remote Sensing of Environment*, In Press, 2006.
- Bauer, M.E.**, B. Loeffelholz and B. Wilson. 2005. Estimation, mapping and change analysis of impervious surface area by Landsat remote sensing. *Proceedings, 16th William T. Pecora Memorial Remote Sensing Symposium*, CD ROM, 9 pp.
- Yuan, F., K.E. Sawaya, B. Loeffelholz, and **M.E. Bauer**. 2005. Land cover classification and change analysis of the Twin Cities (Minnesota) metropolitan area by multitemporal Landsat remote sensing. *Remote Sensing of Environment* 98:317-328.
- Brezonik, P.L., K. Menken, and **M.E. Bauer**. 2005. Landsat-based remote sensing of lake water quality characteristics, including chlorophyll and colored dissolved organic matter (CDOM). *Lake and Reservoir Management* 21(4):373-382.
- Yuan, F., **M.E. Bauer**, N.J. Heinert, and G. Holden. 2005. Multi-level land cover mapping of the Twin Cities (Minnesota) Metropolitan Area with multi-seasonal Landsat TM/ETM+ data. *Geocarto International* 20(2):5-14.
- Thoma, D.P., S. C. Gupta, **M.E. Bauer**, and C.E. Kirchoff. 2005. Airborne laser scanning for riverbank erosion assessment. *Remote Sensing of Environment* 95:493-501.
- Thoma, D.P., S.C. Gupta, and **M.E. Bauer**. 2004. Evaluation of optical remote sensing models for crop residue cover assessment. *Journal of Soil and Water Conservation* 59 (5):224-233.
- Sawaya, K.E., L. G. Olmanson, N.J. Heinert, P.L. Brezonik and **M.E. Bauer**. 2003. Extending satellite remote sensing to local scales: land and water resource monitoring using high-resolution imagery. *Remote Sensing of Environment*, 88:144-156.
- Kloiber, S.M., P.L., Brezonik, L.G., Olmanson, and **M.E. Bauer**. 2002. Development of a remote sensing method for synoptic, regional water quality assessment. *Remote Sensing of Environment* 82(1):38-47.
- Kloiber, S.M., P.L. Brezonik, and **M.E. Bauer**. 2002. Application of Landsat imagery to regional-scale assessments of lake clarity. *Water Research* 36:4330-4340.
- Franco-Lopez, H., A.R. Ek, and **M.E. Bauer**. 2001. Estimation and mapping of forest stand density, volume and cover type using the k-nearest neighbors method. *Remote Sensing of Environment* 77(3):251-274.
- Bauer, M.E.**, N. J. Heinert, J.K. Doyle, and F. Yuan. 2004. Impervious surface mapping and change monitoring using satellite remote sensing. *Proceedings, American Society of Photogrammetry and Remote Sensing Annual Conference*, CD ROM, 10 pp.
- Olmanson, L. G., **M.E. Bauer**, and P.L. Brezonik. 2002. Water quality monitoring of 10,000 Minnesota lakes: statewide classification of lake water clarity using Landsat imagery. *Proceedings, 15th William T. Pecora Memorial Remote Sensing Symposium*, CD ROM, 8 pp. Heading Three.

Kathryn J. Draeger

TOPICS: External Communications

*Regional Sustainable Development Partnerships
University of Minnesota*

Education:

Ph.D., Water Resource Sciences,
University of Minnesota, 2001
(*Honorable Mention for outstanding
Ph.D. thesis from the Universities
Council on Water Resources*)

MS, Soil Science, University of
Minnesota, 1993

B.Sc., Rhetoric and Life Sciences,
University of Minnesota, 1989

Key Qualifications

Dr. Draeger is the Statewide Director of the University's Regional Sustainable Development Partnership, a citizen driven program that creates vibrant relationships between communities in outstate Minnesota and their land grant University. She has broad experience from the public, private and government sectors on environmental issue, policies, and grassroots efforts to address those needs at a community level. She serves as an adjunct assistant professor in the Agronomy and Plant Genetics Department and serves on number nonprofit boards.

Positions

Statewide Director, UMN Regional Sustainable Development Partnerships, 2005 to present

The Regional Partnerships work throughout greater Minnesota to advance sustainable development through a citizen led process that engages both community and faculty for common purposes.

