MNWISC

Minnesota-Wisconsin Invasive Species Conference

2010

Working Together to Control Invasive Species

Conference Proceedings

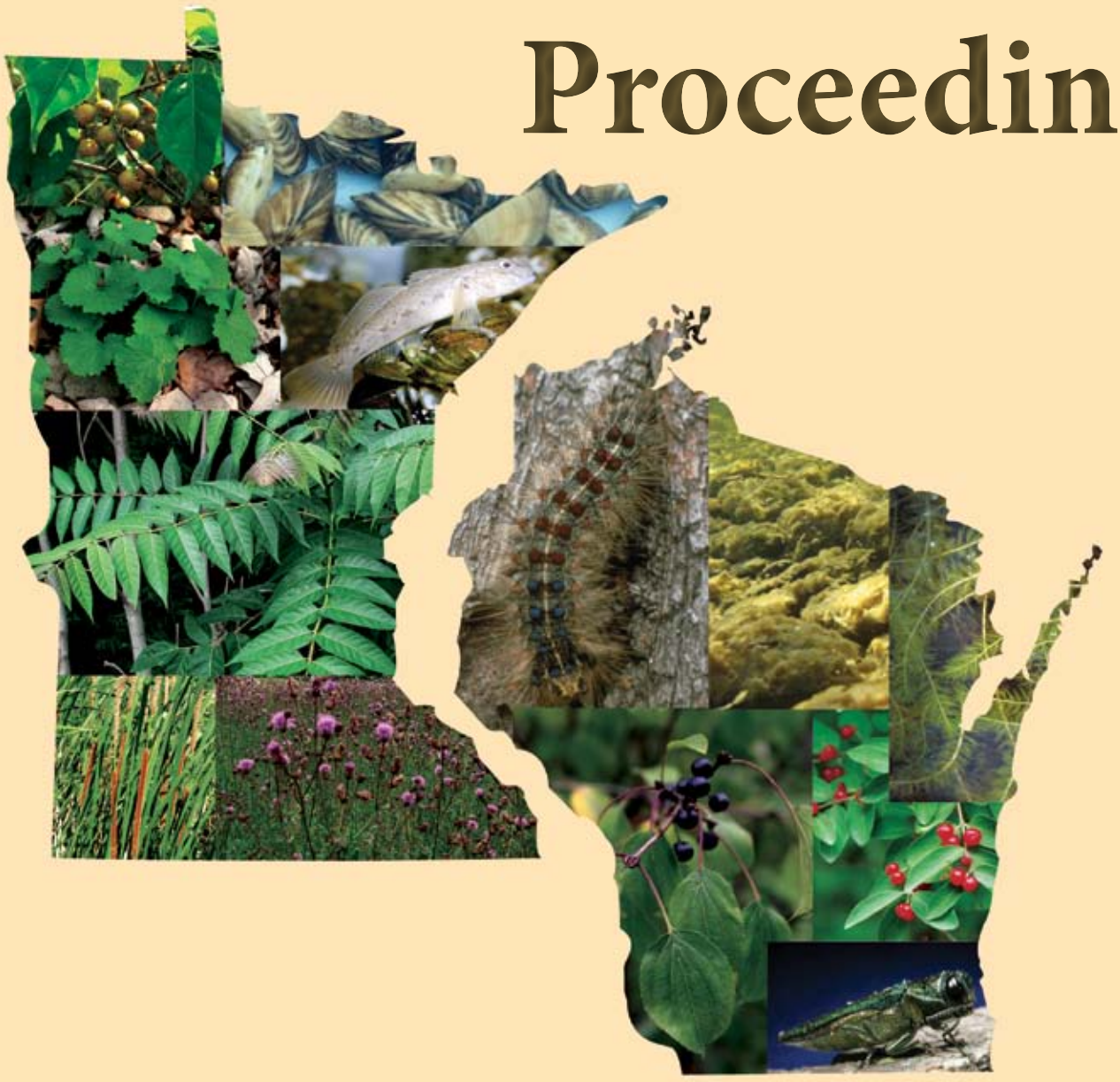

Table of Contents

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Executive Summary

The Minnesota – Wisconsin Invasive Species Conference 2010 (MNWIISC) was held at the Crowne Plaza St. Paul Riverfront Hotel, on November 8 – 10, 2010 in St. Paul, Minnesota, USA. The Minnesota Invasive Species Advisory Council (MISAC), the Invasive Plants Association of Wisconsin (IPAW), and the Midwest Invasive Plant Network (MIPN) co-hosted the conference. The fiscal sponsor was the Soil and Water Conservation Society - Minnesota Chapter. The conference was co-chaired by Laura Van Riper, Terrestrial Invasive Species Coordinator for the Minnesota Department of Natural Resources; and Steve Chaplin, Senior Conservation Scientist for The Nature Conservancy in Minnesota.

This conference was the first joint state effort in our region to comprehensively address invasive species research and management challenges. The goal of this all-taxa conference was to minimize the impacts of terrestrial and aquatic invasive species across Minnesota, Wisconsin, and the greater Midwest by Working Together to Control Invasive Species (see Appendix A for the conference program). Natural resource managers, government employees, university faculty and students, and others interested in invasive species conducted 152 oral presentations and 40 poster presentations. Topics covered new and innovative research, management techniques, outreach initiatives, Cooperative Weed Management Areas, technological developments, prevention and containment, early detection and rapid response, eradication, and post-invasion restoration.

The conference covered 45 terrestrial and 20 aquatic invasive species. Ninety-nine presentations focused on terrestrial invasives and 86 presentations were related to aquatic invasive species and issues. Remaining presentations addressed both aquatic and terrestrial issues by discussing policy, Cooperative Weed Management Areas (CWMAs), laws and regulations, and advances in weed management technology. There were 10 workshop style sessions conducted during the course of the conference that addressed "real world" issues such as managing invasives, coordinating CWMAs, and performing restoration.

A diverse crowd of 582 private landowners, management professionals, lake association members, and public employees came to attend the concurrent sessions. The majority of attendees came from Minnesota and Wisconsin with 351 and 169 attendees respectively. In addition, 19 other states were represented including: Alaska, California, Colorado, Florida, Illinois, Indiana, Iowa, Massachusetts, Michigan, Mississippi, Missouri, Montana, New York, Ohio, South Dakota, Texas, Utah, Vermont, Virginia, and Washington.

Professors and students from 32 public and private universities and colleges mostly from Minnesota and Wisconsin, but also from Alaska, Florida, Indiana, Iowa, Michigan, Mississippi, and South Dakota were represented at the conference. One hundred eighty-eight companies, organizations, and government agencies were also represented. Forty-nine of those were various government agencies with the remaining comprised of restoration companies, consulting firms, non-profits, and lake associations.

The conference hosted over 30 exhibit booths and tables in Governors Hall at the Crowne Plaza St. Paul. Exhibitors came from all over the country, as far away as California, and included: management companies, non-profit organizations, federal agencies, restoration companies, and consulting firms.

Attendee surveys demonstrated that the conference was a resounding success. Attendees found the information useful and applicable to projects and challenges they were facing in their local landscapes. It is our hope that other states will see the success of this conference as encouragement to collaborate with their neighboring states when addressing the threats of invasive species and preserving the integrity of their native landscapes. We hope that attendees of the conference will continue to foster the relationships made at the conference and to learn from and work with one another to address the challenges of invasive species.

About the Hosts

The Minnesota Invasive Species Advisory Council (MISAC) has 30 member representatives working cooperatively to address prevention, containment, research, and management of invasive species in Minnesota. Formed in May 2001 as a response to Presidential Executive Order 13112 on invasive species, the National Invasive Species Management Plan, and Minnesota legislation that encourages the state to plan and take action on invasive species; MISAC was one of the first statewide efforts in the U.S. to cooperatively address aquatic and terrestrial concerns in a single advisory task force. The purpose of MISAC is to review information concerning the current status and management of terrestrial and aquatic invasive species including animals, insects, plants, and diseases in Minnesota. The group is working cooperatively to identify and locate invasive species and share strategies in order to maximize resources for managing invasive species.

The Invasive Plants Association of Wisconsin (IPAW) focuses on promoting better stewardship of the natural resources of Wisconsin by advancing the understanding of invasive plants and encouraging the control of their spread. IPAW sponsors several committees and groups that work to educate and organize people to defend against the spread of invasive species. The membership of IPAW is made up of concerned citizens, agronomists, horticulturalists, professors, and businesses.

The Midwest Invasive Plant Network's mission is to reduce the impact of invasive plants in the Midwest. The network brings together government agencies, non-profit and for-profit corporations, scientists, land managers, and private citizens across the Midwest to collaborate on projects and share information on invasive plants. MIPN's efforts are focused on providing education on invasive plants in the Midwest; promoting effective prevention methods and early detection of new invaders; providing information on recent research that is relevant to management of invasive species; supporting the growth and development of Cooperative Weed Management Areas; and connecting states within our region to each other and to invasive species organizations at a national level.

History of MNWIISC

The 2010 Minnesota-Wisconsin Invasive Species Conference (MNWIISC) evolved from the 2008 Minnesota Invasive Species Conference (MNISC) (Duluth, MN) hosted by the Minnesota Invasive Species Advisory Council and the Soil and Water Conservation Society – Minnesota Chapter. One of the goals of MNISC 2008 was to inspire other states to become more proactive in managing invasive species, and it was in that interest that the Minnesota-Wisconsin Invasive Species Conference began.

The 2008 Minnesota Conference had significant attendance from organizations and individuals in Wisconsin. Upon conclusion of the 2008 conference, representatives from Wisconsin approached the Minnesota Invasive Species Advisory Council to include Wisconsin in the next iteration of the Conference. MISAC discussed this possibility at their quarterly meeting and agreed to the significant benefit of collaborating with Wisconsin.

The Midwest Invasive Plant Network (MIPN) and the Invasive Plants Association of Wisconsin (IPAW) became the co-hosting organizations with IPAW representing Wisconsin and MIPN representing the Midwest region. IPAW as the only state-wide non-profit that addresses invasive plants in Wisconsin and MIPN with their broad support network were obvious choices to help chair important planning committees for the conference and to spread the word in Wisconsin and the Midwest.

Initial funding for MNWIISC 2010 came from profits left over from the 2008 Minnesota Invasive Species Conference. These funds were held by the conference's fiscal sponsor, The Soil and Water Conservation Society – Minnesota Chapter. The 2010 conference funds were also supplemented by 11 sponsors: The Wisconsin Department of Natural Resources, The Minnesota Department of Natural Resources, Dow AgroSciences, The University of Minnesota Sea Grant Program, The University of Wisconsin Sea Grant Institute, The National Park Service, Star Hill Jawz, the Minnesota Nursery and Landscape Association, University of Minnesota - Extension, University of Wisconsin - Extension, and The Nature Conservancy. Funds from sponsors allowed conference organizers to keep registration costs low for attendees (Descriptions of sponsorship levels are in Appendix G and sponsors in Appendix A).

Conference Highlights

The conference began Monday morning with a "meet and greet" opportunity for attendees and exhibitors to interact. This opening to the conference gave attendees a chance to register, pick up their conference materials (Conference Program, Optional Abstract Book, MNWIISC pen and tote bag, and nametag), and enjoy complimentary coffee and tea as they talked with exhibitors, explored the exhibit hall, and prepared for a day of concurrent sessions.

Following the opening Exhibitor Visit, the Monday morning Plenary featured welcome addresses from the host organizations and Minnesota State Representative Jean Wagenius. Representative Wagenius discussed the need to put forward the cause of invasive species at the public policy level and shared some of her own experience dealing with invasives. Representative Wagenius's address was followed by presentations from three invited Plenary speakers: Troy Weldy from The Nature Conservancy – New York; W. Lindsay Chadderton from the Great Lakes Project and The Nature Conservancy; and Janet Clark from Sweetgrass Consulting.

Dr. Weldy's presentation, ***Advancing a State Level Invasive Species Program***, discussed the steps taken to form a statewide invasive species program in New York State. He talked about how the challenges and pitfalls faced there could be used to provide a template for other states to improve on the work done in New York. In his presentation titled, ***Detection of Asian Carp (Hypopthalmichthys moltrix and H. nobilis) Invasion front in Chicago Area Waterway System Using Environmental DNA (eDNA)***, Dr. Chadderton

discussed how an early detection surveillance method that uses the presence of environmental DNA (eDNA) could be used to help control Asian carp invasion in the Chicago Area Waterway System. Ms. Clark's presentation, ***The National Buzz: Politics, Trends, & Opportunities***, covered the current political climate surrounding invasive species issues. Ms. Clark also discussed invasive plant issues in the context of national programs, organizations, and legislation.

Following the Monday morning Plenary, attendees were treated to a box lunch and then an afternoon filled with concurrent sessions. Monday sessions discussed a wide variety of terrestrial and aquatic issues in addition to hosting several workshops about invasive plant management. Monday sessions saw strong attendance in the "***Weed Laws and Policies***" session which brought together some big picture messages on state-wide priorities for Minnesota and Wisconsin. Kelly Kearns of Wisconsin's Department of Natural Resources provided attendees with an overview of Wisconsin's new comprehensive invasive species rule (NR40) that uses science-based assessments to classify and regulate exotic invasive plants, animals, and disease-causing micro-organisms, as well as the various pathways by which invasives can be transported.

Monday evening attendees were invited to the "Poster and Exhibit Reception" in Governors Hall where they could socialize, interact with exhibitors, and speak with the authors of the 40 poster presentations over hors d'oeuvres and refreshments.

After a Tuesday morning of informative presentations, attendees congregated in the Great River Ballroom for a plated lunch and the presentation of the Carol Mortensen Invasive Species Award for Team Achievement. This Award was presented to Wildlife Forever, on behalf of the Threat Campaign® team and Stop Aquatic Hitchhikers!™ campaign for their outstanding achievements in addressing invasive species issues.

The photo to the left shows President and CEO of Wildlife forever, Douglas Grann (right) accepting the Carol Mortenson Invasive Species Award from Minnesota Invasive Species Advisory Council representative Roger Becker (left). The late Carol Mortenson represented the Leech Lake Ban of Ojibwa and was a tireless leader in the fight against invasive species.

Tuesday's plenary presentation featured Dr. Lee E. Frelich, Director of the Center for Hardwood Science at The University of Minnesota, who has been listed among the top 1% of most-cited scientists in the world according to the Science Citation Index, in the Ecology and Environment Category. Dr. Frelich discussed how forests in the Upper Midwest are likely to experience a large magnitude of change from a warming climate. Invasive species intrusions are likely to increase with climate change such as earthworms that have migrated northward which are responsible for changing soil characteristics that will pave the way for invasive plants to enter. Climate change also increases the likelihood of more invasive drought tolerant plants and trees spreading throughout region.

Two concurrent sessions on Tuesday were devoted to cooperative weed management areas (CWMAs). Presentations like Chris Henze's ***Development and Activities of the Hawkeye Cooperative Weed Management Area in East Central Iowa***, provided great networking and learning opportunities for people involved with CWMAs as well as those interested in starting their own or wanting to learn more about what CWMAs are. There were also several presentations that covered the successes and trials experienced by CWMAs in Minnesota, Wisconsin, Indiana, Iowa, Illinois, Ohio, and Michigan.

