



**BUILDING ON THE MIDWEST LEGACY OF
RESTORATION: LINKING THEORY AND PRACTICE
SIXTH MIDWEST-GREAT LAKES SER CHAPTER MEETING**

March 28 to 30, 2014

University of Minnesota, St. Paul, Minnesota

MEETING PROGRAM



WELCOME

Welcome to the Sixth Annual Meeting of the Midwest-Great Lakes Chapter of the Society for Ecological Restoration (SER). Our goal is to highlight the legacy of ecological restoration in the Midwest and the importance of the linkages between theory and practice in ecological restoration. Our scientific agenda features two plenary sessions, a keynote address, three symposia, one workshop, 16 contributed poster presentations, and 34 contributed oral presentations on a diversity of topics that reflect our meeting theme. On Saturday afternoon our Meeting Hosts (The University of Minnesota's Department of Bioproducts and Biosystems Engineering and the Department of Fisheries, Wildlife, & Conservation Biology) will offer a special joint plenary session and tour. Notably, this joint session will highlight large-scale restoration projects and research designed to address the challenges of climate change, habitat fragmentation, multiple stressors, and water quality in agricultural and urban watersheds. On behalf of the Midwest-Great Lakes SER Chapter we welcome you to the Land of 10,000 Lakes and to what we believe will be another outstanding forum for advancing the practice and science of ecological restoration.

2014 ANNUAL MEETING COMMITTEE

The Chapter extends its sincere appreciation to the members of the Annual Meeting Committee for their time and effort in coordinating and developing the Sixth Annual Chapter Meeting: *Rocky Smiley (Chairperson), Roger Anderson, David Benson, Young Choi, Susan Galatowitsch, John Lampe, Christian Lenhart, Jennifer Lyndall, Pamela Rice, Donald Tilton.*

ACKNOWLEDGEMENTS

We are very grateful for the generous support provided by our meeting hosts and sponsors that enabled us to hold a sponsorship reception, support student participation, defrayed food costs, and to make our Annual Meeting as environmentally friendly as possible. We greatly appreciate the contributions of Julia Bohnen, Brad Gordon, Joe Magner, Justin Meissen, Laura Phillips-Mao, Kathryn Swanson, and Annie Weeks who assisted with planning the meeting and provided onsite help. We are also thankful for the participation of the meeting presenters, moderators, tour leaders, field trip leaders, volunteers, and attendees at our Sixth Annual Meeting.

SPONSORSHIP RECEPTION

Enjoy drinks and snacks while examining poster presentations, viewing sponsorship exhibits, and socializing with colleagues.

SER PRINT EXHIBIT

For the SER 2013 Meeting, Madison artist Yvette Pino paired a dozen fine art printmakers with SER members and founders to create prints based on the stories these individuals tell about their work, their mentors, and their history with ecological restoration. We encourage everyone to view this fascinating exhibit that will be on display during the Chapter Meeting.

MEETING HOST



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MEETING SCHEDULE OVERVIEW

Friday March 28 St. Paul Student Center	
11:00 am – 7:00 pm	Registration (Second Floor Hallway)
11:00 am – 7:00 pm	Posters (North Star Ballroom), Sponsorship Exhibits and SER Print Exhibit (Second Floor Hallway)
1:00 pm – 3:15 pm	Opening Plenary Session (North Star Ballroom)
3:15 pm – 3:30 pm	Break
3:30 pm – 5:30 pm	Symposia (North Star Ballroom, Cherrywood, Room 110) and Workshop (Room 202)
5:30 pm – 5:45 pm	Break
5:45 pm – 7:00 pm	Poster Session & Sponsorship Reception (North Star Ballroom)
7:00 pm – 8:00 pm	Dinner and Welcoming Comments (North Star Ballroom)
8:00 pm – 9:00 pm	Keynote Presentation (North Star Ballroom)

Saturday March 29 St. Paul Student Center	
8:00 am – 11:00 am	Registration (Second Floor Hallway)
8:00 am – 2:00 pm	Posters (North Star Ballroom), Sponsorship Exhibits and SER Print Exhibit (Second Floor Hallway)
8:00 am – 8:30 am	Coffee and Tea (North Star Ballroom)
8:30 am – 9:50 am	Concurrent Oral Presentations (North Star Ballroom, Cherrywood, Room 202, Room 110)
9:50 am – 10:10 am	Break
10:10 am – 11:50 am	Concurrent Oral Presentations (North Star Ballroom, Cherrywood, Room 202, Room 110)
11:50 am – 12:00 pm	Break
12:00 pm – 1:45 pm	Lunch, Business Meeting, Awards Ceremony (North Star Ballroom)
1:45 pm – 2:00 pm	Break
2:00 pm – 6:00 pm	Joint Plenary Session (North Star Ballroom) and Chain of Lakes Tour

Sunday March 30 Offsite Field Trips			
	Princeton, MN	Rogers, MN	Twin Cities, MN
9:00 am – 2:00 pm	Prairie Restorations Inc. Production Facilities Field Trip	Crow-Hassen Park Reserve Field Trip	Twin Cities Stream Restoration Field Trip

** All times are central daylight times*

OPENING PLENARY SESSION – FRIDAY MARCH 28, 2014

PERSPECTIVES ON THE IMPORTANCE OF LINKING THEORY AND PRACTICE IN ECOLOGICAL RESTORATION

Representatives from Applied Ecological Services, University of Wisconsin-Eau Claire, Chicago Botanic Garden, and the Minnesota Board of Soil and Water Resources will present their perspectives on the importance of linking theory and practice in ecological restoration.

1:00 – 1:05 pm: Anderson, Roger. ***Introduction***. Illinois State University. Email: rcander@ilstu.edu

1:05 – 1:30 pm: Apfelbaum, Steven I. ***Forty Years of Attempting to Bridge the Developing Science and Practice of Ecological Restoration***. Applied Ecological Services, Inc., Brodhead, Wisconsin. Email: steve@appliedeco.com

Ecological restoration as a field of science and as an on-the-ground practice has developed rapidly in recent years. In the 1970's when I was a student at the University of Illinois there were field courses focused on teaching taxonomy, field ecology, mensuration methods, but not restoration. My alma mater was no different than other universities in that ecosystem restoration was not the focus of research, education, or any training opportunities. If you wanted to learn about forest management, wildlife management, or agriculture - you received training in planning and implementing on-the-ground land management decisions and practices. Some of these traditional techniques can guide current ecological restoration efforts, but their intent is focused on producing board feet, more deer or pheasants, or improving corn yields. Successfully conceptualizing, designing, and implementing ecological restoration projects requires an eclectic training through formal course work and on-the-ground experience. In my personal experience, the on-the-ground experience studying remnant natural areas and remote wilderness areas has provided a greater foundation in understanding how the composition, structure, and dynamics of biotic communities respond to perturbations or disturbances than formal academic training. I will share how my traditional formal training in science has been recast and molded by field experiences on thousands of projects around the world and used to obtain information capable of guiding future ecological restoration efforts. My involvement in a wide range of projects has taught me that nature always throws curve balls when stasis is most often desired in policy, political and land management programs.