Founder and President, Environmental Ground, Inc., 1997 to present

As President of Environmental Ground Dr. Draeger works with foundation, nonprofits, government agencies and private sector businesses on issues of environmental concern ranging from water quality to renewable energy. These efforts include:

- Lead consultant and member of the St. Paul Environment Round Table which held city-wide public meetings to address core environmental issues facing the city of St. Paul. Resulted in 2006 St. Paul City Council resolution to implement the recommendation of the citizen advised Roundtable process and formation of a team of city staff tasked with following through on the recommendations.
- Serving as core consultant to the Bush Foundation's ecological health program working with program officers on program elements, proposal review, and funding recommendations.
- Lead evaluator of the impacts of a regional ecolabel program, the Midwest Food Alliance, on the environment, retail and market share, consumer awareness, and participating farmers.
- Increasing responsibility over four years with The McKnight Foundation's in the MN River Basin as advisor and liaison. Includes developing basin specific workplans, interviews of organizations, and assistance in founding the MN River Basin Watershed Institute. Also proposal review and funding recommendations for Environment Program.

- Project Manager, UMN Literature Review for the Generic Environmental Impact Statement on Animal Agriculture. Managed 100 faculty to produce a 1500 page report on the social, environmental, economic & health impacts of animal agriculture.
- Principal Investigator, EPA funded Water Environment Research Foundation research on water quality, heavy metals, and food chain implications of biosolids in watersheds.
- Project Manager, analyzing the effectiveness of local watershed organizations statewide. Funded by McKnight Foundation, Bush Foundation, and Legislative Commission on MN Resources.

Bush Fellow, Bush Foundation Leadership Program, 2000-2001

Eighteen-month mid-career fellowship to develop leadership skills and gain domestic and international experience in water resources.

Commissioner, Iowa Environmental Protection Commission (EPC), 1995-1996

Appointed by Governor T. Branstad to the Environmental Protection Commission, State of Iowa. Responsibilities include environmental rule setting, oversight of Department of Natural Resources, and enforcement of environmental regulations. Most notably promulgating comprehensive confinement livestock rules for the state. -EPC liaison to the Leopold Center for Sustainable Agriculture.

Program Assistant, Winrock International Institute for Agricultural Development, Morrilton, Arkansas, 1993-1994.

MacArthur Scholar, John D. and Catherine T. MacArthur Interdisciplinary Program on Global Change 1989-1993. Co-developed a MacArthur workshop series on environmental and agricultural issues held at the University of Minnesota, including Nobel Prize winner economist Amaryta Sen. Continued research and writing in soil science.

Research/Teaching Assistant, Soil Biology, 1989-1993

Includes work with the Ecuadorean Ministry of Agriculture through US AID Bean Cowpea CRSP to improve bean yields for small landholders under low-input conditions.

Extensionist, Ecuadorean Ministry of Agriculture, 1988-1989 Worked within the Ecuadorean extension service, funded by Cargill/University College.

Selected Grants

- Reducing Children's Exposure to Pesticides in the Red River Valley, 2006. Funding from the Blue Cross Blue Shield Foundation.
- Perennial Vegetation Mats, funding from the Lindbergh Foundation and the Nancy Grey Foundation for Art in the Environment. Worked with Professor Christine Baeumler of the UMN Art Department to create prairie plant alternatives to rolled sod.
- Evaluating Watershed Management in Minnesota, funding from the LCMR (1997), The McKnight Foundation, and Bush Foundation support for academic work.

Selected Appointments

- Minnesota Birth Defects Working Group, Member, 2004-present
- Minnesota Waters (previously on Rivers Council of Minnesota), Board Member, 2002-present
- Coya Foundation, President, 1997-2003
- Governor's Round Table on Sustainable Development, Member, 1997-2000 (appointed by Gov. Carlson)
- Environmental Trust Fund Coalition, Exec. Committee & Co-chair fundraising subcommittee 1996-1999
- Environmental Protection Commissioner, State of Iowa, 1995-1996 (appointed by Gov. Branstad)

Sangwon Suh

TOPICS: Cost Benefit Analysis

Education:

Ajou University (S. Korea),
Environmental and Engineering,
B.S. 1998

Ajou University (S. Korea),
Environmental and Urban Systems
Engineering, M.S. 2000