The ***Ballast Water Collaborative Update Panel*** organized by Dale Bergeron of the University of Minnesota Sea Grant Program provided a forum for industry and state and federal regulators to continue to spread the news about the collaboration. Discussion focused on the sharing of information pertaining to reducing the risk of the introduction and spread of aquatic invasive species through ballast water discharge and exchange. The issue itself is vast but this collaboration is an important step in the right direction.

After concurrent sessions and workshops concluded on Tuesday, the day culminated in evening cocktail and hors d'oeuvres reception on the top floor of the hotel in the Windows on the River Room where attendees, exhibitors, and sponsors went to unwind, socialize, and enjoy the expansive panoramic views of downtown St. Paul and the Mississippi River.

The Minnesota-Wisconsin Invasive Species Conference came to a close at noon on Wednesday after a morning of concurrent sessions. Attendees and exhibitors were asked to fill out a conference evaluation form and the responses from attendees who filled out the surveys were overwhelmingly positive. There has already been a great deal of interest expressed to plan future joint-state conferences. See survey results in **Appendix F.**

Predominant Topics, Themes, and Species Discussed

A broad range of terrestrial, aquatic, and special workshops on invasive topics were discussed at the conference. Several trends were noticed in the presentations, indicating some of the principle invasive species concerns facing Minnesota and Wisconsin as well as the rest of the Upper Midwest region. Emerald ash borer (*Agrilus planipennis*) was the most discussed invasive species. Four workshops were devoted entirely to emerald ash borer (EAB) and this new pest was also featured in several other presentations outside of the organized workshops.

Emerald ash borer is a devastating wood-boring tree pest, first discovered in the U.S. in 2002. Since then, this invasive insect has spread across 15 states and has decimated millions of trees in the United States. In late 2008 and early 2009, EAB was found in Minnesota and Wisconsin, causing alarm, but also prompting the need to develop a preparedness and resource allocation plan to curb and stop its spread.

An official EAB Response Plan was developed and approved in Wisconsin in July 2008 and shortly after was put to the test due to an invasion of the insect. Minnesota has also compiled an EAB Community Preparedness Manual. The extensive negative impact EAB has had on ash trees in Michigan and its potential to impact Wisconsin and Minnesota made it one of the predominant topics at MNWIISC 2010. EAB history and biology, the need for a rapid response plan, strength in networking, potential impact, and solutions were discussed at length.

Andrea Diss-Torrance of the Wisconsin Department of Natural Resources discussed the importance of firewood regulation and firewood vendor certification to curb the spread of EAB. This presentation, combined with the Wisconsin Department of Natural Resources' exhibit about firewood and firewood treatment methods served to drive the point home that using local firewood is one of the most effective means of controlling the spread of EAB.

Dacia M. Meneguzzo of the USDA Forest Service provided a county-level forecast of emerald ash borer's presence and absence in Minnesota and Wisconsin. The model provided uses of the Random Forests classification algorithm to produce a map depicting the county-level predicted presence/absence of emerald ash borer. Predicting how and where EAB will spread facilitates preparedness and resource allocation.

Early Detection and Rapid Response was an extremely popular theme amongst discussions about terrestrial plants. In a presentation titled ***Terrestrial Invasive Plant Early Detection***, Monika A. Chandler of the Minnesota Department of Agriculture talked about the importance of distributing information regarding high priority species likely to invade a region and using that information to enable strategic resource allocation for targeted responses to emerging threats.

Other EDRR presentations focused on new technologies and methods for detecting invasive plants. Mike Hoppus of the Minnesota Department of Natural Resources discussed using small format aerial photography to detect the presence of buckthorn. He presented the lessons learned and the successes experienced using this method just after canopy leaf fall.

Invasive plants are not just difficult to control but even the most successful eradication leaves land managers with the task of restoring the landscape and this was a popular topic at the conference. Diane L. Larson or the U.S. Geological Society presented results of a study about the effects of planting method and seed mix diversity in restoring a tall grass prairie. The results of the study suggest that good cover of cool season grasses may help prevent invasion by undesirable plants in a newly restored landscape.

Several of the best restoration companies in the region were also in attendance, providing attendees with professional insight into restoration issues through one on one interactions in the exhibit hall.

Buckthorn was one of the most popular terrestrial invasive plant species discussed. Topics focused mostly on removal and control methods but Barb Spears of the Minnesota Department Natural Resources talked about a different way of thinking about buckthorn. In her presentation ***Buckthorn to Bioenergy: How Minnesota is Linking Habitat Restoration to Bioenergy and Local Economies*** she shows how thousands of tons of woody biomass material removed as part of various restoration projects across the state of Minnesota is being used by District Energy St. Paul as a fuel source.

Aquatic presentations were decidedly centered on prevention techniques with at least one concurrent session relating to prevention held throughout the conference. This combined with the "Stop Aquatic Hitchhikers!™ exhibit, which featured preserved examples of invasive animals and plants as well as recommended prevention methods, solidified the importance of vigilance in preventing aquatic invasive species from being introduced and spreading to new areas all together.

The "Stop Aquatic Hitchhikers!™" campaign focuses on preventing the spread of aquatic invasive species by focusing on encouraging boaters to follow a general set of procedures every time they come in contact with any body of water. By doing so waters can be protected from harmful aquatic species.

Eurasian watermilfoil (*Myriophyllum spicatum*), curlyleaf pondweed (*Potamogeton crispus*) and common carp (*Cyprinus carpio*) were key aquatic species discussed at the conference due to the broad geographic region they have infested. Eurasian watermilfoil in particular is a common problem in water bodies throughout the Great Lakes Region (reported in 539 Wisconsin lakes and rivers alone).

D. Jo Heuschele of the University of Minnesota discussed one of the predominant reasons why curlyleaf pondweed is so resilient to eradication methods due to the two dormancy stages of its turions (vegetative buds). In her presentation titled ***Control of Dormancy in Curlyleaf Pondweed Turions***, Ms. Heuschele proposed treatment to break dormancy of turions in autumn, thus preventing turion carry over to the next season.

Presentations covered the gamut of issues regarding invasive common carp such as Justin Sibernagle's (University of Minnesota) discussion of how sunfish egg predation can help control recruitment of invasive carp; Kaveh Someah's (Ovivo) presentation regarding the use of sound and other stimuli to modify carp behavior and provide fish deterrents; and Raymond Newmans's (University of Minnesota) discussion of restoring native plants after an aggressive carp removal.

Although the conference saw a majority of presentations directed at invasive species already present in the region, recently discovered and potentially problematic invasives received attention as well. Laura Herman's (University of Wisconsin Extension – Lakes) poster-presentation, ***New Invaders to Wisconsin,*** elaborated on the possible control problems related to prolific species such as yellow-floating heart (*Nymphoides peltata*), Brazilian elodea (*Egeria densa*) and red swamp crayfish (*Procambarus clarkii*). Carlos Dominguez's presentation on the Asian longhorned beetle demonstrated the potential effects the species could have on hardwood forests in the U.S., reminding us to plan ahead before we have an expensive and destructive problem to manage.

Post-Conference Survey Results

Attendee Surveys

Results of the post conference attendee surveys (n=99) indicate that the conference was successful:

- 95 percent of respondents thought the conference was excellent to good; about one-third of respondents offered very positive comments
- 94 percent thought that the conference achieved its goals
- 62 percent claimed to have gained an understanding of invasive species issues
- 98 percent thought that conference was very to somewhat useful in addressing their organizations's invasive species-related mission of goals
- 95 percent of respondents plan to implement knowledge they gained and nearly half of those identified specific examples
- 60 percent felt networking was very important at the conference

Over half of conference attendees were natural resource managers with the rest being equally divided among researchers, educators, citizens, non-governmental organizations and students.

Negative comments were categorized into three groups. A few felt that the conference should have focused more on take home messages that work. Others felt that it should encompass a wider range of invaders such as snails, mussels, fish, plankton, and crayfish. Thirteen respondents commented about the lack of snacks at breaks and the number of times that beverages were not refreshed.

Exhibitor Surveys

Exhibitors also felt that the conference was successful based on a post-conference survey (n=12):

- 58 percent of respondents felt the exhibitor venue was excellent
- 25 percent of respondents felt the venue was good
- 100 percent indicated that they would consider exhibiting again at a similar conference

Overall, most attendees and exhibitors felt the conference was a resounding success. Success was determined based on the quality of the conference sessions and exhibit events, understanding gained, acknowledgement of meeting mutual goals, and attendees intention to implement knowledge gained.

Media Coverage

Wisconsin & Minnesota join forces to combat invasive species

For the first time, Minnesota and Wisconsin will get together to try to stop the spread of invasive species.
By WPR reporter Mike Simonson featured on the Gitche Gumee Gamut
November 8, 2010

Around 600 people are registered for Monday's three day Minnesota-Wisconsin Invasive Species Conference in St. Paul. University of Minnesota Sea Grant Aquatic Invasive Species Program Coordinator Doug Jensen says the two states have to work together to be effective.

"Invasive species know no borders. There's so many different pathways for the introduction of these species both terrestial and aquatic. Talk about the movement of firewood or the movement of recreational boats or the release of unwanted fish by aquariums and water gardens. So those are the types of pathways we're seeking to try to address."

Tom Boos is the Invasive Plant Coordinator with the Wisconsin Department of Natural Resources. He says sharing resources between the two states in a time of budget cuts is just smart. It's cheaper to keep invasives out then deal with them once they've arrived.

"The priority is definitely on those species that aren't here yet, keeping them out. The Asian Carp is a perfect example and the Emerald Ash Borer was the perfect example prior to it being found here. It's really critical to know what is coming and figure out ways of how to stop it."

Also at the top of the invasive list is the fish-killing virus VHS and the Asian Longhorn Beetle, similar to the Emerald Ash Borer and currently residing in trees in Chicago.

Invasive species conference begins today in St. Paul

By ASSOCIATED PRESS Monday, Nov. 8, 2010

ST. PAUL, Minn. (AP) — Hundreds of people are expected to attend a Minnesota-Wisconsin joint conference on invasive species this week.

Organizers say the conference will bringing together researchers, land and water area managers, property owners, consultants and others to learn from each other how to improve invasive species research and management.
The conference runs from Monday through Wednesday at the Crowne Plaza St. Paul Riverfront Hotel. It will address both aquatic and terrestrial invasive species.

It's being co-hosted by the Minnesota Invasive Species Advisory Council, the Invasive Plants Association of Wisconsin, the Midwest Invasive Plant Network, and the Minnesota chapter of the Soil and Water Conservation Society.

Wildlife Forever Honored at Invasive Species Conference

Published on: November 18, 2010 by WFN News (World Fishing Network)

Wildlife Forever's invasive species partnership was recently honored at the 2010 Minnesota / Wisconsin Invasive Species Conference in St. Paul. Wildlife Forever was awarded the Carol Mortensen Invasive Species Management Award from the Minnesota Invasive Species Advisory Council. Carol Mortensen represented the Leech Lake Band of Ojibwa and was a leader in the fight against invasive species. She authored several books and worked tirelessly to promote awareness, education and outreach on invasive plants and weeds.

"It is truly an honor to accept this award but we can only do so on behalf of our many partners. By working together, the Threat Campaign is reaching millions of American's with consistent messages to stop invasive species" said Wildlife Forever's Invasive Species Program Manager, Pat Conzemius.

Wildlife Forever's collaborative conservation efforts called the Threat Campaign® reach out to youth and adults about protecting habitat and wildlife in a vastly changing environment. Invasive species are one of the greatest threats facing the American landscape and by creatively engaging youth and outdoors people with educational and prevention messages, millions of people are learning how to "Stop Aquatic Hitchhikers!".

“Partners in the U.S. Forest Service, U.S. Fish and Wildlife Service, Minnesota DNR, Wisconsin DNR, and both MN and WI Sea Grant offices have been instrumental in the leadership and support of this unique collaborative outreach effort” said Conzemius.

For more information go to www.WildlifeForever.org and learn how you can help stop the spread of invasive species.

Minnesota And Wisconsin Talk Invasive Species

Posted Tuesday November 9, 2010 by 99.9 Radio: Minnesota And Wisconsin Talk Invasive Species:

Strange-sounding things like spiny water fleas and yellow floating heart are getting close attention this week by Minnesota and Wisconsin officials at this week’s first-ever invasive species conference involving both states. The St. Paul meeting focuses on invasive species that threaten land vegetation and marine life, and Asian carp is a major worry. Doug Jensen with the U-of-M’s Sea Grant program says Minnesota and Wisconsin face many common threats from destructive land and water species.

Carp, VHS top list at Minnesota-Wisconsin invasive species summit 11/6/2010

News From 91.3 KUWS

For the first time, Minnesota and Wisconsin will get together to try to stop the spread of invasive species. Mike Simonson reports from Superior.

600 people are registered for Monday’s three day Minnesota-Wisconsin Invasive Species Conference in St. Paul. University of Minnesota Sea Grant Aquatic Invasive Species Program Coordinator Doug Jensen says the two states have to work together to be effective.

“Invasive species know no borders. There’s so many different pathways for the introduction of these species both terrestial and aquatic. Talk about the movement of firewood or the movement of recreational boats or the release of unwanted fish by aquariums and water gardens. So those are the types of pathways we’re seeking to try to address.”
Tom Boos is the Invasive Plant Coordinator with the Wisconsin Department of Natural Resources. He says sharing resources between the two states in a time of budget cuts is just smart. It’s cheaper to keep invasives out then deal with them once they’ve arrived.

“The priority is definitely on those species that aren’t here yet, keeping them out. The Asian Carp is a perfect example and the Emerald Ash Borer was the perfect example prior to it being found here. It’s really critical to know what is coming and figure out ways of how to stop it.”

Also at the top of the invasive list is the fish-killing virus VHS and the Asian Longhorn Beetle, similar to the Emerald Ash Borer and currently residing in trees in Chicago.

First Joint Minnesota and Wisconsin State Conference Addressing Invasive Species Is Announced

SEEK News: http://www.seek.state.mn.us/article.cfm?id=5231

Working Together To Control Invasive Species October 13, 2011

The 2010 Minnesota-Wisconsin Invasive Species Conference (MNWIISC) will take place November 8-10 in St. Paul, MN, at the Crowne Plaza St. Paul Riverfront Hotel. This is the first ever, joint state conference bringing together researchers, land and water area managers, private property owners, consultants, and others to work together and learn from each other to improve invasive species research and management.

MNWIISC will address both aquatic and terrestrial invasive species. Over 180 oral and poster presentations in six concurrent session tracks will provide nearly 50 distinct sessions on invasive species management issues for attendees to choose from.

Expected attendance is 500-600 people. Over 300 people have already registered.

"If your lake has Eurasian watermilfoil and purple loosestrife, or your local woodland has buckthorn or honeysuckle, or you are concerned about losing your ash trees to emerald ash borer, we have several presentations and exhibitors tailored to your information needs. We want to give citizens, land or water managers, lake associations, and other organizations the tools to be effective stewards," says Steve Chaplin, Senior Conservation Scientist with The Nature Conservancy and MNWIISC Co-Chair.