1:30 – 1:55 pm: Weiher, Evan. ***On the Relevance of Theory to Restoration Science and Practice***. University of Wisconsin – Eau Claire, Eau Claire, Wisconsin. Email: weiher@uwec.edu

Linking theory to practice in ecological restoration is superficially easy, but it is actually a daunting challenge. Just a few years ago, an ecologist reviewed the degree to which ecologists make a clear reference to theory within their peer reviewed publications, and the degree to which the published science was intended to test fundamental theory in ecology. The rates of clear references to theory within the scientific literature were surprisingly low. These rates are no doubt even lower in applied ecology and restoration ecology. Is this really a problem? To what degree is the success of a restoration project (or even experiment) predicated on making use of ecological theory? I suspect the answer is little to none. I further suspect that this is because restoration practitioners are more like chefs and other craftsmen than engineers and ecologists are more like economists than physicists. I also suggest that the gap between restoration practitioners and theory-minded ecologists is largely a matter of aesthetics, arbitrary privilege, and reward structures. I do believe that theory-minded ecologists have a lot to gain by collaborating with restoration practitioners, but a great challenge to these types of collaborations is the need for control plots and other ugly experimental impediments. I also feel insights from the recent explosion of scientific findings related to novel aspects of biodiversity will provide valuable information for the practice of ecological restoration. Specifically, information on functional and phylogenetic diversity within and among plots can inform us on which communities can or should be restored and can be used in developing restoration targets for future restoration projects.

1:55 – 2:20 pm: Larkin, Daniel J. ***Investigating Restoration Actions and Outcomes: What Happens if We Turn This Dial?*** Chicago Botanic Garden, Glencoe, Illinois. Email: dlarkin@chicagobotanic.org

The value of restoration practice is clear when we see a once-degraded site transformed into a diverse, well-functioning ecosystem. This form of “intelligent tinkering” is of obvious importance for conservation. But what is the value of the science of studying restoration, i.e., the systematic observation and investigation of intelligent tinkering? A key contribution of restoration ecology to ecological restoration is, in its most basic form, a framework for answering the question, “If we turn this dial, what happens?” In other words, is the system sensitive to a given manipulation? Does it respond in a desired way? The science of restoration can provide insights into what dials to turn and where to look to see if a needle has moved, and it can help organize collective learning about restoration actions and their consequences. I illustrate these different aspects of restoration science with three ongoing research projects that my students, collaborators, and I are conducting. In a ‘dial-turning’ study, we are investigating phylogenetic diversity—drawing more broadly from across the “Tree of Life” in selecting plant species for restoration—as a heuristic for restoring communities with high functional diversity. In a ‘needle-moving’ study, we are testing how diverse communities of native, mostly solitary bees respond to grassland restoration. We are drawing on the power of ‘collective learning’ in our project PhragNet, in which we are investigating the effectiveness of different management actions for controlling invasive *Phragmites australis* through a large-scale, research-management collaboration.

2:20 – 2:45 pm: Shaw, Daniel. ***Using Ecological Theories to Improve Restoration Success.*** Minnesota Board of Water and Soil Resources, St. Paul, Minnesota. Email: dan.shaw@state.mn.us

Minnesota has a diversity of plant communities with prairie potholes to the south, coniferous forests and bogs to the north, and savannas and deciduous forest in central and eastern portions of the state. There is also a strong history of partnerships and the sharing of information between agencies, universities, and conservation groups to restore landscapes and further the field of ecological restoration. Ecological theories and supporting research related to landscape connectivity, diversity, succession, ecological function, and resiliency play an important role in defining the components of a successful and ecologically complete restoration effort, and are used as a foundation for the development of program goals and plans for the Minnesota Board of Water and Soil Resources. Technical resources such as seed source guidelines, regional seed mixes, and restoration guidance also help provide a framework that combined with practitioner experience guide the development of specific goals and decision making for individual projects. The way we think about and apply ecological theories and research findings change over time as we gain information about project success or failure through research partnerships, a “Practitioners Network”, a “What’s Working” webpage, and restoration evaluations that are all used to collect information from across the state and make it available to professionals. This information is essential for program staff to update or adapt program goals, planning, and technical resources as needed with the ultimate goal of improving the success of future restoration efforts.

2:45 – 3:15 pm: ***Panel Discussion.*** All speakers will take questions from the audience and further discuss their views related to the importance of linking theory and practice in ecological restoration.

SYMPOSIA AND WORKSHOP FRIDAY MARCH 28, 2014

Symposium #1 (North Star Ballroom): Finding Commercial Uses for Prairie Vegetation in Agricultural Watersheds

Organizer: Laura L. Jackson. University of Northern Iowa Tallgrass Prairie Center, Cedar Falls, Iowa. Email: laura.jackson@uni.edu

Presenters: W. Carter Johnson, South Dakota State University, Brookings, SD; Meghann Jarchow, University of South Dakota, Vermillion, SD; Mary A. Harris, Iowa State University, Ames, IA; Laura L. Jackson, University of Northern Iowa Tallgrass Prairie Center, Cedar Falls, IA.

Globally significant regions of agricultural production such as the Midwestern United States face interconnected challenges such as the loss of biodiversity, soil loss, soil degradation, nutrient pollution leading to widespread marine hypoxic zones, hydrological alteration resulting in greater risk of flooding, and increased vulnerability to drought. There is emerging consensus that climate change may not only significantly reduce crop yields, but it will also undermine the long term capacity of terrestrial and aquatic ecosystems to recover from extreme climate events. Field studies, watershed-scale modeling, and historical analyses have converged on a common solution to meaningfully address these interconnected problems -- increasing perennial vegetative cover on the landscape. While scientific evidence for these approaches is well established, and the methods are largely known, market and policy incentives are currently much stronger to grow corn and soybeans. In order to shift socioeconomic drivers towards more sustainable farming systems, it will be necessary to demonstrate economically viable models, and provide training and support for landowners. Several research teams in Midwestern United States are currently exploring the agronomic methods and market mechanisms to capitalize on the ecosystem products and services provided by perennial vegetation. This symposium will present the results of these efforts in the area of feed and fodder, biomass energy, and native seed production, and explore how these interdisciplinary research results can contribute to regional restoration on a landscape scale.