Leiden University (the
Netherlands), Environmental
Science and Engineering, Ph.D.
2004

Carnegie Mellon University,
Industrial Ecology, Post-doc 2005

Positions:

- 08/05 - present: Assistant Professor, Dept. Bioproducts and Biosystems Engineering, College of Food, Agriculture and Natural Resources Science, University of Minnesota.
- 08/04 - present: Associate Fellow, Institute of Environmental Sciences (CML), Leiden University, the Netherlands (Dept. Industrial Ecology).
- 08/04 - 07/05: Postdoctoral Research Associate, Civil and Environmental Engineering, Carnegie Mellon University (Dept. Civil and Environmental Engineering).
- 01/02 - 06/04: Research Scientist, Dept. Industrial Ecology, Institute of Environmental Sciences (CML), Leiden University, the Netherlands.

Selected Professional Services

- 10/06 – present, Editorial Board, *Economic Systems Research*
- 05/06 – present, Advisory Board, Eco-Industrial Development Council
- 02/05 – present, LCA Advisory Board, *Society of Environmental Toxicology and Chemistry (SETAC) – North America*
- 08/05, Review Panel, *Schweizerischer Nationalfonds zur Förderung der Wissenschaftlichen Forschung* (Swiss National Science Foundation)
- 06/03 – present, Co-Editor, *International Journal of Life Cycle Assessment*
- 02/03 – present, LCA Steering Committee, *Society of Environmental Toxicology and Chemistry (SETAC) – Europe*
- 02/02 – 09/03, Peer Review Group, *United Nation's Environmental Program (UNEP)'s Life Cycle Initiative*

Publications

Five publications closely related to the proposed project:

- Suh, S., 2006: Are Services Better for Climate Change? *Environmental Science and Technology*, 40 (21), 6555 – 6560.
- Suh, S., 2005: Theory of Materials and Energy Flow Analysis in Ecology and Economics, *Ecological Modeling*, 189 251 – 269.
- Suh, S., Kagawa, S., 2005: Industrial Ecology and Inter-industry Analysis, *Economic Systems Research*, 17 (4), 349 – 364.
- Suh, S., 2005: Developing Sectoral Environmental Database for Input-Output Analysis: Comprehensive Environmental Data Archive of the U.S., *Economic Systems Research*, 17 (4), 449 – 469.
- Suh, S., 2004: Functions, commodities and environmental impacts in an ecological economic model, *Ecological Economics*, 48 (4), 451 – 467.

Five other significant publications:

- Suh, S., Heijungs, R., 2006: Power series expansion and structural analysis for generalized linear systems, *International Journal of Life Cycle Assessment*, in press.

- Suh, S., Huppel, H., 2005: Methods in Life Cycle Inventory (LCI) of a product, *Journal of Cleaner Production*, 13 (7), 687 – 697.
- Suh, S., K. M. Lee, S. Ha, 2005: Eco-Efficiency for Pollution Prevention in SMEs – a case in South Korea, *Journal of Industrial Ecology*, 9 (4), 223 – 240.
- Suh, S., M. Lenzen, G. Treloar, H. Hondo, A. Horvath, G. Huppel, O. Joliet, U. Klann, W. Krewitt, Y. Moriguchi, J. Munksgaard, G. Norris, 2004: System Boundary Selection for Life Cycle Inventories, *Environmental Science & Technology*. 38 (3), 657 – 664.
- Heijungs, R., Suh, S., 2002: *The Computational Structure of Life Cycle Assessment*, Springer, Dordrecht, the Netherlands.

Selected Grants

- A New Environmental Accounting Framework Using Externality Data and Input-Output Tools for Policy Analysis (EXIOPOL) / European Commission.
- Development and Application of Eco-Industrial Information Network (EIIN) / Ministry of Industry, South Korean Government.
- Materials Use: Science, Engineering and Society (MUSES) under Biocomplexity in the Environment (BE) / National Science Foundation.
- Evaluation of Environmental Impact of Products (EIPRO) / European Commission
- AT&T Industrial Ecology Faculty Fellowship / AT&T Foundation.