The conference is being co-hosted by the Minnesota Invasive Species Advisory Council, the Invasive Plants Association of Wisconsin, the Midwest Invasive Plant Network, and the Soil and Water Conservation Society - Minnesota Chapter.

News headlines increasingly document the threat of invasive plants and animals to the ecological heritage of the upper Midwest. From quagga mussels to Japanese hedge parsley, there may be up to five new invading species entering the region every year.

"Whether you work, live or play in or near forests, rivers, prairies, or lakes, everyone can do something to stop the spread of invasive species," says Laura Van Riper, Terrestrial Invasive Species Coordinator with the Minnesota DNR and MNWIISC Co-Chair.

New laws are in place in both Minnesota and Wisconsin regarding the possession and management of invasive species. Special sessions will teach attendees how the laws affect them.

Plenary presentations will discuss regional approaches, new techniques, and the politics of invasive species research and management. A Welcome Plenary will take place on Monday, November 8 from 10am - 12pm and a Luncheon Plenary on Tuesday, November 9 from 12-1:15pm will also feature the Carol Mortensen Award from the Minnesota Invasive Species Advisory Council.

Plenary speaker highlights include:
· Lindsay Chatterton from The Nature Conservancy Great Lakes Project will discuss the use of DNA testing to detect Asian Carp and other aquatic invasive species.
· Janet Clark, Owner of Sweetgrass Consulting will discuss opportunities for partnerships, publicity, and funding.
· Troy Weldy from The Nature Conservancy - New York Chapter will talk about how New York created a state-wide invasive species program; and
· Lee Frelich, Director of the Center for Hardwood Ecology at the University of Minnesota will discuss how the interaction of invasive species and climate change may greatly affect forests.

Over 32 of the Midwest's and the Nation's leading invasive management and restoration companies, agencies, and organizations will exhibit their products and services.

Conference focuses on invasive species

By Mike Simonson, Wisconsin Public Radio, Nov. 12

600 people are registered for the Minnesota-Wisconsin Invasive Species Conference being held in the Twin Cities, marking the first time, Minnesota and Wisconsin will get together to try to stop the spread of invasive plants, animals, and fish. Minnesota Sea Grant Aquatic Invasive Species Coordinator Doug Jensen said the two states have to work together to be effective, as invasive species know no borders.
"There are so many different pathways for the introduction of these species, both terrestrial and aquatic," said Jensen.

This includes the movement of firewood or recreational boats, and the release of unwanted fish by aquariums and water gardens. These pathways will be addressed at the conference.

Tom Boos, the Invasive Plant Coordinator with the Wisconsin Department of Natural Resources, said sharing resources between the two states in a time of budget cuts is just smart as it's cheaper to keep invasives out than deal with them once they've arrived.

"The priority is definitely on those species that aren't here yet, keeping them out," said Boos. "The Asian Carp is a perfect example and the Emerald Ash Borer was the perfect example prior to it being found here. It's really critical to know what is coming and figure out ways of how to stop it."

Also at the top of the invasive list is the fish-killing virus VHS and the Asian Longhorn Beetle, which is similar to the Emerald Ash Borer and currently residing in trees in Chicago. The three-day conference is set to begin Monday in St. Paul.

Minn.-Wis. invasive species event this week in St. Paul - November 8th, 2010

St. Paul Pioneer Press

Organizers say the conference will bringing together researchers, land and water area managers, property owners, consultants and others to learn from each other how to improve invasive species research and management.

MNWIISC Internet Presence

MNWIISC's Internet presence went beyond online registration and e-mail updates. As many of our attendees may already know MNWIISC 2010 had an internet presence on two major social networking sites: Facebook and Twitter. These services were used to reach out to our attendees before and during the conference with News, photos, links, and more.

Appendix A

MNWISC
Minnesota-Wisconsin Invasive Species Conference
2010

Working Together to Control Invasive Species

Conference Program

Crowne Plaza St. Paul Riverfront Hotel
St. Paul, Minnesota
November 8-10, 2010

Welcome Letter From the Co-Chairs

Dear Conference Participants:

The Minnesota Invasive Species Advisory Council, the Invasive Plants Association of Wisconsin, and the Midwest Invasive Plant Network are pleased to host the first ever Minnesota -Wisconsin Invasive Species Conference in St. Paul, Minnesota. As hosts, we would like to officially welcome you to the Crowne Plaza St. Paul Riverfront Hotel. We hope you have an educational – and fun – conference.

Your presence at this joint-state conference serves to emphasize the need for this forum. Its purpose is to improve invasive species management and minimize the impacts of terrestrial and aquatic invasive species across Minnesota, Wisconsin, and the Midwest. Attending the conference are representatives from our region in all sectors – private landowners and lake association representatives, public agency staff, environmental consultants, academics, extension staff, and others. The breadth of representation shows our collective commitment to learning from each other and working together.

Our invited Plenary Speakers highlight the diversity of our audience and their expertise. They will share with us the latest research; tools and strategies for large-scale, state and regional invasive species programs; and the broader public policy concerns that will help you to improve your invasive species research, management or outreach challenges.

In addition to our six concurrent sessions and poster session, exhibitors from all across the region will showcase the latest products, services, and opportunities for managing invasive species.

There are many things to do outside the conference in downtown St. Paul. You will find some of St. Paul's finest dining options steps away from the Crowne Plaza, attractions such as the State Capitol, the Science Museum of Minnesota, and much more. See the St. Paul map and guide at the Registration Desk for more information.

On behalf of the conference hosts, sponsors, executive committee, program committee and everyone who has contributed to this event, we hope you enjoy the conference and everything that St. Paul, Minnesota has to offer.

Enjoy!

Laura Van Riper

Laura Van Riper

Terrestrial Invasive Species Coordinator
Minnesota Department of Natural Resources

Steve Chaplin

Stephen Chaplin

Senior Conservation Scientist
The Nature Conservancy

TABLE OF CONTENTS

Conference-At-A-Glance

Sunday, November 7

Registration	4:00 pm - 7:00 pm	Registration is on the *Lower Level* of the Crowne Plaza

Monday, November 8

Registration	7:00 am- 5:00 pm	Registration is on the *Lower Level* of the Crowne Plaza
Coffee With Exhibitors	8:30 am- 10:00 am	Enjoy coffee or tea with exhibitors
Opening Plenary ***Great River Ballroom***	10:00 am- 12:00 pm	Welcome from host organizations and Minnesota State Rep. Jean Wagenius, and speakers: Lindsay Chadderton, Great Lakes Project, The Nature Conservancy; Janet Clark, Sweetgrass Consulting; and Troy Weldy, The Nature Conservancy - New York
Lunch	12:00 pm - 1:10 pm	Lunch will be served in *Garden Court East*

*Concurrent Sessions	1:20 pm - 2:35 pm	3:05 pm - 4:20 pm
Terrestrial and Overview	Weed Laws and Policies - *Kellogg I*	Best Management Practices - *Kellogg I*
Terrestrial	Biology and Impacts of Invasive Species - *Kellogg II*	Outreach & Prevention 1 - *Kellogg II*
Aquatic Prevention	Interrupting Pathways - *Great River I*	Interrupting the Boating Pathway - *Great River I*
Aquatic Biology and Management of Plants	Biology of Invasive Submersed Plants - *State I*	Biology of Invasive Emergent Plants - *State I*
Aquatic	Management of Invasive Aquatic Plants 1 - *State III*	Aquatic Invasive Species Public Awareness - *State III*
Workshops	Terrestrial Invasive Plant Management: Early Detection & Rapid Response - *Great River II*	Terrestrial Invasive Plant Management: Prairie - *Great River II*
Poster and Exhibit Reception	4:30 pm - 6:30 pm in *Governors Hall:* Enjoy hors d'oerves and a cash bar while talking with poster presenters	

Tuesday, November 9

Registration	7:00 am- 5:00 pm	Coffee and Tea will be served in *Governors Hall* from 7:00 am - 8:30 am
Lunch Plenary - *Great River II*	12:00 pm- 1:20 pm	MISAC - Carol Mortensen Award and Speaker: Lee Frelich, University of Minnesota

*Concurrent Sessions	8:30 am -10:10 am	10:40 am -11:55 am	1:30 pm -2:45 pm	3:15 pm -4:30 pm
Terrestrial	Herbicides - *Kellogg I*	Biocontrol of Terrestrial Invasives - *State I*	Early Detection and Rapid Response 1 - *State III*	Early Detection and Rapid Response 2 - *State III*
Terrestrial	Forest Early Detection and Rapid Response - *State I*	Forest Insect Pests - *Kellogg I*	Invasive Pathogens - *State I*	Biomass & Biofuels - *State I*
Aquatic Prevention	Ballast Water - *Great River I*	Aquatic Invasive Species in Lake Superior - *Great River I*	Aquatic Invasive Species Programs and Partnerships - *Great River I*	Aquatic Invasive Species Regulations & Enforcement - *Great River I*
Aquatic Biology and Management of Plants	Management of Invasive Submersed Plants: Herbicide Use - *State III*	Management of Curlyleaf Pondweed - *State III*	Management of Invasive Aquatic Plants 2 - *Kellogg II*	Management of Invasive Submersed Plants: Funding and Economics - *Kellogg II*
Aquatic and Cooperative Weed Management Areas	Aquatic Invasive Species Control: Technology and Efforts - *Kellogg II*	Aquatic Invasive Invertebrates - *Kellogg II*	Cooperative Weed Management Areas 1 - *Kellogg I*	Cooperative Weed Management Areas 2 - *Kellogg I*
Workshops	Terrestrial Invasive Plant Management: Prairie and Wetlands - *Capitol Ballroom*	Terrestrial Invasive Plant Management: Forest - *Capitol Ballroom*	Emerald Ash Borer Workshop 1 - *Capitol Ballroom*	Emerald Ash Borer Workshop 2 - *Capitol Ballroom*
Tuesday Evening Reception	4:30 pm - 6:30 pm Reception in *Windows on the River (22nd floor)*			

Wednesday, November 10

Registration	7:00 am- 10:00 am	Coffee and tea will be served in *Governors Hall* from 7:00 am - 8:30 am

*Concurrent Sessions	8:30 am - 10:10 am	10:40 am - 11:55 am
Terrestrial	Restoration - *Kellogg II*	Outreach & Prevention 2 - *Kellogg II*
Terrestrial	Management of Woody Invasives - *State III*	Distribution and Detection - *State III*
Aquatic Prevention	Citizen and Business Involvement - *Great River I*	Aquatic Early Detection and Rapid Response - *Great River I*
Aquatic Biology and Management of Plants	Restoration of Emergent and Submersed Plants - *Kellogg I*	Management and Ecology of Eurasian Watermilfoil - *Kellogg I*
Aquatic	Common Carp Management - *State I*	Carp and Invasive Fish Management - *State I*
Workshops	Emerald Ash Borer Workshop 3 - *Capitol Ballroom*	Emerald Ash Borer Workshop 4 - *Capitol Ballroom*
Conference Ends	12:00 pm	Exhibits and Posters must be removed by 2:00 pm

*Note: Concurrent Sessions are comprised of 3 or 4, 20 minute presentations and 5 minutes for questions.

Conference Host Organizations

The Minnesota Wisconsin Invasive Species Conference is being hosted by the following organizations dedicated to the control of invasive species in the Midwest.

Invasive Plants Association of Wisconsin
The mission of the Invasive Plant Association of Wisconsin is to promote better stewardship of the natural resources of Wisconsin by advancing the understanding of invasive plants and encouraging the control of their spread. IPAW sponsors several committees and groups that work to educate and organize people to defend against the spread of invasive species. The membership of IPAW is made up of concerned citizens, agronomists, horticulturists, professors, and business.

Midwest Invasive Plant Network
The Midwest Invasive Plant Network's mission is to reduce the impact of invasive plants in the Midwest. Our network bring together government agencies, non-profit and for-profit corporations, scientists, and private citizens across the Midwest to collaborate on projects and share information on invasive plants. MIPN's efforts are focused on providing education on invasive plants in the Midwest; promoting effective prevention methods and early detection of new invaders; providing information on recent research that is relevant to management of invasive species; supporting the growth and development of Cooperative Weed Management Areas; and connecting states within our region to each other and to invasive species organizations at a national level.

Minnesota Invasive Species Advisory Council
The Minnesota Invasive Species Advisory Council is a diverse group with a common interest in battling non-native invasive species in Minnesota that was initiated in May 2001. The Council was formed in response to Presidential Executive Order 13112 on invasive species, the National Invasive Species Management Plan, and Minnesota Legislation that encouraged the state to plan and take action on invasive species. The purpose of MISAC is to review information concerning the current status and management of terrestrial and aquatic invasive species including animals, insects, plants, and diseases in Minnesota. The group is working cooperatively to identify and locate invasive species and share strategies in order to maximize resources for managing invasive species.

Fiscal Sponsor

Soil and Water Conservation Society - Minnesota Chapter
The SWCS is a nonprofit scientific and educational organization –founded in 1943- that serves as an advocate for conservation professionals and for science-based conservation practice, programs, and policy. Our mission is to foster the science and art of natural resource conservation. Our work targets conservation of soil, water, and related natural resources on working land- the land used to produce food, fiber, fuel, and other services that improve the quality of life people experience in rural and urban communities. We work to discover, develop, implement, and constantly improve ways to use land that sustains its productive capacity and enhances the environment at the same time. Join us on Monday afternoon in Kellogg I from 4:30pm - 5:00pm for an informal session about what SWCS is all about and how you can get involved.