Time	Presenters	Title
3:30 – 3:55	Johnson, W. Carter	Profitable prairie restoration: the EcoSun Prairie Farm experiment
3:55 – 4:20	Jarchow, Meghann	Ecological and agronomic tradeoffs in prairies managed with nitrogen fertilization
4:20 – 4:45	Harris, Mary A.	Prairie strips integrated with row crops: biodiversity, soil conservation, and income opportunities
4:45 – 5:10	Jackson, Laura L.	Finding commercial uses for prairie in agricultural watersheds: a review of the possibilities, and what it will take to get us there.
5:10 – 5:30		Presenter and audience discussion

Symposium #2 (Cherrywood): Minnesota's State-wide Watershed Restoration and Protection Program – Putting the Clean Water Act into Action

Organizers and Presenters: Chris Klucas, Minnesota Pollution Control Agency, St. Paul, Minnesota, Email: Christopher.Klucas@state.mn.us; Pat Conrad, Emmons & Olivier Resources Inc., Oakdale, Minnesota, Email: pconrad@eorinc.com; Jason Naber, Emmons & Olivier Resources Inc., Oakdale, Minnesota, Email: jnaber@eorinc.com; Meghan Jacobson, Emmons & Olivier Resources Inc., Oakdale, Minnesota, Email: mjacobson@eorinc.com; Casey Thiel, Chisago Soil and Water Conservation District, North Branch, Minnesota, Email: casey.thiel@mn.nacdnet.net

The State of Minnesota has recently adopted a watershed approach to address the water quality of its 81 major watersheds. This watershed approach incorporates water quality assessment, watershed analysis, civic engagement, planning, implementation, and measurement of results into a 10-year cycle that addresses both restoration and protection of lakes and streams. In addition to listing waters not meeting state standards as impaired and performing Total Maximum Daily studies, the watershed approach process facilitates a more cost-effective and comprehensive characterization of multiple water bodies and overall watershed health. A key aspect of this effort is to develop and use watershed-scale models and other tools to help state agencies, local governments, and other watershed stakeholders determine how to best proceed with restoring and protecting lakes and streams. In this symposium, five representatives from two public agencies and a private consulting firm will share their knowledge of and experiences with the new watershed approach. The symposium will provide: 1) a state agency perspective of the WRAPS (watershed restoration and protection strategy) process; 2) an independent consulting firm perspective of the technical challenges associated with watershed-wide restoration, such as lake water quality modeling, stream bacteria source identification, and stream aquatic life stressor identification; and 3) a county agency example of how the WRAPS process translates into real-world restoration and protection activities. The symposium will end with a question and answer session providing an opportunity for the research and restoration community to ask questions about the Watershed Restoration and Protection Strategy approach, to provide input on how their research and restoration activities may benefit this process, and to ultimately shed light on key water quality questions that need to be addressed by the research community to further advance state-wide water quality restoration and protection projects.

Time	Presenters	Title
3:30 – 3:50	Klucas, Chris	An overview of the watershed restoration and protection strategy process
3:50 – 4:10	Jacobson, Meghan	Modeling lake water quality and internal phosphorus loads
4:10 – 4:30	Conrad, Pat	Identifying stream bacteria sources and reduction strategies
4:30 – 4:50	Naber, Jason	Linking stream aquatic life impairments to pollutant-and habitat-based stressors
4:50 – 5:10	Thiel, Casey	Putting the restoration and protection plan into action through civic engagement, grant writing, and project implementation
5:10 – 5:30		Question and answer session with presenters

Symposium #3 (Room 110): Consequences of Emerald Ash Borer Induced Mortality for Black Ash Wetlands: Insights from Research for Restoration and Management

Organizers: Christian Lenhart, University of Minnesota, St. Paul, Minnesota, Email: lenh0010@umn.edu; Anthony D'Amato, University of Minnesota, St. Paul, Minnesota, Email: damato@umn.edu; Robert Slesak, Minnesota Forest Resources Council, St. Paul, Minnesota, Email: raslesak@umn.edu

Presenters: Anthony D'Amato, University of Minnesota, St. Paul, MN; Christian Lenhart, University of Minnesota, St. Paul, MN; Robert Slesak, Minnesota Forest Resources Council, St. Paul, MN, Christopher Looney, University of Minnesota, St. Paul, MN; Mike Reinikainen, University of Minnesota, Cloquet, MN.

Black ash-dominated wetlands are abundant in the Upper Great Lakes and northeastern portions of North America, covering 4047 km² in the state of Minnesota alone. The impending loss of forested ash wetlands across this region due to the emerald ash borer (EAB) raises difficult questions for management and restoration of these ecosystems. Black ash (*Fraxinus nigra*) often constitutes the primary tree species in these wetlands and only a few non-host tree species are capable of filling its ecological niche following EAB infestation. Little is known about the ecology of black ash wetlands despite the prevalence of this wetland type across the region. For example, the hydrologic response of widespread ash mortality is unknown. It is thought that widespread tree death would increase water levels as a result of reduced transpiration and interception. Similarly, the recruitment and vegetation dynamics of these wetlands are largely unknown hampering efforts aimed at encouraging the regeneration of non-host species within these forested wetlands. Our symposium will discuss the ecological setting in which forested ash wetlands occur and potential ecological and hydrological responses to EAB-induced mortality. Results from a large-scale, manipulative experiment in northern Minnesota evaluating the implications of EAB for restoration and management will be presented. Detailed studies of the dynamics of old-growth black ash wetlands will also be included to provide a broader ecological context for restoration activities in the face of EAB. These studies also provide an excellent example of the integration of scientific theory and practical forest management and restoration. Lessons learned from the ecological and hydrological studies presented as part of this symposium will provide valuable insights and guidance for forested ash wetland restoration efforts throughout the Great Lakes region.

Time	Presenters	Title
3:30 – 3:50	D'Amato, Anthony	Overview of a large-scale experiment to assess the impact of emerald ash borer on the structure and function of black ash forest ecosystems and the potential for restoration
3:50 – 4:10	Lenhart, Christian	The hydrologic setting of black ash wetlands: implications for restoration and management
4:10 – 4:30	Slesak, Robert	Water table response of black ash wetlands to simulated emerald ash borer mortality and harvesting
4:30 – 4:50	Looney, Christopher	Impacts of restoration treatments and emerald ash borer on vegetation communities in black ash-dominated wetlands
4:50 – 5:10	Reinikainen, Mike	Two-year survival of potential replacement tree species in ash-dominated wetlands
5:10 – 5:30		Question and answer session

Workshop #1 (Room 202): Seedling Identification of Selected Prairie Plants

Instructor: Dave W. Williams. Tallgrass Prairie Center, Cedar Falls, Iowa. Email: dave.williams@uni.edu

Prairie restoration often involves the introduction of desired plants by seed. Assessing plant establishment success or failure in the first and second growing seasons is critical for determining appropriate management action. In order to conduct an accurate assessment of plant establishment, the resource manager or landowner must have the skills necessary to identify native forbs and grasses as seedlings and juveniles. This workshop will use live seedling plants to give participants a “hands on” experience and the confidence to identify seedling plants commonly found in the tallgrass prairie in the Midwestern United States. Participants will identify a few basic plant parts, find those parts on live plants, and learn about key characteristic groups to help identify prairie seedlings. In addition, there will be selected look-alike weed seedlings available for comparison. Everything is provided in this workshop. All that is needed is the desire to enjoy the experience and to come prepared to get your hands dirty and take home seedling prairie plants at the end of the workshop.