Collaborators & Other Affiliations

Collaborators and Co-editors: Reinout Heijungs (CML), Gjalte Huppel (CML), Jeroen Guinee (CML), Helias Udo de Haes (CML), Arjan de Koning (CML), Rene Kleijn (CML), Ester van der Voet (CML), Lauren van Oers (CML), Ayman Elshkaki (CML), Ruben Huele (CML), Anneke Wegener Sleeswijk (CML), Arnold Tukker (TNO), Peter Eder (EC-JRC), Shigemi Kagawa (Tohoku Univ.), Manfred Lenzen (Sydney Univ.), Yuichi Moriguchi (NIES), Olivier Joliet (UMich), Mark Huibregts (Nijmegen Univ.), Bo Weidema (LCA 2.-0 consultants), Per Nielsen (Univ. Copenhagen), Kun Lee (Ajou Univ.), Sangsun Ha (Samsung Semiconductor Ind.), Ignazio Mongelli (EC-JRC), Gerald Rebitzer (Alcan), Tomas Ekvall (Chalmers Univ.), Rolf Frischknecht (ESU-service), David Hunkeler (Aquatech), Gregory Norris (Sylvatica), Tomas Rydberg (EC), Peter Schmidt (Daimler-Chrysler), David Penington (EU-JRC); Graham Treloar (Deakin Univ.), Hiroki Hondo (Yokohama Univ.), Arpad Horvath (UC Berkeley), Uwe Klann (DRL), Wolfram Krewitt (DRL), Jesper Munksgaard (AKF), Leo Breedveld (EC-JRC), Erik Dietzenbacher (Univ. Groningen), Stefan Giljum (SERI), Klaus Hubacek (Univ. Leeds).

Graduate and Postdoctoral Advisors: Kun Lee (Ajou), Gjalte Huppel (CML), Helias Udo de Haes (CML), Lester Lave (Carnegie Mellon), Chris Hendrickson (Carnegie Mellon), Scott Matthews (Carnegie Mellon).

Thesis Advisor and postgraduate-scholar sponsor: Yiwen Chiu (WRC), Stephanie Potolka (CivE), Jin-Young Moon (Appl Econ), Junghan Bae (BBE), Ling Luo (Leiden University)

Steve Polasky

TOPICS: Cost Benefit Analysis

Education:

Ph.D. Economics, University of Michigan, 1986

B.A., Williams College, cum laude, 1979

London School of Economics, 1977 – 1978

Positions:

- Fesler-Lampert Professor of Ecological/Environmental Economics, University of Minnesota, 1999 - present
- Senior Staff Economist, President's Council of Economic Advisers, 1998 - 1999
- Associate Professor, Agricultural and Resource Economics Department,
- Oregon State University, 1993 - 1999
- Visiting Senior Research Fellow, Marine Policy Center, Woods Hole Oceanographic Institution, 1997
- Assistant Professor, Economics Department, Boston College, 1986 - 1993
- Visiting Research Fellow, Marine Policy Center, Woods Hole Oceanographic
- Institute, 1990 - 1993
- Visiting Scholar, Economics Department, M.I.T., 1990
- Research Assistant, Resources for the Future, 1980 -1981
- Research Assistant, National Economic Research Associates, 1979 - 1980

*Department of Applied Economics &
Department of Ecology, Evolution, and Behavior
University of Minnesota*

Key Qualifications:

Dr. Polasky is the Fesler-Lampert Professor of Ecological/Environmental Economics at the University of Minnesota. He has broad experience in ecological, environmental and resource economics issues. He served as the senior staff economist for environment and resources for the President's Council of Economic Advisers 1998-1999. He is currently serving on the US EPA's Science Advisory Board Environmental Economics Advisory Committee and the Committee on Valuing the Protection of Ecological Systems and Services Committee. He is currently serving on the U.S. Department of Interior Committee on Natural Resource Damage Assessment and Restoration. He is also currently serving on the Science Council of The Nature Conservancy.