Conference Committes and Acknowledgements

Conference Host Organizations

Invasive Plants Association of Wisconsin
Thomas Boos – Wisconsin Department of Natural Resources
Willis Brown – Michler and Brown, LLC
Jerry Doll – University of Wisconsin Extension
Mark Feider – Milwaukee Audubon Society
Robert J. Frank- Fish and Wildlife Association
Tom Hunt – University of Wisconsin Platteville
Vija Pandian – Brown County
Brian Pillsbury – USDA – Natural Resources Conservation Service
Jim Reinartz – University of Wisconsin - Milwaukee
Gene Roark – Wisconsin Woodland Owners Association
Amy Staffen – The Prairie Enthusiasts
Rolf Utegaard – Eau Claire County Exposition Center
Anne Walker – Home Land Garden, LLC

Midwest Invasive Plant Network
Heather Bacher – Central Indiana Land Trust
Roger Becker – University of Minnesota
Trish Beckjord – Landscape Architect
Lisa Brush – The Stewardship Network
Carmen Chapin – National Park Service – Great Lakes Exotic Plant Management Team
Steve Chaplin – The Nature Conservancy
Bob Clancy – Ecological Restoration Specialist
Janet Clark – Sweetgrass Consulting
Brian Corr – Valent BioSciences Corporation
Bob Fitch – Minnesota Nursery and Landscape Association
Rachel Gagnon – Ontario Invasive Plant Council, Ontario Federation of Hunters and Anglers
Bob Hartzler – Iowa State University
Chris Henze – Johnson County Secondary Road Department
Jennifer Hillmer – Cleveland Metroparks
Kelly Kearns – Wisconsin Department of Natural Resources
Zach Lowe – Max McGraw Wildlife Foundation
Bob Masters – Dow AgroSciences, LLC
Debbie Maurer - Lake County Forest Preserve District
Christoper Pierce – USDA Animal & Plant Health Inspection Service, Plant Protection & Quarantine
Mark Renz – University of Wisconsin
Jan Schultz – USDA Forest Service
Kate Howe - MIPN Coordinator

Minnesota Invasive Species Advisory Council

Co-Chairs
Teresa McDill – Minnesota Department of Agriculture
Jay Rendall – Minnesota Department of Natural Resources

Mark Abrahamson – Minnesota Department of Agriculture
Roger Becker – University of Minnesota
Robert Bruesewitz – US Fish and Wildlife Service
Susan Burks – Minnesota Department of Natural Resources
Shannon Carpenter – Soil and Water Conservation Society – Minnesota Chapter
Kevin Connors – USDA-APHIS
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Jack Greenlee – USDA-Forest Service
John Haanstad – USDA-APHIS PPQ
Michael Hoff – US Fish & Wildlife Service
Doug Jensen – University of Minnesota Sea Grant Program
Rhett Johnson – The Nature Conservancy
Byron Karns – National Park Service-St. Criox National Scenic Riverway
Susan Kedzie – Leech Lake Band of Ojibwe
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Ginger Kopp – Minnesota Natural Resources Conservation Service
Ben Lang – Minnesota Crop Improvement Association
Tina Markeson – Minnesota Department of Transportation
Robin Martinek – Natural Resources Conservation Service
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Dan Shaw – Minnesota Board of Water and Soil Resources
Barb Spears – Minnesota Forestry Association
Carol Strojny – Minnesota Board of Water and Soil Resources
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Kathy Widin – Minnesota Shade Tree Advisory Committee

Fiscal Sponsor

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Dave Copland – Karst and Driftless Area
Kay Clark – Minnesota/Missouri Watershed
Jeff Hellermann – Red River of the North

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Laura Van Riper – Minnesota Department of Natural Resources

Roger Becker – University of Minnesota
Thomas Boos – Wisconsin Department of Natural Resources
Shannon Carpenter – Soil and Water Conservation Society – Minnesota Chapter
Kate Howe – Midwest Invasive Plant Network
Doug Jensen – University of Minnesota Sea Grant Program
Courtney LeClair – Wisconsin Department of Natural Resources

Sponsorship Committee

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Leads
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Roger Becker - University of Minnesota
Tara Kelly - Belwin Conservancy
Patricia Morton - The Nature Conservancy
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Andrea Diss-Torrance – Wisconsin Department of Natural Resources
Dennis McDougall – USDA Forest Service
Rob Venette – USDA Forest Service

Aquatic
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Laura Herman – University of Wisconsin Extension Lakes
Brittany Hummel – Minnesota Department of Natural Resources
Doug Jensen – University of Minnesota Sea Grant Program
Eric McFarlane – University of Wisconsin Extension Lakes
Scott van Egeren – Wisconsin Department of Natural Resources
Mindy Wilkinson – Wisconsin Department of Natural Resources

Conference Administration
Bergner Associates – Milwaukee, Wisconsin

Graphics Design
Bonnie Reichert – Wisconsin Department of Natural Resources
Bergner Associates – Milwaukee, Wisconsin

Webmaster
Dennis Fuchs - Soil and Water Conservation Society - Minnesota Chapter

General Information

Conference Location
All conference sessions, poster displays, exhibits, lunches, receptions, and plenary presentations will be held at the Crowne Plaza St. Paul Riverfront Hotel, 11 E Kellogg Blvd, St. Paul, MN.

Getting to the Conference
From Minneapolis/St. Paul International Airport (7.5 miles): Take I-494 East to Highway 5 (7th Street). Follow Highway 5 to downtown St. Paul. Turn right/east onto Kellogg Boulevard. At the third stoplight, turn left/north onto Wabasha Street. The hotel parking garage will be on your right.

Parking
The Crowne Plaza Ramp on Wabasha St. (5' 9" height restriction) is available for a reduced Conference daily rate of $7.00; $14.00 for overnight guests. The Capitol City Ramp at 50 4th St. is available for the same rates, does not have a height restriction, and is also connected to the hotel. Enter from 4th Street, Cedar Street, or Kellogg Blvd. Attendees may pick up parking vouchers for both garages at Conference Registration in the lower lobby.

Hotels and Accommodations
The Crowne Plaza St. Paul Riverfront Hotel provides a beautiful setting for the Minnesota-Wisconsin Invasive Species Conference. The hotel offers spectacular views of the Mississippi River and downtown St. Paul. The Crowne Plaza also offers several amenities including: swimming pool, exercise facilities, whirl pool, in-house restaurant, and free wi-fi. The hotel is located only blocks away from several downtown options for entertainment, shopping, and dining.

Blocks of rooms are reserved in Hudson, Wisconsin for Wisconsin state government employees who must stay in state.
- Holiday Inn Express (1200 Gateway Boulevard)
- Best Western Hudson House Inn (1616 Crest View Drive)
- Fairmount Inn (2400 Center Drive)

Registration
The Registration desk is located on the lower level of the Crowne Plaza St. Paul Riverfront Hotel. Registration hours are:

Sunday, November 7:	4:00 pm - 7:00 pm
Monday, November 8:	7:00 am - 5:00 pm
Tuesday, November 9:	7:00 am - 5:00 pm
Wednesday, November 10:	7:00 am - 10:00 am

On site costs for Registration are $225 for a full Registration, $140 for Monday OR Tuesday only, and $90.00 for Wednesday.

Speaker Ready Room - *The Parlor*
7:00 am - 3:00 pm: Monday and Tuesday
7:00 am - 10:00 am: Wednesday
The Parlor, located on the main floor of the Crowne Plaza St. Paul Riverfront, will be available for speakers as a quiet area to prepare for presentations. A computer will be provided and wi-fi will be available. (Note: This room will not be secured. Presenters will be responsible for their own valuables)

Power Point Presentations should have been uploaded to the conference speakers' online drop box (www.mnwiisc.org). If you were unable to upload your presentation, bring it on a USB flash drive or CD clearly labeled with your name and presentation title. Your presentation will need to be uploaded the day prior to your presentation or by 8:00 am on the day of.

Resource Tables
Our presenters, hosting organizations, and exhibitors are encouraged to bring complimentary invasive species publications and other materials for distribution in the foyer area near registration. Sale of items is not allowed.

Food and Beverages
Starbucks Coffee and Tazo Teas will be offered each morning from 7:00 am - 8:30 am in Governors Hall and at all morning and afternoon breaks.

A box lunch will be provided on Monday, November 8 for all attendees. On Monday evening there will be an Exhibit and Poster Reception held in Governors Hall. Refreshments will be served and a cash bar will be available.

On Tuesday, November 9, a plated lunch will be served for the Tuesday Lunch Plenary session. All Lunches and Receptions will have vegetarian options. On Tuesday evening, a reception for all attendees will be held in the beautiful "Windows on the River", located on the 22nd floor of the Crowne Plaza hotel. This room features vast panoramic views of the Mississippi River Valley and downtown, a classic rotating dining room, and a scenic glass elevator that goes directly from the lobby to the 22nd floor. Hors d'oeuvres and a cash bar will be served.
*Note: Meals are not guaranteed to those who register at the door.

Posters and Exhibits
Posters and Exhibits will be on display in Governors Hall, located on the lower level of the Crowne Plaza, for the duration of the conference. Doors open at 8:30am on Monday, November 8. We have a variety of exhibitors with valuable information regarding invasive species identification, management, and restoration services who will be available throughout the conference.

Exhibits may be set up on Sunday, November 7 from 3:00 pm – 7:00 pm or Monday, November 8 from 7:00 am – 8:30 am. Setup for posters will be available Monday, November 8 from 7:00 am until 9:00 am. All exhibits and posters must be removed between 12:00 pm and 2:00 pm on Wednesday, November 10.

Monday Plenary Presentations

10:00 am - 12:00 pm Great River Ballroom

The Minnesota-Wisconsin Invasive Species Conference has invited some of the nation's premier experts on invasive species to give our plenary presentations. Our presenters have worked regionally, nationally, and across the globe on researching or managing invasive species and invasive species issues. The Monday, November 8 Opening Plenary will feature welcome addresses from the host organizations, Minnesota State Representative Jean Wagenius, followed by three guest speakers whose presentations are described below.

Monday, November 8

Troy Weldy

Director of Ecological Management

The Nature Conservancy - New York

Advancing a State Level Invasive Species Program

For many years, New York talked about the threat from invasive species and the need to take action. Various efforts were started, only to later fail or fizzle out. Over the last five years though, New York has organized many partners and laid a strong foundation for a statewide invasive species program. This program has quickly grown where New York now has an Office of Invasive Species Coordination within the NYS Department of Environmental Conservation with five agency staff, dedicated annual state funding, an Invasive Species Council that includes all state agencies impacted by invasive species, an Invasive Species Advisory Committee which consists of various organizations impacted by invasive species, and mobilized hundreds of volunteers to aid in our efforts to combat invasive species. This presentation will highlight how New York accomplished this work, including pitfalls to avoid and important steps to include. The direction taken by New York may provide other states with a template to improve upon the work started in New York.

Biographical Information

Troy Weldy is currently the Director of Ecological Management for the New York Chapter of The Nature Conservancy, a Research Associate for the New York State Museum and Adjunct Faculty for the Institute of Wetland Environmental Education and Research. He is author of over 75 articles and other publications including the newly released New York Flora Atlas and a chapter on invasive species management within Conserving Biodiversity on Military Lands. Troy lobbies for invasive species support with many New York partners which has resulted in dedicated state funding (nearly $25M to date), the creation of the New York State Invasive Species Council and Advisory Committee, the formation of eight regional partnerships, and a formalized approach to establish New York's first regulatory invasive species list. His previous roles include Director of US Network Operations for NatureServe, Executive Director of the New York Flora Association, Botanist for the New York Natural Heritage Program, and Faculty Research Associate for Vassar College. He has a BS from Butler University and a MA from the College of William & Mary.

W. Lindsay Chadderton

Aquatic Invasive Species Director

Great Lakes Project, The Nature Conservancy

Detection of Asian Carp (*Hypopthalmichthys molitrix* and *H. nobilis*) Invasion Front in Chicago Area Waterway System Using Environmental DNA (eDNA)

Detection of new incursions of invasive species commonly relies upon the ability to detect and monitor low densities of patchily distributed non-indigenous species. This can be particularly challenging in aquatic ecosystems where even large organisms can be difficult to directly observe or capture. Traditional sampling methods are only effective in a narrow range of habitats, principally shallow water with slow water velocities or moderate to high visibility. Genetic based sampling methods have the potential to overcome many of the constraints posed by traditional aquatic monitoring and detection gear. Here we present results of an ongoing surveillance effort using environmental DNA to delimit the spread of bighead and silver carps (*Hypopthalmichthys nobilis* and *H. molitrix*) from the Illinois River through the Chicago Area Waterway System to Lake Michigan. Repeated detection of Asian carp DNA above the electric barriers in 2009 and 2010 indicate that the invasion of Lake Michigan by silver carp has started and is imminent for bighead carp. Our results show that monitoring for the presence of environmental DNA of high-risk invasive species has potential to provide a sensitive early detection surveillance method in aquatic environments.

Biographical Information

Lindsay has worked as the Aquatic Invasive Species Director for The Nature Conservancy's Great Lakes Project since January 2007. He joined the Conservancy from New Zealand where he worked for 16 years for the Department of Conservation, a federal government agency (equivalent to USFWS, USFS, and National Park Service), the last seven years spent leading their freshwater science program. He has experience in the management of invasive species in terrestrial, marine and freshwater ecosystems having managed or advised on rat eradication programs in New Zealand, Falkland Islands and Fiji, established an incursion response and eradication program for an introduced marine algae (*Undaria pinnatifida),* and was a principle technical advisor on national and regional rapid response programs for common carp, mosquito fish, rudd and European gudgeon, and an introduced diatom (*Didymosphenia geminata*). Lindsay is based at the University of Notre Dame and was part of the four person team that developed the environmental DNA surveillance methods being used to track the invasion Asian carp in Chicago waterways.

Janet Clark

Owner

Sweetgrass Consulting

The National Buzz: Politics, Trends & Opportunities

Natural resource management decisions are often based as much on politics as good science. Understanding the current political milieu helps identify opportunities for partnerships, publicity, and funding. Invasive plant issues will be discussed in the context of national programs, organizations, legislation, and what's hot inside the Beltway.

Biographical Information

Based in Montana, Janet Clark is self-employed as a writer/editor, project manager, and researcher of conservation and agriculture issues, policies, and funding opportunities. She serves on the Invasive Species Advisory Committee for the National Invasive Species Council and on the Boards of Directors for the Midwest Invasive Plant Network and the Pacific Northwest Invasive Plant Council. Janet has worked on invasive plant projects for 20+ years in various capacities, often coordinating multi-partner projects, publications, and events in the West and nationally. She is particularly interested in effective communication and organizational networking, natural resource policy, ecosystem sustainability issues, and public participation in legislative and policy-making processes.

Concurrent Sessions

Monday, November 8

There are six concurrent sessions during each time period. Every presentation listed is 20 minutes followed by 5 minutes of questions unless otherwise noted. Asterisk (*) indicates the presenting speaker. Aquatic sessions are Blue, terrestrial sessions are Green, and workshops are Tan.

1:20 pm - 2:35 pm

Weed Laws and Policies
Kellogg I
Moderator:
Tom Boos, Wisconsin Department of Natural Resources

1:20pm **The Revised Minnesota Noxious Weed Law**
Anthony B. Cortilet, Minnesota Department of Agriculture

1:45pm **Wisconsin's New Comprehensive Invasive Species Rule**
Kelly Kearns, Wisconsin Department of Natural Resources

2:10pm **Minnesota's State Management Plan for Invasive Species**
Jay Rendall* and Luke Skinner, Minnesota Department of Natural Resources

Biology and Impacts of Invasive Species
Kellogg II
Moderator:
Roger Becker, University of Minnesota

1:20pm **Principles of Invasion Biology and Their Role in Invasive Species Management**
Robert Venette*, USDA Forest Service; Nadilia N. Gomez Raboteaux, University of Minnesota

1:45pm **Invasive Earthworm Impacts on Ground-Nesting Songbirds in Northern Hardwood Forests**
Scott Loss* and Robert B. Blair, University of Minnesota

2:10pm **Garlic Mustard (*Alliaria petiolata*) Invasion & Impacts: Implications for Management & Restoration**
Laura Phillips-Mao, University of Minnesota

Interrupting Pathways
Great River I
Moderator:
Doug Jensen, University of Minnesota Sea Grant Program

1:20pm **Using Technology to Prevent Invasive Species Introduction at Boat Accesses**
Ronald Faust*, Gull Chain Of Lakes Association; Eric Lindberg*, Environmental Sentry Protection, LLC

1:45pm **Effects of Fishing Tournaments in Minnesota's Laurentian Region**
Drew Christianson, University of Minnesota

2:10pm **Invasive Aquatic Species on Our Door Step: The Need for Vigilant Neighbors**
Martha Balfour*, Jennifer Hauxwell, Alison Mikulyuk, Michelle Nault, and Scott van Egeren, Wisconsin Department of Natural Resources

Biology of Invasive Submersed Plants
State I
Moderator:
Alison Mikulyuk, Wisconsin Department of Natural Resources

1:20pm **Seasonal Water Quality Patterns in Curly-leaf Pondweed Plots**
William F. James, Eau Galle Aquatic Ecology Laboratory

1:45pm **Invasion Trajectories and Population Trends of Eurasian Watermilfoil (*Myriophyllum spicatum*) in Wisconsin**
Scott van Egeren*, Jennifer Hauxwell, Alison Mikulyuk, and Michelle Nault, Wisconsin Department of Natural Resources

2:10pm **Control of Dormancy in Curly-leaf Pondweed (*Potamogeton crispus L.*) Turions**
D. Jo Heuschele* and Florence Gleason, University of Minnesota

Management of Invasive Aquatic Plants 1
State III
Moderator:
Laura Herman, University of Wisconsin Extension- Lakes

1:20pm **Assessment Techniques for Determining Treatment Areas for Curlyleaf Pondweed and Eurasian Watermilfoil**
Steve McComas* and Jo Stuckert, Blue Water Science

1:45pm **Past, Present, and Future Efforts to Manage Flowering Rush (*Butomus umbellatus*) in Minnesota**
Darrin Hoverson, Minnesota Department of Natural Resources

2:10pm **Purple Loosestrife (*Lythrum salicaria*) Management in Minnesota**
Joe Eisterhold, Minnesota Department of Natural Resources

Terrestrial Invasive Plant Management Workshop: Early Detection and Rapid Response
Great River II
Moderator:
Cathy McGlynn, Chicago Wilderness

1:20pm **Identification and Management of Weedy Umbels**
Courtney LeClair, Wisconsin Department of Natural Resources

1:45pm **Narrowleaf Bittercress (*Cardamine impatiens*) – A Newly Recognized Invasive Plant in Minnesota**
Katie Farber, Fortin Consulting, Inc.