** Due to limited materials this workshop will be on a first-come-first-serve basis to the first 30 participants.*



POSTER SESSION - FRIDAY MARCH 28, 2014

North Star Ballroom 5:45 pm – 7:00 pm

Poster #	Presenters	Title
1	Anderson, Roger C. , P.C. Smiley Jr., J. Lyndall, & Y.D. Choi	Midwest-Great Lakes SER Chapter: Who we are, what we do, and what we will do
2	Anderson, Roger C. , J. Herold, M.R. Anderson, J.T. Bauer, & V. Borowicz	Comparison of the effect of early and late removal of second-year garlic mustard (<i>Alliaria petiolata</i>) on first-year plants and deciduous forest spring and summer dominant herbaceous groundlayer species in central Illinois, USA
3	Eachus, Brian* , D. Gibson, K. Davison, D. Gilbertson, & M.B. McNicoll	Effects of management on <i>Pastinaca sativa</i> (wild parsnip) in a low-diversity grassland.
4	Larson, Diane L. , D. Wells, S. Vacek, P.A. Rabie, N. Palaia, J.L. Larson, P. Drobney, & J.B. Bright	Can we use theories of complementarity and limiting similarity to reduce exotic infestation in prairie reconstructions?
5	Loebach, Chris A.* & R.C. Anderson	Investigating epizoochory as a seed dispersal mechanism of the invasive plant garlic mustard (<i>Alliaria petiolata</i>)
6	Damm, Mary C. , M. Bogonovich, & J.D. Bever	Micro-scale plant community composition differs between native and reconstructed Iowa tallgrass prairies
7	Ohrtman, Michelle K. , S.A. Clay, & A. Smart	Box elder (<i>Acer negundo</i>) as a bottom-up control for saltcedar (<i>Tamarix</i> spp.) in the northern Great Plains
8	Peterson, Donnie* , S. Yaninek, & C. Sadof	Suitability of green ash (<i>Fraxinus pennsylvanica</i>) and blue ash (<i>F. quadrangulata</i>) to emerald ash borer (<i>Agrilus planipennis</i>) and their potential to serve as a refuge for biological control agents
9	Gibson, Dan* , B. Eachus, K. Davison, D. Gilbertson, & M.B. McNicoll	Understory community structure response to mechanical thinning and fire regime in an oak woodland restoration in Northeast Iowa
10	Gordon, Brad* , P. Rothrock, & P. Labus	Oak savanna and wetland benchmarks developed for calculating site vegetation quality categories
11	DeJoode, Daniel R. , G. Vande Water, & F.J. Rozumalski	Large-scale transplantation results of dwarf lake iris (<i>Iris lacustris</i>) and Houghton's goldenrod (<i>Solidago houghtonii</i>) after three growing seasons
12	Kinsman, Samantha J.* , R. Shmagranoff, & Y.D. Choi	The birds of Wolf Lake
13	Aten, Nancy M. and D.J. Collins	The development of an ecological restoration approach and suite of site-specific projects beneficial to the conservation of a Door County, Wisconsin landscape using concepts from Christopher Alexander's "A Pattern Language"
14	Ross, Nikol* , C. Lenhart, & D. Current	Effectiveness of nitrate reduction in a constructed wetland receiving tile-drainage water from an agricultural field in along Elm Creek, a Blue Earth River tributary in south central, Minnesota
15	Triplett, Laura J.*	Riparian vegetation establishment and variation in hydrologic timing within the Lower Minnesota River Basin
16	Smiley Jr., Peter C. , K.R. Rumora, & K.R. Seger	Implications of the results of colonization experiments for designing riparian restoration projects adjacent to agricultural headwater streams

Student presentations are denoted with an * following the name of the presenter

KEYNOTE PRESENTATION – FRIDAY MARCH 28, 2014

Susan Galatowitsch

Department of Fisheries, Wildlife, and Conservation Biology, University of Minnesota, St. Paul, Minnesota

HIT-AND-RUN RESTORATION

Abstract: Over the past few decades, people have attempted with confidence larger and more complex ecological restoration projects. This is good news because restoration is trivial unless pursued at a scale and scope commensurate with the Earth's most pressing environmental challenges. However, as a scientific field and as a professional practice, ecological restoration has not made much progress towards working at meaningful time-scales. In many parts of the world, restoration efforts under a few years in duration abound, whereas projects with ongoing management and monitoring exceeding 5 years are rare. For the most part, this short project time horizon reflects policy preferences for funding new projects and program budget cycles tied to short-term accountability. Short time horizons are not consistent with the recovery rates of ecosystems, which we have learned is often much longer than expected. And, for highly degraded ecosystems, there is mounting evidence that restoration interventions must be sustained long enough to counteract the reinforcing effects from positive feedbacks – or risk project failure. To restore highly degraded grasslands, wetlands, rivers, or forests is clearly a commitment of decades, not a couple of years. What can be done to reduce the prevalence of “hit-and-run” restorations? First, plans and budgets need to be tied to realistic, time-bound goals. Second, competitive funding for restoration work should be based on an organization's demonstrated ability to achieve ecological outcomes and to rebound after setbacks and surprises. Third, researchers need to focus attention on providing decision-support for follow-up restoration actions and on developing restoration methods intended to accelerate recovery. Finally, policy should balance financial support for both new and ongoing restoration efforts.



Biography: Dr. Susan M. Galatowitsch is Department Head of Fisheries, Wildlife, and Conservation Biology at the University of Minnesota. She is in Minnesota's Academy of Distinguished Teachers and has been a Fesler-Lampert Distinguished Chair of Urban and Regional Affairs. Dr. Galatowitsch teaches courses in restoration ecology and wetland ecology at the University of Minnesota and has also taught restoration ecology at the University of Cape Town while a Fulbright Fellow. Dr. Galatowitsch earned a B.A. in Environmental Biology from St. Mary's College-Minnesota, an M.S. in Botany from the University of Minnesota, and a Ph.D. in Ecology & Evolutionary Biology from Iowa State University. Her research focuses on restoration assessment, revegetation, management of invasive species, and climate change adaptation for wetland and riparian ecosystems. In addition to many research publications, she has authored two books, *Ecological Restoration* (Sinauer Associates) and *Restoring Prairie Wetlands: An Ecological Approach* (with Arnold van der Valk).