Selected Grants

- Anderson, J.L., E. Nater and S. Polasky. Minnesota terrestrial carbon sequestration project. Initiative for Renewable Energy and the Environment, University of Minnesota. July 1, 2005 – December 31, 2006.
- Polasky, S., D. Tilman, V. Eidman, F. Kulacki, J. Kuzma, and D. Tiffany. Full cost accounting of renewable and conventional energy sources. Initiative for Renewable Energy and the Environment, University of Minnesota, July 1, 2005 – June 30, 2007.
- Polasky, S. Landowner contact and incentives for Topeka shiner conservation. Minnesota Department of Natural Resources. July 2003 – June 2004.
- Polasky, S. and L. Westphal. Developing a collaborative modeling approach to assess biological and economic effects of land use decisions and pollution mitigation. USDA Forest Service, April 2003 – March 2008.
- Polasky, S. and R.G. Haight. Open space and property values: an urban economics model with application to the Twin Cities Region. USDA Forest Service, September 2001 – August 2003.
- Polasky, S. and B. Palik. Predicting ecological and social impacts of riparian landuse in a north central lakescape. USDA Forest Service, September 2001 – August 2003.

Selected Publications

- Naidoo, R., A. Balmford, P.J. Ferraro, S. Polasky, T.H. Ricketts, and M. Rouget. Forthcoming. Integrating economic cost into conservation planning. *Trends in Ecology and Evolution*.
- Kramer, D.B., S. Polasky, A. Starfield, B. Palik, L. Westphal, S. Snyder, E. Gustafson, P. Jakes, and R. Hudson. A comparison of alternative strategies for cost effective water quality management in lakes. Forthcoming. *Environmental Management*.
- Hill, J., E. Nelson, D. Tilman, S. Polasky and D. Tiffany. 2006. Environmental, economic, and energetic costs and benefits of biodiesel and ethanol biofuels. *Proceedings of the National Academy of Sciences* 103: 11206-11210.
- Bin, O. and S. Polasky. 2005. Evidence on the amenity value of wetlands in a rural setting. *Journal of Agricultural and Applied Economics* 37(3): 589-602.
- Polasky, S., E. Nelson, E. Lonsdorf, P. Fackler and A. Starfield. 2005. Conserving species in a working landscape: land use with biological and economic objectives. *Ecological Applications* 15(4): 1387-1401.
- Boyer, T. and S. Polasky. 2004. Valuing urban wetlands: a review of non-market valuation studies. *Wetlands* 24(4): 744-755.
- Bin, O. and S. Polasky. 2004. Effects of flood hazards on property values: evidence before and after Hurricane Floyd. *Land Economics* 80(4): 490-500.
- Nalle, D.J., C.A. Montgomery, J.L. Arthur, S. Polasky and N.H. Schumaker. 2004. Modeling joint production of wildlife and timber in forests. *Journal of Environmental Economics and Management* 48(3): 997-1017.
- Santelmann, M., D. White, K. Freemark, J.I. Nassauer, J.M. Eilers, K.B. Vache, B.J. Danielson, R.C. Corry, M.E. Clark, S. Polasky, R.M. Cruse, J. Sifneos, H. Rustigian, C. Coiner, J. Wu and D. Debinski. 2004. Assessing alternative futures for agriculture in the U.S. Corn Belt. *Landscape Ecology* 19(4): 357-374.
- Tilman, D., K. Cassman, P. Matson, R. Naylor and S. Polasky. 2002. Agricultural sustainability and the costs and benefits of intensive production practices. *Nature* 418: 671-677.
- Mahan, B., S. Polasky, and R. Adams. 2000. Valuing urban wetlands: a property price approach. *Land Economics* 76(1): 100-113.
- Innes, R., S. Polasky and J. Tschirhart. 1998. Takings, compensation and endangered species protection on private land. *Journal of Economic Perspectives* 12(3): 35-52.
- Ando, A., J. Camm, S. Polasky and A. Solow. 1998. Species distributions, land values, and efficient conservation. *Science* 279: 2126-2128.

Steven J. Taff

TOPICS: Air

Education:

1985: Ph.D., Agricultural Economics,
University of Wisconsin - Madison

1974: M.S., Urban and
Regional Planning,
University of Wisconsin -
Madison

1969: B.A., Psychology (with
Honors), Macalester College,
St. Paul, Minnesota

Prior Positions:

- 1985-1990: Assistant Professor and Extension Economist, Department of Agricultural and Applied Economics, University of Minnesota.
- 1981-1985: Research Assistant, Department of Agricultural Economics, University of Wisconsin – Madison.
- 1978-1980: Resource Agent, La Crosse County and University of Wisconsin – Extension.
- 1974-1978: Area Community Development Agent, Mississippi River Regional Planning Commission and University of Wisconsin – Extension.
- 1969-1971: US Army Translator (Vietnamese).