2:10pm **Japanese Stiltgrass Ecology and Management: A Report from the Stiltgrass Summit**
Katherine M. Howe*, Midwest Invasive Plant Network, Purdue University; Christopher Evans, River to River CWMA

2:35pm - 3:05pm Break
Visit with Exhibitors in Governors Hall

3:05 pm - 4:20 pm

Best Management Practices
Kellogg I
Moderator:
Dennis McDougall, U.S. Forest Service

3:05pm Best Management Practices for Terrestrial Invasive Species
Thomas Boos II, Wisconsin Department of Natural Resources

3:30pm Rights-of-Ways and Invasive Species Best Management Practices
Thomas Boos II*, Wisconsin Department of Natural Resources; Mike Grisar*, We Energies; Tim Ramburg*, St. Croix County, Wisconsin; Crystal Koles*, American Transmission Company; and Tina Markeson*, Minnesota Department of Transportation
(This is 50 minutes)

Outreach and Prevention 1
Kellogg II
Moderator:
Janet Clark, Sweetgrass Consulting

3:05pm Prevention Through Policy and Partnership
Bonnie L. Harper-Lore, Restoration Ecologist

3:30pm Outreach Efforts Around Recreational Pathways for Terrestrial Invasive Species
Susan Burks, Minnesota Department of Natural Resources

3:55pm Gravel Pit Certification, ATV and Snowmobile Trail Invasive Plant Management
Marsha J. Watland, Becker County Agriculture Inspector

Interrupting the Boating Pathway
Great River I
Moderator:
Nathan Olson, Minnesota Department of Natural Resources

3:05pm Invasive Species Prevention through Watercraft Inspection
Maureen Ziskovsky* and Heidi Wolf, Minnesota Department of Natural Resources

3:30pm Launching Clean Boats and New Career Opportunities
Teresa W. Wolfe, St. Croix National Scenic Riverway

3:55pm Cleaning of Recreational Boats to Slow the Spread of Aquatic Invasive Species
John D. Rothlisberger*, USDA Forest Service, Eastern Region; W. Lindsay Chadderton, The Nature Conservancy; Joanna McNulty and David M. Lodge, University of Notre Dame

Biology of Invasive Emergent Plants
State I
Moderator:
Joe Eisterhold, Minnesota Department of Natural Resources

3:05pm Possible Negative Impacts of Hybrid Cattail on Wetlands in South Central Minnesota
Laurence N. Gillette, Three Rivers Park District

3:30pm Ecological and Genetic Variation of Purple Loosestrife Following Introduction of Biocontrol Agents
Gina L. Quiram, University of Minnesota

3:55pm Exploring Molecular Determinants of Invasion in Purple Loosestrife (*Lythrum salicaria*) using Metabolomics
Will Menzel*, Adrian Hegeman and Gina Quiram, University of Minnesota

Aquatic Invasive Species Public Awareness
State III
Moderator:
Mindy Wilkinson, Wisconsin Department of Natural Resources

3:05pm Stop Aquatic Hitchhikers!™ From Theory to Application
Doug Jensen, University of Minnesota Sea Grant Program

3:30pm Aquatic Invasive Species Prevention through Public Awareness: Examples from Minnesota DNR And Its Partners
Jay Rendall, Minnesota Department of Natural Resources

3:55pm Great Lakes Invasive Species Outreach Partnerships
Pat Conzemius* and Doug Grann*, Wildlife Forever

Terrestrial Invasive Plant Management Workshop: Prairie
Great River II
Moderator:
Tara Kelly, Belwin Conservancy

3:05pm Canada Thistle (*Cirsium arvense*) Management in Minnesota Native Prairies
Roger Becker*, University of Minnesota; Milt Haar, Badlands National Park; Judy Markl, Luke Skinner, and Laura Van Riper, Minnesota Department of Natural Resources; Lee Klossner, Brad Kinkaid, Doug Miller, and Elizabeth Jean Katovich, University of Minnesota; and J.B. Bright, US Fish and Wildlife Service

3:30pm Another Tool for the IPM Toolbox? Assessing Wetblade Technology to Manage Canada Thistle
Kevyn Juneau* and Catherine Tarasoff, Michigan Technological University; Ken Graeve, Minnesota Department of Transportation

3:55pm Controlling Spotted Knapweed (*Centaurea stoebe*) in NW Minnesota State Parks and Trails
Chris Weir-Koetter, Minnesota Department of Natural Resources

Poster Presentations

Governors Hall

*Posters will be displayed throughout the conference. An exhibit reception with poster presenters will be held on Monday from 4:30 pm - 6:30 pm. Complementary refreshments and a cash bar will be offered. Asterisk * indicates the lead presenting author.*

Invasive Species Biology, Ecology, Impacts, and Distribution

Naturalized Yellow-flowered Alfalfa (*Medicago sativa* ssp. *falcata*): Is it Invasive?
Roger N. Gates*, Arvid A. Boe, Patricia S. Johnson, and Lan Xu, South Dakota State University

An Invasive Species May Limit Diet Expansion In a Native Lady Beetle
Kristina Prescott* and David A. Andow, University of Minnesota

Evaluating the Invasive Potential of Norway Maple (*Acer platanoides* L.) and Amur Maple (*Acer tataricum* L. ssp. *ginnala* (Maxim.)) in Central Minnesota – Initial Results
Steve McNamara*, Mary Gervais, and Stan C. Hokanson, University of Minnesota

Phenology of Flowering Rush and Hardstem Bulrush in the Detroit Lakes Chain
Casey Olson*, Samantha Dusek*, and Michelle Marko, Concordia College; John Madsen and Joshua Chesier, Mississippi State University; and Tera Gutter, Pelican River Watershed District

Inter Simple Sequence Repeat (ISSR) Variation in Reed Canarygrass (*Phalaris arundinacea* L.)
Michael Nelson* and Neil Anderson, University of Minnesota

Site and Climate Effects on Midwest Forest Invasibility by Non-Native Plants
Cassandra Kurtz*, USDA Forest Service; Rebecca Montgomery and Neil Anderson, University of Minnesota; W. Keith Moser, USDA Forest Service

Population Biology of Garlic Mustard (*Alliaria petiolata*) in Minnesota Hardwood Forests
Laura Van Riper* and Luke Skinner, Minnesota Department of Natural Resources; Roger Becker, University of Minnesota

Light Brown Apple Moth Cold Hardiness: Potential for Overwintering in the Midwest
Lindsey D.E. Christianson*, University of Minnesota; Robert C. Venette, USDA Forest Service; Robert L. Koch, Minnesota Department of Agriculture; William D. Hutchison, University of Minnesota

Competitive Responses of Tansy and Goldenrod Differ According to Ploidy and Genotype
Ada Tse* and Julie Etterson, University of Minnesota

Spatial Distribution of Nonnative Invasive Plants Inventoried in the North by Forest Inventory and Analysis
Cassandra Olson* and Greg Liknes*, USDA Forest Service

Invasive Reed Canarygrass (*Phalaris arundinacea*) in Wisconsin Trout Stream Restorations
Amanda Little*, Hope Larsen, and Camille Thorson, University of Wisconsin

***Celastrus orbiculatus* (Oriental bittersweet) at the UW Arboretum, Madison, WI**
Rebecca Mosel* and Timothy Kuhman, Edgewood College

Invasive Species Prevention, Containment, and Preparedness

Wisconsin DNR Monitor Effort for Aquatic Invasive Species: A Partnership Approach
Laura Herman*, University of Wisconsin Extension – Lakes; and Mindy Wilkinson, University of Wisconsin Extension – Environmental Resource Center

Current Regulatory Policy for Invasive Earthworms in Minnesota
Jenna Kallestad*, Hamline University; and David A. Andow, University of Minnesota

Demand for Earthworm Bait
David Northbird, University of Minnesota

Genetic Conservation of Minnesota's Ash Resource
Julie Hendrickson*, University of Minnesota; and Andrew David, University of Minnesota—North Central Research and Outreach Center

Semi-Automated Identification of Municipal Ash Trees Using High Resolution Aerial Imagery
Dacia M. Meneguzzo*, Greg C. Liknes, and Susan J. Crocker, USDA Forest Service

Clean Boats, Clean Waters: Citizens and Staff Work Together to Protect Wisconsin's Lakes
Erin McFarlane, University of Wisconsin Extension - Lakes

Youth Protecting Wisconsin Waters: The Department of Workforce Development Boat Inspection Program
Erin McFarlane*, University of Wisconsin Extension – Lakes; and Jeff Bode, Wisconsin Department of Natural Resources

Preventing Saltcedar (*Tamarix* spp.) Invasion in the Northern Great Plains
Michelle Ohrtman*, Sharon Clay, and Alexander Smart, South Dakota State University

Firewood Use and Movement: Before and After Regulation and an Education Campaign
Andrea Diss-Torrance*, Kim Peterson, and Ed Nelson, Wisconsin Department of Natural Resources

What Does "Local" Firewood Buy You? Managing the Risk of Invasive Species Introduction
Andrea Diss-Torrance*, Wisconsin Department of Natural Resources; Patrick C. Tobin and Laura M. Blackburn, USDA Forest Service; and Brian D. Brown, Wisconsin Department of Natural Resources

NR 40 - Wisconsin's New Comprehensive Invasive Species Rule
Kelly Kearns* and Thomas Boos II, Wisconsin Department of Natural Resources

Forest Resource Information to Support Decision-Makers and Land Managers
Susan J. Crocker*, Dacia M. Meneguzzo, Greg C. Liknes, Barry T. Wilson, Patrick Miles, and Charles H. Perry, USDA Forest Service

Freshwater Ballast Treatment- Moving Toward Prevention in the Great Lakes
Jeffery Henquinet, University of Wisconsin- Milwaukee

Invasive Species Early Detection and Rapid Response

Early Detection System for the Great Lakes Early Region
Brendon Panke* and Mark Renz, University of Wisconsin; and Carmen Chapin, National Park Service, National Institute of Invasive Species Science, and Midwest Invasive Plant Network

New Invaders in Wisconsin Waters
Laura Herman*, University of Wisconsin Extension-Lakes; Heidi Bunk; Scott van Egren and Scott Provost, Wisconsin Department of Natural Resources

Early Detection of Invasive Cereal Cyst Nematodes using PCR-Restriction Fragment Length Polymorphism
Tina Seeland, Minnesota Department of Agriculture

Invasive Species Control and Management

Yellow Floating Heart Eradication Experiences in Wisconsin
Susan Graham*, Wisconsin Department of Natural Resources

Biological Control of Garlic Mustard (*Alliaria petiolata*): An Update
Elizabeth Jean Katovich*, Roger Becker, and David Ragsdale, University of Minnesota; Hariet Hinz and Esther Gerber, CABI Biosciences; Luke Skinner, Minnesota Department of Natural Resources; and Bernd Blossey, Cornell University

Impact of Mowing Timing on Japanese Hedge Parsley (*Torilis japonica*) Seed Production
Rose Menyon Heflin* and Mark J. Renz, University of Wisconsin

Cool Season Grass Management in Riparian Zones and Resulting Impact on Stream Characteristics
Ryan deRegnier*, Mark Renz, and Kris Wright, University of Wisconsin

Developing Biological Control for Common and Glossy Buckthorn
Andre Gassmann, CABI Biosciences; Laura Van Riper* and Luke Skinner, Minnesota Department of Natural Resources

Biological Control of Invasive Plants in Minnesota
Monika A. Chandler*, Minnesota Department of Agriculture; Luke Skinner and Laura Van Riper, Minnesota Department of Natural Resources

Southeast Ohio Non-Native Invasive Species Interest Group: Building Collaboration for Landscape-Level Impacts
Cheryl Coon* and Ryan Orwan, Wayne National Forest

Preliminary Characterization of Digestive Enzymes in Native Mussels and Zebra Mussels: A Step Toward Developing a Species-Specific Control for Aquatic Invasive Species
Blake Sauey*, Scott Cooper, and Sandra Grunwald, University of Wisconsin; Jon Amberg, Teresa Newton, and Mark P. Gaikowski, US Geological Survey

Efforts to Develop Potential Selective Agents for the Control of Common Carp (*Cyprinus carpio*) Through Large-Scale Synthesis of GD-174 and Analog Design
Jared Scherr, Rhianna Nichols, and Tammy Clark*, Viterbo University; Terrance D. Hubert and Mark P. Gaikowski , US Geological Survey

The Effects of Burning and Herbicide Treatments on Spotted Knapweed (*Centaurea maculosa*)
Alan Einck, St. Cloud State University

Identification and Management of Weedy Umbels
Courtney LeClair, Wisconsin Department of Natural Resources

Post-Invasion Restoration

Prairie Restoration: Increasing Warm-Season Native Grasses with Fire, Herbicide, and Nitrogen Application
Shauna Waughtel*, Sharon A. Clay, Alexander Smart, David E. Clay, and Leo Schleicher, South Dakota State University

Photo Credit :WI DNR
Parrot Feather, *Myriophyllum aquaticum*

Photo Credit :WI DNR
Zebra Mussels, *Dreissena polymorpha*

Mississippi

National River and Recreation Area

National Park Service
U.S. Department of the Interior

A partner park:

to preserve, enhance, and make special places available to visitors by working with other agencies and volunteers just like you.

This national park offers opportunities to work alongside our rangers on a wide variety of restoration projects. Volunteers provide valuable assistance in restoring colorful native landscapes where invasive species presently exist.