CONCURRENT ORAL PRESENTATIONS

SATURDAY MARCH 29, 2014

NORTH STAR BALLROOM

Prairie Restoration I. 8:30 am – 9:50 am

Moderator: Roger Anderson

8:30 – 8:50	Bassett, Tyler*	Land use legacies in prairie restoration: persistent effects on invasion resistance
8:50 – 9:10	A.R. Thada, R.T. Reber, & P.E. Rothrock, & Brad Gordon*	Interseeding forbs in a grass-dominated prairie restoration in northeast Indiana
9:10 – 9:30	Jorgensen, Niels* & M. Renz	Native forb establishment following herbicide applications
9:30 – 9:50	Anderson, Roger C. , M.R. Anderson, & E.A. Corbett	Weevils, deer, and fire effects on flowering diversity of tallgrass prairie forbs

Prairie Restoration II. 10:10 am – 11:30 am

Moderator: Justin Meissen

10:10 – 10:30	Meissen, Justin C.* , S.M. Galatowitsch, & M.W. Cornett	Classifying maximum lifespan in perennial tallgrass prairie plants: can we use readily available trait data?
10:30 – 10:50	Kelly, Tara L.	The reintroduction of bison in a tallgrass prairie
10:50 – 11:10	Johnson, Douglas H. , L.D. Igl, & B.E. Jamison	Effects on breeding birds of seeding mixtures in planted grasslands
11:10 - 11:30	Umek, Lauren* & L. Egerton-Warburton	Restoration and management effects on litter decomposition and microbial functioning in the Chicago Wilderness

*Student presentations are denoted with an * following the name of the presenter*

CONCURRENT ORAL PRESENTATIONS

SATURDAY MARCH 29, 2014

CHERRYWOOD

Human Dimensions in Restoration. 8:30 am – 9:50 am

Moderator: Fred Rozumalski

8:30 – 8:50	Di Misa, Joe	Great Lakes coastal ecological restoration challenges and successes at Middle Bass Island, Ohio
8:50 – 9:10	Ballantyne, Drew M., S. Witte, & J.P. Maksymiu	Golf's environmental opportunities
9:10 – 9:30	Cornett, Meredith W.	Palms, pines, and people: redefining forest restoration in the Anthropocene
9:30 – 9:50	Rozumalski, Fred J.	Human perception of a lakeshore restoration and bioengineered shoreline stabilization ten years after establishment

Wetlands and Shallow Lakes. 10:10 am – 11:50 am

Moderator: Kathryn Swanson

10:10 – 10:30	Jacobson, M., Jeffrey Lee , & D.Tix	Seed bank and seeding interactions in wetland restoration success
10:30 – 10:50	Jessop, Jordan* , J. Matthews, A. Kent, T.J. Benson, & M. Ward	Tradeoffs among ecosystem services in restored wetlands
10:50 – 11:10	Thomforde, Stephen L.	Canvasbacks (<i>Aythya valisineria</i>), wild celery (<i>Vallisneria americana</i>), and phosphorus regulation in Midwest large shallow water lakes: Novel ideas for restoration
11:10 – 11:30	Bajer, Przemyslaw G. & P.W. Sorensen	The role of common carp in phosphorus cycling, water clarity, and vegetation density in a stratified eutrophic lake: a whole lake experiment
11:30 – 11:50	Husveth, Jason J.	Restoring rich fen and wet prairie peatlands using native seed banks in the Anoka Sand Plain

*Student presentations are denoted with an * following the name of the presenter*

CONCURRENT ORAL PRESENTATIONS

SATURDAY MARCH 29, 2014

ROOM 202

Restoration Planning and Prioritization. 8:30 am – 9:50 am

Moderator: Laura Phillips-Mao

8:30 – 8:50	Smiley Jr., Peter C. & C. Lenhart	A review of theoretical frameworks applicable for designing agricultural watershed restoration projects
8:50 – 9:10	Hmielowski, Tracy L. , S.K. Carter, H. Spaul, V. Radeloff, & P. Zedler	Where should we burn? Techniques for identifying priority areas at landscape scale
9:10 – 9:30	Esser, Rebecca, J. Dowler, P. Drobney, & M. Knutson	Making smart decisions about tallgrass prairie reconstruction
9:30 – 9:50	Phillips-Mao, Laura , S.M. Galatowitsch, & J. Refsland	Developing a qualitative state-transition model to guide implementation of the Minnesota Prairie Conservation Plan

Monitoring, Evaluation, and Adaptive Management. 10:10 am – 11:30 am

Moderator: Julia Bohnen

10:10 – 10:30	Hoch, Greg and R. Esser	A comparison of methods for surveying vegetation diversity in restored prairies
10:30 – 10:50	Johnson, Wade A.	A restoration evaluation program for Minnesota
10:50 – 11:10	Knutson, Melinda G. , C. Dixon, S. Vacek, & P. Heglund	Adaptive management on the ground: what we've learned
11:10 – 11:30	Bohnen, Julia L. & S.M. Galatowitsch	Using monitoring data to guide management decisions at the Spring Peeper Meadow wetland restoration

*Student presentations are denoted with an * following the name of the presenter*

CONCURRENT ORAL PRESENTATIONS
SATURDAY MARCH 29, 2014
ROOM 110

Forest and Savanna Restoration. 8:30 am – 9:50 am

Moderator: Rachel Olm

8:30 – 8:50	Dreisilker, Kurt M., J. Dawson, & A. Koeser	Enhancing establishment of white oak and American hazelnut enrichment plants in a mesic forest using understory removal and group selection
8:50 – 9:10	Reinhardt, Jason R., L.M. Nagel, & C. Swanston	Searching for focus: indicator species analysis in Michigan oak savannas
9:10 – 9:30	Shuey, John & C. Bladow	Restoring ecological resilience in Indiana oak forest and barrens as adaptation for future climate change regimes
9:30 – 9:50	Volke, Malia* and W.C. Johnson	The emergence of reservoir deltas in the regulated Missouri River: Opportunities for cottonwood forest restoration

Stream Restoration. 10:10 am – 11:50 am

Moderator: Annie Weiler-Weeks

10:10 – 10:30	Aadland, Luther	Spatial and temporal scales of river restoration effects
10:30 – 10:50	Boote, Martin J. & Greg L. Gaulke	Evaluating fish movement following dam removal
10:50 – 11:10	Krider, Lori, B. Wilson, J. Magner, B. Hansen, L. Lahti, & B. Asmus	Ecological implications of agricultural drainage ditch restoration through a two-stage design (Mower County, Minnesota)
11:10 – 11:30	Gillespie, Robert B., P.C. Smiley Jr., K.E. Sanders, K.W. King, D.R. Smith, & E.A. Pappas	Restoration implications of the results from a tiered assessment conducted to evaluate the influence of water chemistry on fishes within agricultural headwater streams
11:30 – 11:50	O'Leary, Mark J.	Integrating creek, tributary and riparian corridor restoration into park planning and design in Indiana