*Department of Applied Economics
University of Minnesota*

Key Qualifications

Steven J. Taff is an associate professor and extension economist with the Department of Applied Economics and an Adjunct Professor with the Department of Forest Resources, both at the University of Minnesota. A former county extension agent and regional planner, Taff holds advanced degrees in urban and regional planning (M.S.) and in agricultural economics (Ph.D.) from the University of Wisconsin.

At Minnesota since 1986, he specializes in the economics of agricultural and natural resource policies, with special emphasis on land management decisions in both rural and urban settings. Taff is widely known for his attempts to bring economic science to bear on practical policy making. Some of his recent research examines the economics of conservation easements, the fiscal implications of preferential property tax programs, alternative energy systems, and performance measures in landscape design.

Current Positions:

- Associate Professor and Extension Economist, Department of Applied Economics and Adjunct Professor, Department of Forest Resources
- Graduate faculties in Applied Economics, Forest Resources, Water Resources Science, and Conservation Biology

Selected Publications:

Updegraff, K., M. J. Baughman, and S. J. Taff. Environmental Benefits of Cropland Conversion to Hybrid Poplar: Economic and Policy Considerations. *Biomass and Bioenergy*. 27(2004):411-428. December 2004.

Shultz, S. and S. J. Taff. Implicit Prices of Wetland Easements in Areas of Production Agriculture. *Land Economics*. 80(4):501-512. November 2004.

Shultz, S. and S. J. Taff. Calculating Wetland Easement Payments Using Alternative Land Value Data: A Case Study of the USFW Small Wetland Acquisition Program in the Prairie Pothole Region. *Journal of Soil and Water Conservation*. 59(3): May 2004.

- Taff, S. J. and N. Senjem. Increasing Regulators' Confidence in Point-Nonpoint Pollutant Trading Schemes. *Water Resources Bulletin* . v.32,no.6, December 1996, pp.1187-94.
- Doss, C.R., and S. J. Taff. The Influence of Wetland Type and Wetland Proximity on Residential Property Values . *Journal of Agricultural and Resource Economics* . v.21, no.1, July 1996, pp.120-129.
- Kozloff, K., S. J. Taff, and Y. Wang. Micro-Targeting the Acquisition of Cropping Rights to Reduce Nonpoint Source Water Pollution. *Water Resources Research*, v.28, no.3, March 1992, pp.623-28.
- Jones, K., B. Jordan, K. H. Keller, and S. J. Taff. *Pathways to a Reduced Carbon Energy System for the Upper Midwest*. University of Minnesota Department of Applied Economics. Staff Paper P06-10. June 2006.
- Viaggi, D. and S. J. Taff. Public Acquisitions of Property Rights To Serve Agriculture/Conservation Policy: Lessons from Italy and the US. In **Food, Agriculture and the Environment: Economic Issues**. E. Defrancesco, L. Galletto, and M. Thiene, eds. Dipartimento Territorio e Sistemi Agroforestali - Università di Padova; Fondazione Casa di Risparmio di Padova e Rovigo. FrancoAngeli s.r.l., Milano, Italy. pp.341-354. 2005.
- Taff, S. J. and J. Leitch. Valuation of Nonmarket Goods and Services for Environmental Assessment . in *Environmental Methods Review: Retooling Impact Assessment for the Next Century* . A.L. Porter and J. J. Fittipaldi, eds. Army Environmental Policy Institute. Atlanta. March 1998.
- Helmberger, J. M. and S. J. Taff. Transfer of Consolidated Conservation (Con-Con) Land Administration from the Department of Natural Resources to the Counties: Analysis of Fiscal Impacts. Pinnacle Consulting Group for Minnesota Department of Natural Resources. April 2000.
- Taff, S. J. and P. Glewwe. The 1999 Agricultural Assistance Program: A Preliminary Evaluation. Minnesota Department of Revenue. February 2000.