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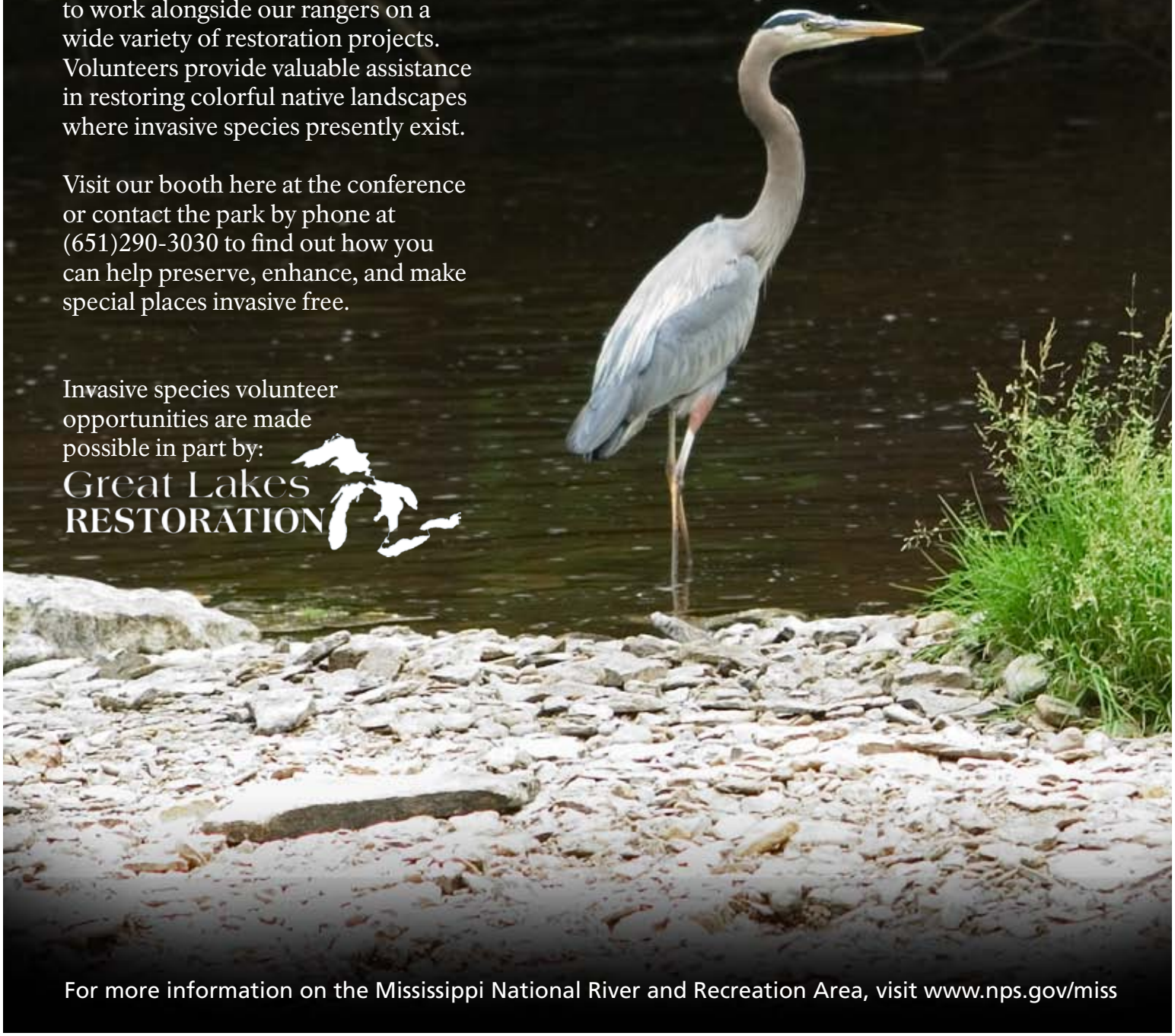

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Zebra mussels clustered on a native mussel
I've made the commitment to
STOP AQUATIC HITCHHIKERS!
HAVE YOU?
Kent Hrbek, former Minnesota Twin and avid outdoorsman
REMEMBER...
Clean off aquatic plants, animals, and mud from boat, trailer, and gear
Drain all water from bilge, livewell, and bait container
Dry or spray boat and gear to remove or kill invasive species that are hard to see
Dispose of unwanted live bait in the trash
Minnesota Department of Natural Resources

8:30 am - 10:10 am

Herbicides
Kellogg I
Moderator:
Bob Masters, Dow AgroSciences

8:30am Invasive and Noxious Weed Management With Aminopyralid
Byron B. Sleugh*, Mary B. Halstvedt, Daniel C. Cummings, Pat L. Burch, William N. Kline, Vernon B. Langston, David Hillger, and Vanelle F. Peterson, Dow AgroSciences, LLC

8:55am Native Forb Tolerance to Aminopyralid (Milestone® VM) Applications for Invasive Weed Control
Mary Halstvedt*, Dow AgroSciences LLC; K. George Beck, Colorado State University; Roger Becker, University Of Minnesota; Celestine Duncan, Weed Management Services; Rodney Lym, North Dakota State University; Peter Rice, University Of Montana; and Byron Sleugh, Dow AgroSciences, LLC

9:20am Herbicide Use Questions? Ask the Experts
Bob Masters*, Dow AgroSciences; Mark Renz*, University of Wisconsin-Madison Extension; Louanne Brooks*, IVM Dow AgroSciences; Dale S. Sutherland* and Rick Schulte*, CPS Timberland; and Lee Shambeau*, 4 Control, Inc.
(This is 50 minutes)

Forest Early Detection and Rapid Response
State I
Moderator:
Essam Dabaan, USDA APHIS

8:30am Forest Pest First Detector a Voluntary Early Detection Program in Minnesota
Angela S. Gupta*, University of Minnesota Extension; Mark Abrahamson, Minnesota Department of Agriculture; Val Cervenka, Minnesota Department of Natural Resources; Jeff Hahn and Dean Herzfeld, University of Minnesota Extension; Ken Holman, Minnesota Department of Natural Resources; Mike Reichenbach and Gary Wyatt, University of Minnesota Extension

8:55am Predicting the Distributions of Invasive Plants Across Northern Wisconsin
Steve Garske and Miles Falck*, Great Lakes Indian Fish & Wildlife Commission

9:20am Determining the Potential Range of Forest Invaders Using Freely-Available Software and Climate Information
Greg C. Liknes*, Susan J. Crocker and Dacia M. Meneguzzo, USDA Forest Service

9:45am Invasive Plant Survey and Modeling to Support Forest Management Planning
Susan Burks*, Jim Rack, and Melissa Powers, Minnesota Department of Natural Resources

Ballast Water
Great River I
Moderator:
Dale Bergeron, Minnesota Sea Grant

8:30am Great Lakes Ballast Water Collaborative Update Panel Session
Dale Bergeron*, University of Minnesota Sea Grant Program; Craig Middlebrook*, St. Lawrence Seaway Development Corporation, US Department of Transportation; Jeff Stollenwerk*, Minnesota Pollution Control Agency; and Susan Sylvester*, Wisconsin Department of Natural Resources
(This is 75 minutes)

9:45am The Great Ships Initiative: Performance Assessment of a Candidate Ship-Board Treatment System
Euan D. Reavie*, Natural Resources Research Institute, University of Minnesota-Duluth; Mary D. Balcer, Heidi Saillard and Matthew C. TenEyck, University of Wisconsin-Superior; Allegra A. Cangelosi and Nicole L. Mays, Northeast-Midwest Institute; Lisa E. Allinger, NRRI, UMD; Donald M. Reid, Nepean, Ontario; and Tyler Schwerdt, AMI Engineering

Management of Invasive Submersed Plants: Herbicide Use
State III
Moderator:
Brittany Hummel, Minnesota Department of Natural Resources

8:30am Management of Invasive Aquatic Plants in Minnesota: Defining Success
Chip Welling, Minnesota Department of Natural Resources

8:55am Sampling of Herbicide Residuals Confirms Extended Exposure to Low Concentrations of 2,4-D and Triclopyr can Control Eurasian Watermilfoil
John G. Skogerboe*, Michael D. Netherland, and LeeAnn M. Glomski, US Army Engineer Research and Development Center

9:20am Aquatic Herbicide Use Patterns: Differences in Restoration, Nuisance Control, and Eradication Strategies
Michael D. Netherland, US Army Engineer Research and Development Center

9:45am Effects of Whole Lake Early Season 2,4-D on Eurasian Watermilfoil (*Myriophyllum spicatum*)
Michelle Nault*, Jennifer Hauxwell, and Alison Mikulyuk, Wisconsin Department of Natural Resources;
John Skogerboe, US Army Corps of Engineers; Scott van Egeren, Wisconsin Department of Natural Resources

Photo Credit :WI DNR
Gypsy moth larva,
Lymantria dispar

Aquatic Invasive Species Control: Technology and Efforts
Kellogg II
Moderator:
Maureen Ziskovsky, Minnesota Department of Natural Resources

8:30am **Reducing Spread of Invasive Species Through In-Line Screening**
Lindsey Roberts McKenzie*, Donald Lutch, and Emily Davis, Short Elliott Hendrickson, Inc.; Tom Wesolowski, City of Shoreview, Minnesota; and William (Jay) Rendall, Minnesota Department of Natural Resources

8:55am **Response to Appearance of the Red Swamp Crayfish (*Procambarus clarkii*) in Southeast Wisconsin**
Scott van Egeren*, Wisconsin Department of Natural Resources; Erin Vennie-Vollrath, University of Wisconsin; Heidi Bunk, Wisconsin Department of Natural Resources; and Aaron Meinke, University of Wisconsin

9:20am **Development of Methods to Orally Deliver Biocides to Control or Limit Invasive Aquatic Animals**
Terrence D. Hubert* and M.P. Gaikowski, US Geological Survey

9:45am **Key Points from the 2010 International Symposium on Genetic Biocontrol of Aquatic Invasive Species**
Leah M. Sharpe*, University of Minnesota; and Anne R. Kapuscinski, Dartmouth University

Terrestrial Invasive Plant Management Workshop: Prairie and Wetlands
Capitol Ballroom
Moderator:
Brian Pillsbury, USDA Natural Resources Conservation Science

8:30am **Reed Canary Grass – Why Is It So Successful and How Can it be Controlled?**
Kelly Kearns, Wisconsin Department of Natural Resources

8:55am **Large Scale Control of Phragmites and Lyme Grass in Wisconsin on Lake Michigan**
Mark Martin, Wisconsin Department of Natural Resources

9:20am **Cheatgrass (*Bromus tectorum*) Management for High Diversity Dry Prairies in Minnesota**
Wiley S. Buck*, Great River Greening; Karen Schik*, Friends of the Mississippi River; and Rich Biske, The Nature Conservancy

9:45am **Management of Invasive Species of the Prairie**
Justin Sykora, Prairie Restorations, Inc.

10:10am- 10:40am Break
Visit with Exhibitors in Governors Hall

10:40 am - 11:55 am

Biocontrol of Terrestrial Invasives
State I
Moderator:
Kathleen Knight, USDA Forest Service, Northern Research Station

10:40am **The Minnesota Department of Agriculture's New and Established Biological Control Programs**
Monika A. Chandler, Minnesota Department of Agriculture

11:05am **Biological Control of Garlic Mustard (*Alliaria petiolata*) and Buckthorn: an Update**
Elizabeth Jean Katovich*, Roger Becker and David Ragsdale, University of Minnesota; Hariet Hinz and Esther Gerber, CABI Biosciences, Delemont, Switzerland; Luke Skinner, Minnesota Department of Natural Resources; and Bernd Blossey, Cornell University

11:30am **Status of Biological Control Development for Several Invasive Wetland and Terrestrial Plants**
Brock Woods, Wisconsin Department of Natural Resources and University of Wisconsin Extension

Forest Insect Pests
Kellogg I
Moderator:
Val Cervenka, Minnesota Department of Natural Resources

10:40am **An Overview of Asian Longhorned Beetle (*Anoplophora glabripennis*) in the United States**
Carlos Dominguez, USDA-APHIS-PPQ

11:05am **Wood and Phloem Feeding Insects in Lake States Forests**
John F. Kyhl, USDA Forest Service, Forest Health Protection

11:30am **Gypsy Moth (*Lymantria dispar*) Monitoring & Treatments in Minnesota - MDA Program Update**
Natasha Northrop, Minnesota Department of Agriculture

Aquatic Invasive Species in Lake Superior
Great River I
Moderator:
Joe Eisterhold, Minnesota Department of Natural Resources

10:40am **Comparing Planktonic Bacterial Communities in Ship Ballast Water and the Duluth-Superior Harbor**
J. B. Welch,* and Randall E. Hicks, University of Minnesota-Duluth

11:05am **Status of Aquatic Non-Indigenous Species in the Duluth-Superior Harbor**
Anett Trebitz*, Gregory Peterson, Joel Hoffman, John R. Kelly, and Corlis West, US Environmental Protection Agency

Tuesday Plenary

12:00 pm - 1:20 pm Great River Ballroom

The Tuesday, November 9 Lunch Plenary will feature the Carol Mortensen Award given by the Minnesota Invasive Species Advisory Council (MISAC) and guest speaker Dr. Lee Frelich.

Tuesday, November 9

Carol Mortensen Invasive Species Award

The Carol Mortensen Invasive Species Award honors the memory of Carol Mortensen who represented the Leech Lake Band of Ojibwe on the Minnesota Invasive Species Advisory Council (MISAC). She worked tirelessly to promote awareness of, and education on invasive species and authored books on noxious weeds and invasive species. Working as an individual or in collaboration with others, Carol was always passionate about proactively addressing issues related to invasive species. Her contributions and achievements helped to protect Minnesota's natural resources. The Carol Mortensen Invasive Species Management Award shall be presented annually by the Minnesota Invasive Species Advisory Council to a person or entity which has made significant contributions to the prevention, management, and increased awareness of invasive species in the state of Minnesota. This award is intended to publicly recognize an award recipient in honor of Carol's spirit and leadership.

The award is given to a recipient who has demonstrated outstanding achievement through their professional conduct or community service, or leadership, or contributions to address invasive species issues (locally, multi-county or statewide) through:

1. Improving cooperation and coordination among invasive species partners;
2. Raising awareness of invasive species issues including innovative educational approaches; and
3. Demonstrated significant contributions or achievement to prevention, management or control of invasive species.

Lee E. Frelich
Director of The Center for Hardwood Ecology
University of Minnesota

Climate Change and Invasive Species in Forests of Minnesota and Wisconsin

Forests in the Upper Midwest are very likely to experience a large magnitude of changes from a warming climate and from invasive species. Invasive earthworms change seedbed characteristics and the water and nutrient cycles within the soil, changing the suite of native plant species that do well, and facilitating invasive plant species. A warming climate is likely to lead to loss of the boreal species, as well as expansion of drought tolerant tree species and savannas at the expense of mesic forests. Interactions between invasive species and climate change are likely to lead to very large changes to forests, as well as alternative future scenarios that depend on the extent to which invasive species are kept out of the forest.