*Student presentations are denoted with an * following the name of the presenter*

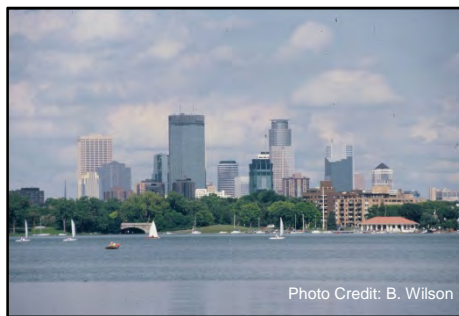
LUNCH, BUSINESS MEETING, & AWARDS CEREMONY (12:00 – 1:45 PM)

**JOINT PLENARY SESSION AND TOUR – SATURDAY MARCH 29,
2014 (2:00 – 6:00 pm)**

***RESTORATION SCALED-UP: AMBITIOUS SOLUTIONS TO
COMPLEX CHALLENGES IN MINNESOTA AND BEYOND***

Complex, landscape-scale environmental challenges require ambitious and creative solutions, but what does it take to “scale up” restoration in order to address such challenges? In this plenary session representatives from The Nature Conservancy, Minnesota Pollution Control Agency/University of Minnesota, and Barr Engineering will highlight large-scale, ambitious restoration projects and cutting-edge research designed to address the challenges of climate change, habitat fragmentation, multiple stressors, and water quality in agricultural and urban watersheds. They will feature projects in stream, lake, prairie, and forest ecosystems, share insights and lessons learned, and discuss the policies, funding mechanisms, and partnerships that enabled the initiation of these projects and the achievement of desired outcomes. The plenary session will conclude with a walking tour of the Minneapolis Chain of Lakes, giving attendees an opportunity to view urban lake restoration practices and outcomes first-hand and engage in discussion with plenary speakers, all while enjoying one of the Twin Cities’ most popular and scenic destinations.

Time	Presenters	Title
2:00 – 2:05	Laura Phillips-Mao	Welcome and Introduction
2:05 – 2:30	Meredith Cornett	Supersize me: approaches to large-scale restoration in a changing world.
2:30 – 2:55	Joe Magner	WRAPS: Minnesota’s Codified Watershed Restoration Program
2:55 – 3:15	Jeff Lee	Minneapolis Chain of Lakes Clean Water Partnership.
3:15 – 3:20	Laura Phillips-Mao	Concluding Remarks
3:20 – 3:50		Travel to Tour Site
3:50 – 5:20	Jeff Lee and Bruce Wilson	Walking Tour of the Minneapolis Chain of the Lakes
5:20 – 5:45pm		Return to Meeting Site



JOINT PLENARY SESSION PRESENTATION ABSTRACTS

Cornett, Meredith W.* ***Supersize Me: Approaches to Large-scale Restoration in a Changing World.*** The Nature Conservancy in Minnesota, North Dakota and South Dakota, Duluth, Minnesota. Email: mcornett@tnc.org

In recent years, large-scale restoration has gained momentum in the conservation community. The need to “scale up” restoration projects is often referenced as a pathway to bolstering resilience, sustaining ecosystem services and restoring connectivity. To determine whether a large-scale approach is appropriate requires clarity about restoration objectives, timeline, and desired changes. The success of large-scale projects also depends on defining the scaling strategies at the outset. I will explore emerging approaches to “scaling up” by highlighting two contrasting examples of The Nature Conservancy’s large-scale restoration projects: 1) The Glacial Ridge Project (9,000 ha), initiated in 2001, is the largest prairie wetland restoration in North America; and 2) Adaptation Forestry in Minnesota’s Northwoods, a project supported by the Wildlife Conservation Society’s Climate Adaptation Fund, was initiated in 2012. Both projects were implemented in conjunction with numerous state, federal, and local partners. In terms of habitat and ecological objectives, the two projects differ significantly. The Glacial Ridge Project, conducted over a 10-year period, aimed primarily to reconnect fragmented tallgrass prairie habitat and restore hydrologic function to address spring flooding in the Red River Valley. In contrast, the more recent Adaptation Forestry project is underway in the relatively unfragmented sub-boreal forests of northeastern Minnesota with an overall goal of enhancing resilience in the face of climate change. The area directly impacted by the Adaptation Forestry project is smaller than that of Glacial Ridge (<1,000 ha), but the project is ultimately intended to impact >2.4 million ha in northeastern Minnesota. Generalizable considerations for designing projects to impact increasingly large spatial and temporal scales will be summarized.

Magner, Joseph* ***WRAPS: Minnesota’s Codified Watershed Restoration Program.*** University of Minnesota and Minnesota Pollution Control Agency, St. Paul, Minnesota. Email: magne027@umn.edu

The 2013 Minnesota Legislature created a law requiring the state environmental agencies to produce watershed restoration and protection strategies (WRAPS) for each major (8-digit HUC) watershed. Northern Minnesota is the protection oriented part of the state, whereas the intensively managed Red River Valley and southern portions of the state will focus on restoration. Though restoration is needed over much of the agricultural landscape to meet water quality standards, implementation of a given restoration plan will be difficult to achieve without one-on-one farmer conversations. Funding from the Clean Water Legacy will typically pass through a local unit of government to landowners. However, landowner “buy-in” will require good science and persuasive arguments to demonstrate win-win opportunities. Scientists from the University of Minnesota have been engaged with local government and landowners in the Elm Creek watershed near the Iowa border for over a decade. Wetland and stream restoration has been limited, but we have observed small incremental changes in water storage, nutrient sequestration, habitat and biota. Over the next two decades, with funding from the Clean Water Legacy, Minnesota citizens expect to see restored streams that meet or exceed water quality standards.