Michael A. Kilgore

TOPICS: Cost Benefit Analysis

*Department of Forest Resources
University of Minnesota*

Education:

Ph.D. University of Minnesota,
Forestry, 1990.

Positions:

- Associate Professor, Dept. of Forest Resources, University of Minnesota. 2006–Present.
- Director, Center for Environment and Natural Resources Policy, University of Minnesota. 2002–Present.
- Assistant Professor, Dept. of Forest Resources, University of Minnesota. 2001–2006.
- Executive Director, Minnesota Forest Resources Council. 1995–2001.

Key Qualifications

Dr. Kilgore is Associate Professor of Natural Resource Economics and Policy in the University of Minnesota's Department of Forest Resources. He is also the director of the University's Center for Environmental and Natural Resources Policy. Dr. Kilgore had led or been a key participant in several forest and natural resource planning, policy, and economic studies that were state to national in scope.

He led the development of a first-of-its-kind statewide cumulative environmental impact study of forest management practices (i.e., GEIS on Timber Harvesting and Forest Management), and has served on national committees addressing forest policy and family forestry issues.

Selected Grants

Since 2001, Dr. Kilgore has been awarded 26 competitive grants totaling \$1,493,052 in research funds, \$698,489 of which are projects for which Dr. Kilgore was the principal investigator. Examples of selected grants include:

- Evaluating the financial and economic impacts of retention and disposal policies for county tax forfeited forest land in northern Minnesota. Charles K. Blandin Foundation. 2005–2006.
- An Empirical Assessment of the Cost of Applying Minnesota's Forest Management Guidelines (amendment). USDA-Forest Service, North Central Research Station. 2006–2009.
- Assessing Drivers of and Trends in Forest Parcelization and Development in Minnesota: An Itasca County Case Study. Minnesota Forest Resources Council 2006 – 2007.
- Estimating MN Family Forest Owner Participation in the Sustainable Forest Incentive Act Under Alternative Incentive Payment Structures. Charles K. Blandin Foundation. 2006–2008.
- Analysis of forest resource planning programs and structural characteristics of state forest resource planning agencies. Northeast State Forest Resource Planners. 2003–2004.

- Existing and potential incentives for practicing sustainable forestry on non-industrial private forest lands. National Commission on Science for Sustainable Forestry. 2004 – 2007.

Selected Appointments

- Minnesota Conservation Legacy Council: 2006 – present.
- MN Master Logger Program Certification Board: 2006 – present.
- Blandin Foundation Vital Forests/Vital Communities Advisory Board: 2004 – present.
- Society of American Foresters, National Committee on Forest Policy: 2003- present.
- Canadian Embassy, Review Team of Canadian Forest Management Policies and Practices: 2004.
- Governor's Forest Products Industry Task Force Implementation Team: 2003 – present.

Selected Publications

Kilgore, M. A. The Impact of Contract Deed Financing on Minnesota Forest Land Markets. In press: *The Appraisal Journal*.

Snyder, S.A., M.A. Kilgore, R. Hudson, and J. Donnay. Determinants of forest land prices in northern Minnesota: a hedonic pricing approach. In press: *Forest Science*.

Kilgore, M., J. Leahy, C. Hibbard, and J. Donnay. Assessing family forest land certification opportunities: a Minnesota case study. In press: *Journal of Forestry*.

Kilgore, M., J. Leahy, C. Hibbard, and J. Donnay. Evaluating logger certification attitudes and preferences: a Minnesota case study. In press: *Forest Products Journal*.

Ellefson, P. V., C.M. Hibbard, and M. A. Kilgore. Intergovernmental roles and responsibilities involving nonfederal forests in the United States: an assessment of federal and state conditions. In press: *Society and Natural Resources*.

Ellefson, P. V., M. A. Kilgore, and J.E. Granskog. Government regulation of forestry practices on private forest land in the United States: an assessment of state government responsibilities and program performance. In press: *Forest Policy and Economics*.

Kilgore, M.A. 2004. Trends in America's family forests: public forest policies and the family forest. *Journal of Forestry*. 102(7): 11-12.

Kilgore, M.A. and C.R. Blinn. 2003. The financial cost to forest landowners who implement forest management guidelines: an empirical assessment. *Journal of Forestry* 101(8): 37-41.

A PUBLIC-PRIVATE PARTNERSHIP