Biographical Information

Lee E. Frelich is Director of the University of Minnesota Center for Hardwood Ecology. He received a Ph.D. in Forest Ecology from the University of Wisconsin-Madison in 1986. Dr. Frelich teaches courses in Forest Fire Ecology and Landscape Ecology on St. Paul Campus. He has advised 20 graduate students, and is a senior member of the Conservation Biology, Natural Resource Science and Management, Ecology, and Invasive Species Graduate Programs. Dr. Frelich has published numerous papers on forest ecology and has been listed among the top 1% of all scientists in the world in the Science Citation Index, Ecology and Environment Category. He has appeared in the news media 250 times including *The New York Times*, *Newsweek*, *National Geographic*, and many TV and radio stations. Current research interests include fire and wind in boreal forests, long-term dynamics of old-growth hemlock and maple forests, invasive earthworms in forests, and global warming.

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11:30am Lake Superior Aquatic Invasive Species Complete Prevention Plan
Roger Eberhardt, Michigan Department of Natural Resources; Susan Greenwood, Ontario Ministry of Natural Resources; Nancy Stadler-Salt, Environment Canada; Elizabeth LaPlante, US Environmental Protection Agency; and Amy Thomas*, Battelle

Management of Curlyleaf Pondweed
State III
Moderator:
Nathan Olson, Minnesota Department of Natural Resources

10:40am Attempts To Improve Water Quality By Management of Curlyleaf Pondweed in Minnesota
Chip Welling, Minnesota Department of Natural Resources

11:05am Control and Management of Curlyleaf Pondweed (*Potamogeton crispus*) in a Shallow Lake
Udai B. Singh*, Minnehaha Creek Watershed District; Steve McComas, Blue Water Science; and Yvette Christianson and Kelly Dooley, Minnehaha Creek Watershed District

11:30am Evaluation of Lake-wide, Early-season Herbicide Treatments for Controlling Invasive Curlyleaf Pondweed (*Potamogeton crispus*) in Minnesota Lakes
James A. Johnson*, Freshwater Scientific Services, LLC; Raymond M. Newman and Ajay Jones, University of Minnesota

Aquatic Invasive Invertebrates
Kellogg II
Moderator:
Scott van Egeren, Wisconsin Department of Natural Resources

10:40am Faucet Snails (*Bithynia tentaculata*): What They Are and Why We Should Care
Darrin Hoverson, Minnesota Department of Natural Resources

11:05am Preventing Between-Lake Hitchhiking of the Spiny Water Flea (*Bythotrephes longimanus*)
Donn K. Branstrator*, Lyle J. Shannon, Meghan E. Brown, and Marte T. Kitson, University of Minnesota

11:30am Using Suitability Assessments to Determine the Degree of Zebra Mussel Colonization Potential
Steve McComas* and Jo Stuckert, Blue Water Science

Terrestrial Invasive Plant Management: Forest
Capitol Ballroom
Moderator:
Kelly Kearns, Wisconsin Department of Natural Resources

10:40am Japanese Knotweed (*Polygonum cuspidatum/Fallopia japonica*) – Biology, Impacts and Control Methods
Brock Woods, Wisconsin Department of Natural Resources and University of Wisconsin - Extension

11:05am A Tale of Two Bittersweets: Ecology, Morphology, Invasion, Hybridization, Control and Conservation
Noel B. Pavlovic*, US Geological Survey- Great Lakes Science Center, Lake Michigan Ecological Research Station; Stacey A. Leicht- Young, US Geological Survey, Lake Michigan Ecological Research Station; and David N. Zaya, University of Illinois at Chicago

11:30am Garlic Mustard: a Comparison of Management Options
Mark Renz, University of Wisconsin-Madison

12:00pm - 1:15pm Lunch Plenary
Great River Ballroom

1:30 pm - 2:45 pm

Early Detection and Rapid Response 1
State III
Moderator:
Patricia Morton, The Nature Conservancy

1:30pm Terrestrial Invasive Plant Early Detection
Monika A. Chandler*, Minnesota Department of Agriculture; Roger Becker, University of Minnesota; and Laura Van Riper, Minnesota Department of Natural Resources

1:55pm Increasing the Impact of an Early Detection Rapid Response Program
Mindy Wilkinson, University of Wisconsin Extension-Environmental Resource Center and Wisconsin Department of Natural Resources

2:20pm Common Lake Shore Weeds – A Guide for Identification and Control
Gina Hugo*, Sherburne Soil & Water Conservation District; and Mary Blickenderfer, University of Minnesota-Extension

Invasive Pathogens
State I
Moderator:
Rob Venette, USDA Forest Service, Northern Research Station

1:30pm Three Year Efficacy of Oak Wilt Treatments in Minnesota
Karrie A. Koch* and Gina L. Quiram, University of Minnesota; Susan Burks, Minnesota Department of Natural Resources; and Robert C. Venette, USDA Forest Service

1:55pm Thousand Cankers Disease of Walnut: What, Where, and Why Should We Care?
Kathryn Kromroy*, Minnesota Department of Agriculture; and Jennifer Juzwik*, Forest Service- Northern Research Station

2:20pm Invasive Forest Pathogens in Wisconsin: Current and Future Concerns
Kyoko Scanlon, Wisconsin Department of Natural Resources

Aquatic Invasive Species Programs and Partnerships
Great River I
Moderator:
Christal Campbell, University of Wisconsin Extension

1:30pm An Overview of Wisconsin's Aquatic Invasive Species Program
Bob Wakeman, Wisconsin Department of Natural Resources

1:55pm Clean Boats, Clean Waters: Citizens and Staff Work Together to Protect Wisconsin's Lakes
Erin McFarlane, University of Wisconsin Extension Lakes - Stevens Point

2:20pm Aquatic Invasive Species Prevention Program Development in Burnett County, Wisconsin: Integrating Education, Outreach, Remote Sensing, and Enforcement
Dave Ferris*, Burnett County, Wisconsin; and Eric Lindberg, Environmental Sentry Protection, LLC

Management of Invasive Aquatic Plants 2
Kellogg II
Moderator:
Darrin Hoverson, Minnesota Department of Natural Resources

1:30pm Regional Collaboration on Invasive Species Management in the Cisco Chain of Lakes
Mark Schimpf* and Lee Hengescht*, Sigurd Olson Environmental Institute

1:55pm Ecology and Management of Flowering Rush in the Detroit Lakes Chain
John Madsen* and Joshua Cheshier, Mississippi State University; Michelle Marko, Concordia College; and Tera Guetter, Pelican River Watershed District

2:20pm Effect of Weevil Stocking on Eurasian Watermilfoil Populations in Two Coastal Lakes
Michelle D. Marko*, Laura Brutscher and Emily Lichte, Concordia College

Cooperative Weed Management Areas 1
Kellogg I
Moderator:
Kate Howe, Midwest Invasive Plant Network

1:30pm Leveraging Time, Materials and Funding, Partnership Examples from Minnesota Cooperative Weed Management Areas
Dan Shaw, Minnesota Board of Water and Soil Resources

1:55pm Cooperative Weed Management Areas
Luan Johnsrud, Pope Soil and Water Conservation District

2:20pm Northwoods Cooperative Weed Management Area
Darienne McNamara, Northwoods Cooperative Weed Management Area

Emerald Ash Borer Workshop 1
Capitol Ballroom
Moderator:
Ken Holman, Minnesota Department of Natural Resources

1:30pm Regulatory Tactics to Prevent Spread of Emerald Ash Borer (*Agrilus planipennis*)
Teresa McDill*, Mark Abrahamson, and Paul Ahlen, Minnesota Department of Agriculture

1:55pm Reducing the Risk of Invasive Species Introduction on Firewood: Regulation and Certification
Andrea Diss-Torrance, Wisconsin Department of Natural Resources

2:20pm Minnesota Department of Natural Resources Firewood Program, History, Status and Future Directions
Susan Burks, Minnesota Department of Natural Resources

2:45pm - 3:15pm Break
Visit With Exhibitors in Governors Hall

3:15 pm - 4:30 pm

Early Detection and Rapid Response 2
State III
Moderator:
Brendon Panke, University of Wisconsin

3:15pm A National Scale Citizen Science Program for Invasive Species
Alycia W. Crall, Colorado State University and National Institute of Invasive Species Science

3:40pm Early Detection System for the Great Lakes Early Region
Brendon Panke* and Mark Renz, University of Wisconsin; and Carmen Chapin, National Park Service, National Institute of Invasive Species Science, and Midwest Invasive Plant Network

4:05pm Feedback On An Early Detection System For The Great Lakes Early Region
Brendon Panke* and Mark Renz, University of Wisconsin; and Carmen Chapin, National Park Service, National Institute of Invasive Species Science, and Midwest Invasive Plant Network

Biomass & Biofuels
State I
Moderator:
Dennis McDougall, US Forest Service, Northeastern Area

3:15pm Does Woody Biomass Harvest Open Forests to Increased Exotic Plant Invasion?
Michael Rentz, University of Minnesota

3:40pm Exposure of the Upper Midwest to Invasive Terrestrial Plants from Mandated Cellulosic Biofuel Crop Production
David J. Smith, University of Minnesota

4:05pm **Buckthorn to Bioenergy: How Minnesota is Linking Habitat Restoration to Bioenergy and Local Economies**
Barb Spears, Minnesota Department of Natural Resources

Aquatic Invasive Species Regulations and Enforcement
Great River I
Moderator:
Lisie Kitchel, Wisconsin Department of Natural Resources

3:15pm **New "No Transport" Law in Wisconsin**
Bob Wakeman, Wisconsin Department of Natural Resources

3:40pm **Law Enforcement Techniques for Aquatic Invasive Species**
Phil Meier* and Jason Jensen*, Minnesota Department of Natural Resources

4:05pm **Invasive Species Prevention through Minnesota's Prohibited Invasive Species and Infested Waters Permits**
Jay Rendall, Minnesota Department of Natural Resources

Management of Invasive Submersed Plants: Funding and Economics
Kellogg II
Moderator:
Darrin Hoverson, Minnesota Department of Natural Resources

3:15pm **Tried-and-True versus Experimental Methods for Eurasian Watermilfoil Control: An Economic Analysis**
Frances R. Horman, University of Minnesota

3:40pm **Aquatic Invasive Species Control Funding in Wisconsin**
Carroll Schaal, Wisconsin Department of Natural Resources

4:05pm **Minnesota DNR Grants for Control and Prevention of Aquatic Invasive Species**
Wendy Crowell, Minnesota Department of Natural Resources

Cooperative Weed Management Areas 2
Kellogg I
Moderator:
Dan Shaw, Minnesota Board of Water and Soil Resources

3:15pm **Development and Activities of the Hawkeye Cooperative Weed Management Area in East Central Iowa**
Chris Henze, MIPN Iowa Representative, Johnson County Secondary Road Department

3:40pm **The Indiana Coastal Cooperative Weed Management Area**
Maggie Byrne, The Nature Conservancy, Indiana Chapter

4:05pm **Aquatic Invasive Species: State, County and Town Coordination in Wisconsin's Northwoods**
Ted Ritter, Vilas County Land & Water Conservation Department

Emerald Ash Borer Workshop 2
Capitol Ballroom
Moderator:
Andrea Diss-Torrance, Wisconsin Department of Natural Resources

3:15pm **Wisconsin's EAB Response Plan – Past, Present and Future**
Jennifer Statz, Wisconsin Department of Agriculture

3:40pm **County-Level Forecast Of Emerald Ash Borer Presence/Absence in Minnesota and Wisconsin**
Dacia M. Meneguzzo*, Susan J. Crocker , and Greg C. Liknes, USDA Forest Service

4:05pm **Emerald Ash Borer Community Preparedness in Minnesota**
Robert Koch*, Minnesota Department of Agriculture; Ken Holman*, Minnesota Department of Natural Resources; and Rebecca Koetter, University of Minnesota

Wisconsin DNR Invasive Species Contact Information

Terrestrial Species

Plants

* Tom Boos, Forestry Invasive Plants Coordinator, thomas.boos@wi.gov, 608-266-9276
* Kelly Kearns, Plant Conservation Program Biologist, kelly.kearns@wi.gov, 608-267-5066
Courtney LeClair, Invasive Plant Early Detection & Education, courtney.leclair@wi.gov, 608-267-7438

Insects and Plant Diseases

* Jane Cummings-Carlson, Forest Health Coordinator, jane.cummingscarlson@wi.gov, 608-275-3273
Andrea Diss-Torrance, Forest Entomologist, andrea.disstorrance@wi.gov, 608-264-9247

Other Animals

Alan Crossley, Wildlife Biologist, alan.crossley@wi.gov, 608-266-5463

Aquatic Species

Plants

Bob Wakeman, Statewide AIS Coordinator, robert.wakeman@wi.gov, 262-574-2149
Erin McFarlane, AIS Volunteer Coordinator, erin.mcfarlane@uwsp.edu, 715-346-4978
Mindy Wilkinson, AIS Outreach Specialist, melinda.wilkinson@wi.gov, 608-261-1092

Fish

* Bill Horns, Great Lakes Fisheries Coordinator, william.horns@wi.gov, 608-266-8782

** indicates contacts for Wisconsin's Invasive Species Identification, Classification, and Control Rule (NR 40)*

Wisconsin Lakes Partnership

8:30 am - 10:10 am

Restoration
Kellogg II
Moderator:
Erik Anthonisen, Minnesota Department of Natural Resources

8:30am Formation of the Southeastern Wisconsin Invasive Speciees Consortium
James Reinartz*, Univeristy of Wisconsin - Milwaukee; Jill Hapner Washington County, Wisconsin- Planning & Parks Department

8:55am Effects of Planting Method and Seed Mix Diversity on Tallgrass Prairie Restoration Success
Diane L. Larson*, US Geological Survey, Northern Prairie Wildlife Research Center; Pauline Drobney, Neal Smith National Wildlife Refuge; Sarah Vacek and J.B. Bright, Morris Wetland Management District (WMD); Nick Palaia, Litchfield WMD; Doug Wells, Fergus Falls WMD; and Jennifer Larson, University of Minnesota

9:20am Restoring Invasive Plant Species Dominated Areas By Means of Assisted Succession
Jamie Hanson, Saint Cloud State University

9:45am Bird City Wisconsin Addresses Invasives
Noel J. Cutright * and Carl Schwartz, Bird City Wisconsin

Management of Woody Invasives
State III
Moderator:
Isaiah Messerly, National Park Service

8:30am Forestry Mowing: An Economical Solution for Woody Invasive Species Management in Hardwood Forests
Clay Frazer, EC3 Environmental Consulting Group, Inc.