Lee, Jeffrey* **Minneapolis Chain of Lakes Clean Water Partnership.** Barr Engineering Company, Duluth, Minnesota. Email: jefflee@barr.com

The Chain of Lakes Clean Water Partnership was a 10-year initiative that in the beginning was one of the largest urban lake restoration projects in the nation. The Minneapolis Chain of Lakes Clean Water Partnership project focused on developing and implementing a plan for improving and preserving four lakes: Cedar Lake, Lake of the Isles, Lake Calhoun, and Lake Harriet. It was funded by the Minnehaha Creek Watershed District, Minneapolis Parks and Recreation Board, City of St. Louis Park, Hennepin County, City of Minneapolis and the Minnesota Pollution Control Agency. The Minneapolis Chain of Lakes are located 4.8 km southwest of downtown Minneapolis, Minnesota. The chain's five lakes are the central natural resource feature of the Minneapolis Chain of Lakes Regional Park. The chain receives urban runoff from a fully developed 32 km² watershed that includes portions of Minneapolis and the adjoining suburban communities. Major land use categories within the watershed include residential development (51%), industrial/commercial (19%), and open space (14%). A critical part of the management plan was the development of lake water quality goals and watershed loading reductions strategies by a Citizens Advisory Committee. The long-term goals recommended by the Committee were based upon an analysis of historical, existing lake conditions, and predicted lake conditions. A short-term target of 10 to 20 percent pollutant reduction for all water quality management activities, and a long-term target of pollutant reduction of greater than 20 percent in selected watersheds is the goal. The results of the \$12 million project (using \$1.1 million in state funding) are improved water quality and a healthy, sustainable environment for recreation on and around these important lakes.



Photo Credit: J. Meissen

OFFSITE FIELD TRIPS - SUNDAY MARCH 30, 2014

*** For all field trips participants are responsible for their own transportation and unless indicated differently below participants are responsible for their own meals. To facilitate carpooling all field trips will meet at 9 am at the Biosystems and Agricultural Engineering Building (see campus map below).**

9:00 am to 2:00 pm: ***Native Plant Community Restoration and Materials Production.*** Ron Bowen and John Bowen. Prairie Restorations, Inc., Princeton Production Facilities, Princeton, MN. Email: rbowen@prairieresto.com

Ron and John Bowen and Prairie Restorations, Inc. (PRI) have been restoring native habitats since 1977. Since then, PRI staff has completed thousands of projects including prairie, wetland, forest and shoreline restorations on corporate, residential, and public sector properties. The company offers installation and land management services out of six Minnesota locations and utilizes plant materials that are sourced from three locations to provide local ecotype seeds and plants. This field trip will highlight four areas of operations. A company overview and project profile will be followed by a tour of field production facilities, seed harvesting and cleaning, and greenhouse operations. PRI annually produces 1134 kg of grass seed and 771 kg of wildflower seed. In addition, they produce 350,000 greenhouse seedlings and provide a total of 150 species of native plants. Seed is processed in a 1300 m² facility on-site. Plugs are produced beginning in March in 2323 m² of greenhouse space for use in contract projects and for wholesale and retail sales. Products offered for sale include seed, seed mixes, plants, trees, shrubs, and sod flats. PRI staff will offer their insights into how the native seed industry has changed over the decades. *A light lunch will be provided compliments of PRI.*

9:00 am to 2:00 pm: ***Forty Years of Restoring a Minnesota Landscape.*** John Moriarty. Location: Crow-Hassen Park Reserve, Rogers, MN. Email: JMoriarty@threeriversparkdistrict.org

Located on the Crow River in western Hennepin County, Crow-Hassen Park Reserve is a 11 km² park that showcases a diverse array of restoration projects and Minnesota ecosystems. Maintained by the Three Rivers Park District, Crow-Hassen Park Reserve is required to maintain at least 80 percent of the park in a natural state. Once an agricultural landscape, restoration efforts over the last 40 years have returned the natural hydrology to drained wetlands, restored viable populations of native wildlife, and restored native plant communities. This walking tour will take you through remnant and restored "Big Woods" maple-basswood forests, a 2.4 km² restored tallgrass prairie, and pothole marshes as we focus on the challenges and successes of creating a functioning restored landscape. As we explore the park, we will highlight the goal of managing these restorations for wildlife and the efforts being undertaken to achieve this such as species reintroduction programs for trumpeter swans and bull snakes, songbird monitoring, and Blanding's turtle management. We will also highlight the ongoing old-field management program that promotes habitat heterogeneity during the successional transition to forest as well as the critical role volunteers have played in achieving restoration success at Crow-Hassen Park Reserve. This field trip requires about 40 minutes of one-way drive time and will be fully outdoors, so please plan your time and attire accordingly.

9:00 am to 1:00 pm: ***Stream Restorations in Urban Environments.*** Kevin, Biehn, Emmons and Olivier Resources, Inc. Location: Twin Cities metropolitan area. Email: kbeihn@eorinc.com

This field trip will visit two urban stream restorations within the Twin Cities metropolitan area. The first site will be Brown's Creek, a cold water trout stream within a public golf course. The creek was a highly manicured reach of Brown's Creek that had become excessively wide and shallow. Monitoring had indicated that anthropogenic changes resulted in a substantial warming of this cold-water fishery. Restoration included one of the first field applications of temperature modeling. The completed project enhanced wildlife habitat, reduced instream warming, and improved course aesthetics while still meeting the strict playability standards of the golf course. The second site we will visit is one of the largest stream restoration projects in the Midwest to date. Over 1.2 km of Rice Creek, presumably straightened in the early 1900's for agricultural drainage, was reconnected to its natural meandering flow path. Now over 5 years mature, the design successfully stabilized the stream channel and reconnected the channel to its 0.8 km² floodplain. Historic abandoned water courses were identified and modified to recreate a stable stream profile, cross-section, and alignment. Habitat enhancement has been documented via an improvement in fish and invertebrate scores (IBI) over preconstruction surveys. The successful project spurred interest in establishing a dedicated canoe route and has become a restoration precedent.



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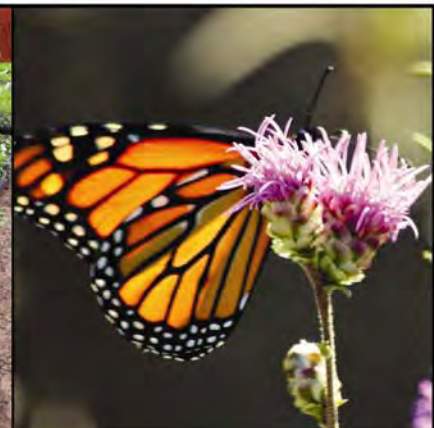
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Since its incorporation in 1988, the Society for Ecological Restoration (SER) has given voice to the field of ecological restoration and has become known as the leader in this emerging discipline. With over 2,500 members across 70 countries and 14 regional chapters, SER is a dynamic global network that fosters the exchange of knowledge and expertise among ecological restoration practitioners and scientists from diverse disciplines.

SER promotes ecological restoration and best practices by establishing regional chapters, hosting biannual conferences, and advising international organizations with policy and legislation. The Society's collection of publications includes *Restoration Ecology*, The Society's peer-reviewed journal and *The Science and Practice of Ecological Restoration*, SER's book series published in collaboration with Island Press.

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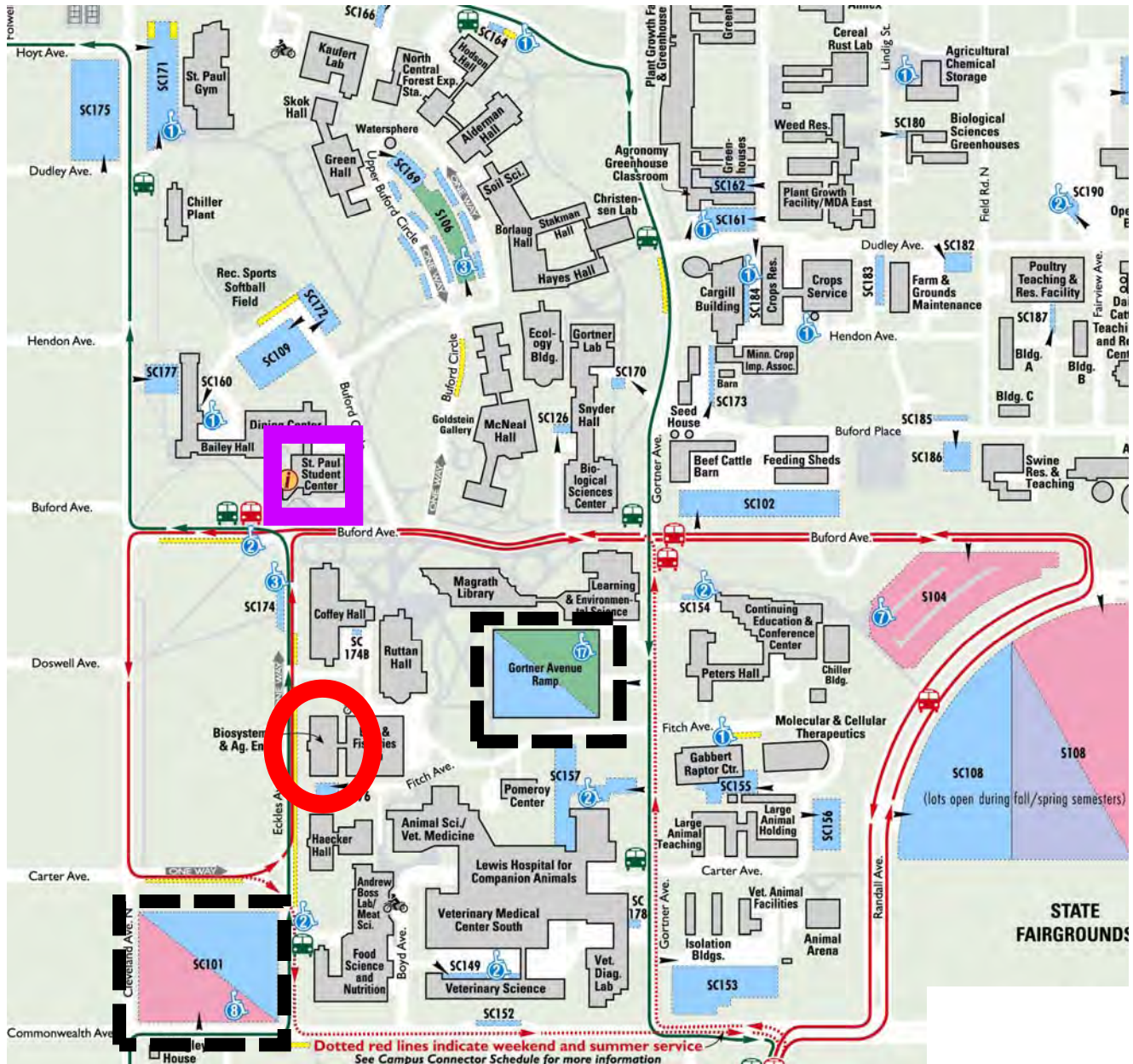
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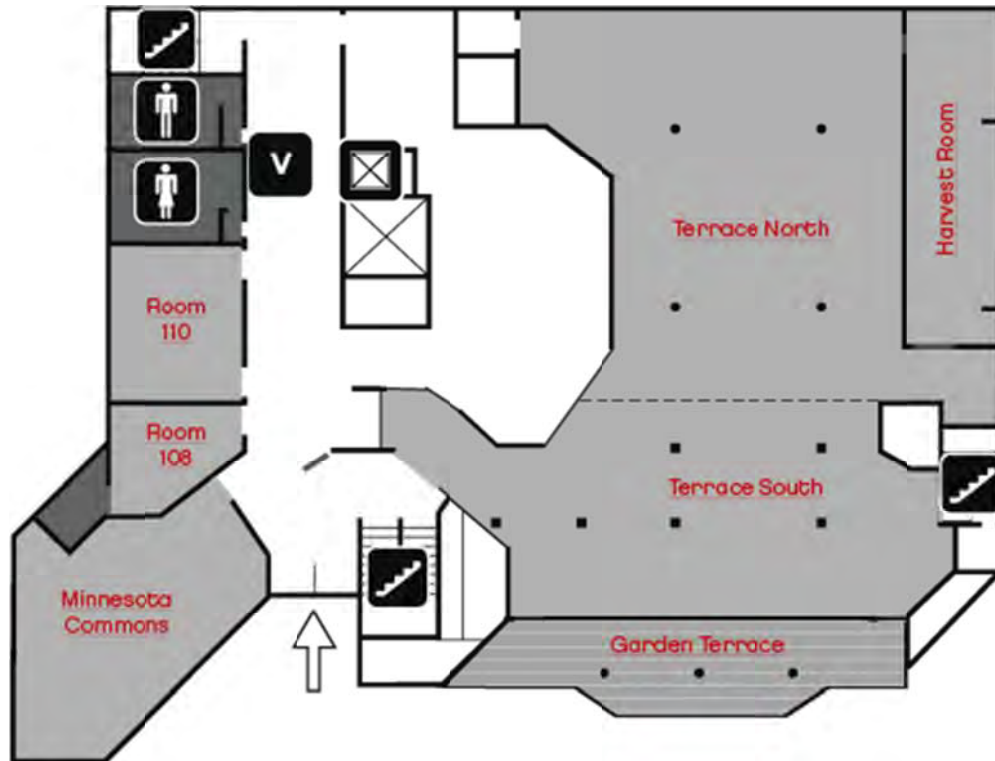
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Location of St. Paul Student Center



- The physical address of the St. Paul Student Center is 2017 Buford Avenue, St. Paul, MN 55108.
- The purple square on the map above indicates the location of St. Paul Student Center on the University of Minnesota St. Paul campus.
- The red circle on the map above indicates the location of the meeting and departure point for the offsite field trips on Sunday.
- Visitor parking is indicated by the two dashed black squares on the map located south of the St. Paul Student Center. Lot SC101 has the best daily rates (\$4/day), while the Gortner Avenue Ramp Lot charges hourly rates (maximum \$12/day).

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