8:55am New Control Method for Buckthorn and Other Invasive Tree Species
John K. Lampe, Private Landowner

9:20am DIE Buckthorn Scum!!
Terry Helbig*, Minnesota Department of Natural Resources; Jon Alness*, Zumbro Valley Forestry

9:45am Post-Buckthorn Removal: What Have We Learned?
Jyneen Thatcher, Washington Conservation District

Citizen and Business Involvement
Great River I
Moderator:
Dan Swanson, Minnesota Department of Natural Resources

8:30am Minnesota Waters' Aquatic Invasive Species Position and Recommendations – Quelling the Aquademic
Dick Osgood, Minnesota Waters

8:55am Prevent the Spread: Aquatic Invasive Species Training for Lake Service Providers
Clyde Clement, Brainerd Lakes Aquatic Invasive Species Task Force

9:20am Citizen Engagement in Aquatic Invasive Species Prevention
Luke Skinner, Minnesota Department of Natural Resources

9:45am Empowering Citizens to Address the Sale and Use of Invasive Species
Diane Schauer, Calumet County, Wisconsin

Management and Ecology of Eurasian Watermilfoil
Kellogg I
Moderator:
Chip Welling, Minnesota Department of Natural Resources

8:30am Shoreline Habitat Requirements of the Native Milfoil Weevil, *Euhrychiopsis lecontei*, in Portage County, Wisconsin
Amy L. Thorstenson* and Ronald L. Crunkilton, University of Wisconsin; Michael A. Bozek, US Geological Survey Wisconsin Cooperative Fisheries Unit, University of Wisconsin; and Nancy B. Turyk, University of Wisconsin

8:55am Contrasting Effects Of Early-Season Harvesting And Chemical Treatment In Lake Monona
Alison Mikulyuk*, Jennifer Hauxwell, Michelle Nault and Scott van Egeren, Wisconsin Department of Natural Resources

9:20am Water Level Fluctuation as a Tool for Eurasian Watermilfoil (*Myriophyllum spicatum*) Control and Lake Restoration
Scott Provost, Wisconsin Department of Natural Resources

9:45am Eurasian Watermilfoil Impacts To Native Plants In Christmas Lake
Dick Osgood, Osgood Consulting

Common Carp Management
State I
Moderator:
Maureen Ziskovsky, Minnesota Department of Natural Resources

8:30am Population Estimates Of Common Carp Demonstrate That Nursery Habitat May Be Limiting
Jake Osborne*, Justin Silbernagel and Peter Sorensen, University of Minnesota

8:55am Hormone Implants Induce Potent Pheromonal Attractant Release From Common Carp (*Cyprinus carpio*)
Hangkyo Lim* and Peter W. Sorensen, University of Minnesota

9:20am Egg Predation by Native Sunfish Control Recruitment of Invasive Common Carp
Justin Silbernagel* and Peter Sorensen, University of Minnesota

9:45am **Integrated Pest Management of the Common Carp**
Przemek Bajer*, Chris Chizinski, Hangkyo Lim, Justin Silbernagel, Jake Osborne and Peter Sorensen, University of Minnesota

Emerald Ash Borer Workshop 3
Capitol Ballroom
Moderator:
Susan Burks, Minnesota Department of Natural Resources

8:30am **Cold Hardiness of Emerald Ash Borer and Its Implications for the Upper Midwest**
Robert Venette*, USDA Forest Service - Northern Research Station; and Mark Abrahamson, Minnesota Department of Agriculture

8:55am **The Influence of Satellite Populations on Emerald Ash Borer (*Agrilus planipennis* Fairmaire) Damage in US Communities, 2010-2020**
Kent Kovacs*, University of Minnesota; Rodrigo Mercader, Michigan State University; Robert Haight, USDA Forest Service; and Nathan Siegert, Michigan State University

9:20am **Identification and Removal of Emerald Ash Borer (*Agrilus planipennis*) Infested Trees**
Mark Abrahamson, Minnesota Department of Agriculture

9:45am **SLAM – A Strategy to SL.ow A.sh M.ortality in Emerald Ash Borer Outlier Sites**
Steven Katovich, USDA- Forest Service

10:10am- 10:40am Break
Visit with Exhibitors in Governors Hall

10:40 am - 11:55 am

Outreach and Prevention 2
Kellogg II
Moderator:
Carmen Chapin, National Park Service

10:40am **Right Plant, Right Place. Right Time, Right Now.**
Bob Fitch, Minnesota Nursery & Landscape Association

11:05am **Development of Non-invasive Plant Alternatives for Use in the Landscape**
Benjamin M Clasen* and Alan G. Smith, University of Minnesota

11:30am **Weed Feed: Edible Invasive Species & Community Activism**
Peter A. Nause, Dudgeon-Monroe Neighborhood Association Parks Committee

Distribution and Detection
State III
Moderator:
Tina Markeson, Minnesota Department of Transportation

10:40am **Buckthorn Detection Using Small Format Aerial Photography**
Mike Hoppus, Minnesota Department of Natural Resources

11:05am **Using FIA Data to Detect the Invasion Stage of Non-Native Invasive Plants and Quantify the Invasibility of Forested Lands in the Upper Midwest**
Zhaofei Fan* and Weiming Yu, Mississippi State University; and W. Keith Moser, USDA Forest Service Northern Research Station

11:30am **Extent and Spread of Selected Non-Native Invasive Plants in Upper Midwest Forests**
W. Keith Moser*, USDA Forest Service Northern Research Station; Zhaofei Fan and WiemingYu, Mississippi State University

Aquatic Early Detection and Rapid Response
Great River I
Moderator:
Brittany Hummel, Minnesota Department of Natural Resources

10:40am **Citizen Scientists Monitor Wisconsin's Rivers for Invasive Species**
Laura MacFarland, River Alliance of Wisconsin

11:05am **Aquatic Invasive Species Monitoring Through the Citizen Lake Monitoring Network**
Laura Herman, University of Wisconsin Extension-Lakes

11:30am **Early Detection Monitoring for Vulnerable Great Lakes Coastal Ecosystems**
J. R. Kelly, US Environmental Protection Agency

Restoration of Emergent and Submersed Plants
Kellogg I
Moderator:
Chip Welling, Minnesota Department of Natural Resources

10: 40am **Initial Attempts to Restore Native Plants After Carp Removal in Lake Susan**
Raymond M. Newman*, Josh Knopik and James A. Johnson, University of Minnesota

11:05am **Water Quality Issues Associated with Native Macrophyte Reestablishment**
William F. James, Engineer Research and Development Center, Eau Galle Aquatic Ecology Laboratory

11:30am **Avoiding Reinvasion: Theory, Practice, and Policy**
Susan Galatowitsch, University of Minnesota

Carp and Invasive Fish Management
State I
Moderator:
Dan Swanson, Minnesota Department of Natural Resources

10:40am Asian Carp and The Great Lakes - What Can We Expect?
Phil Moy, University of Wisconsin Sea Grant Institute

11:05am Control of Invasive Carp Movements Using Non-physical Behavioural Barrier Techniques
Kaveh Someah, Ovivo USA, LLC

11:30am Round Gobies in the Duluth Superior Harbor
Michael Lynch, Elise Cordo and Allen F. Mesinger*, University of Minnesota

Photo Credit :
WI DNR
Common Buckthorn,
Rhamnus cathartica

Emerald Ash Borer Workshop 4
Capitol Ballroom
Moderator:
Val Cervenka, Minnesota Department of Natural Resources

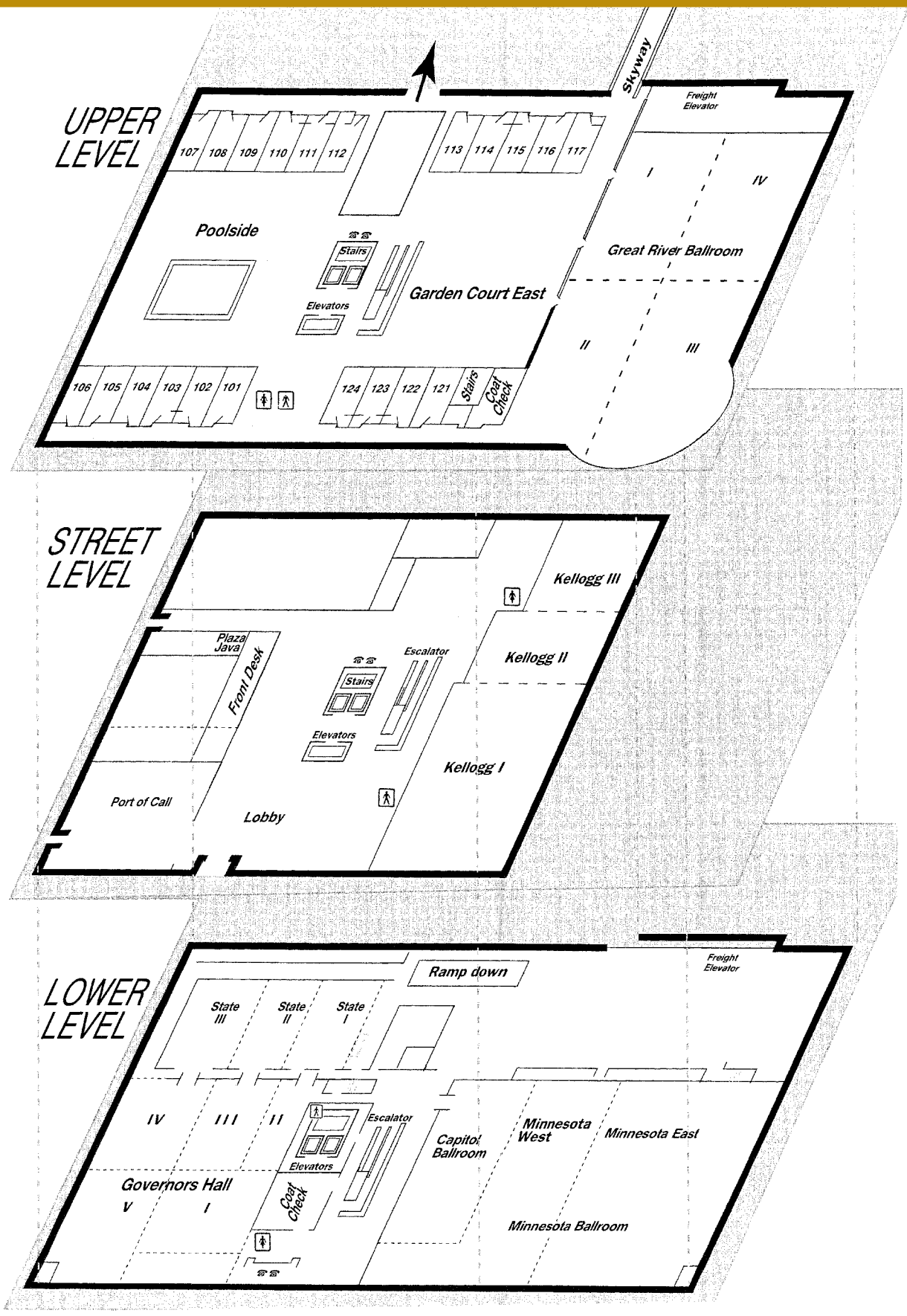
10:40am The Risks and Benefits of Biological Control: A Case Study of the Emerald Ash Borer
Juli Gould, USDA-APHIS

11:05am Effects of Emerald Ash Borer on Ash Populations and Forest Plant Communities
Kathleen S. Knight*, USDA Forest Service Northern Research Station; Daniel A. Herm, Kamal J.K. Gandhi, Annemarie Smith, Catherine P. Hems, Wendy Klooster and John Cardina Ohio State University; Robert P. Long, John P. Brown, and Joanne Rebbeck, USDA Forest Service Northern Research Station

11:30am Potential Impact of EAB in Riparian Forests in Wisconsin and Minnesota
Susan J. Crocker* and Dacia M. Meneguzzo, USDA Forest Service, Forest Inventory and Analysis Program

Photo Credit :
WI DNR
Emerald Ash Borer,
Agrilus planipennis

Crowne Plaza Space



JF New
For more than 20 years, JFNew has been providing sound solutions to challenging environmental issues. Our team of more than 100 professionals provides a broad range of ecological consulting and restoration services across the U.S. With more than 355 available species, JFNew also operates one of the largest native plant nurseries in the nation. Our customized approach takes full advantage of each site's unique attributes, resulting in long-term project success.

EC3
EC3 Environmental Consulting Group, Inc. is located in Madison Wisconsin with satellite offices servicing WI, MN, IL, and IA. EC3 specializes in Environmental Planning, Natural Resources Consulting, and Ecological Restoration Services. We are a highly diverse company staffed with botanists, ecologists, scientists, and dedicated lands stewards who bring to the table more than 50 years of experience relating to; ecology, wetlands, prairie & savanna restoration, wildlife habitat, erosion control and stormwater management. We have worked for every sector of the client spectrum, from private landowners to the government agencies, assisting both the regulators and the regulated. Should you find interest in EC3 please contact us to set up a meeting where we can work together to build a strong working relationship with you or your organization.

Clarke Aquatic Services
Clarke is a global environmental products and services company, focused on helping to make communities around the world more livable, safe and comfortable. Specializing in mosquito control and aquatic services, our mission is to pioneer, develop and deliver the most eco-responsible and advanced products, services and business practices possible.

Compass Tools
CompassTools is the leader is GIS hardware and software, training, service and support. We have been in the GIS and GPS business since 1994 and have assembled the best team anywhere.

US Forest Service - Eastern Region
Islands of green in a sea of people, the Eastern Region is the most geographically, ecologically, and socially diverse area in the United States. Boundaries contain 20 states with over 43% of the nation's population, making it the most urban. Nine of the top 20 metropolitan areas in the U.S. are within the Region's boundary. National Forest boundaries include 24 million acres of land, although only one of every two acres within these boundaries is National Forest land. Management of the 12 eastern National Forests is thus extremely complex. The Region is rich in water with over 10,000 lakes, 15,000 miles of streams, and 2 million acres of wetlands. The 12 million acres of national forest system lands are among the largest contiguous blocks of public lands harboring areas of very rich biological diversity. Community types include: boreal forests; tall grass prairie; pine barrens; shoreline along three Great Lakes; central hardwood forests; glades; bogs; Appalachian foothills; the White Mountains; some of the most extensive virgin forests in the eastern U.S., and so much more.

Weed Science Society of America
The Weed Science Society of America is a nonprofit scientific society that promotes research, education, and extension outreach activities related to weeds. They provide science-based information to the public and policy makers, as well as foster awareness of weeds and their impacts on managed and natural ecosystems.

Minnesota Wanner Company
Minnesota Wanner Company has decades of experience building top-quality, custom spraying equipment for herbicide applications and prescribed burning. When down time is critical, our large inventory of sprayer parts, nozzles and accessories, knowledgeable staff and same-day shipping make us the first choice of professionals. Visit our conveniently located factory/warehouse in Edina, call us toll free at 1-800-247-4998 or shop after hours at our web store
www.mnwanner.com

Truax Company, Inc.
The Truax Company has manufactured grass and grain drills for over 36 years. Our goal is to meter and place seed into the soil envelope wherein it has the best chance to out compete the invasive species. Whether it is the surface applied seeds of the inter mountain West or cool season varieties of the Midwest the Truax Drills achieve the best soil to seed contact.

Ducks Unlimited
Ducks Unlimited is the world's largest non-profit wetlands conservation organization. We work cooperatively with landowners and managers, both public and private, to identify and then implement common sense, science-based solutions to environmental problems. A unique component of Ducks Unlimited is the integrated team effort of field biologists and civil engineers, who combine their respective professions to provide environmental services unmatched by any other organization. DU has worked with our conservation partners to protect, restore and enhance more than 475,000 acres of wetlands and associated habitats in Wisconsin and Minnesota.

The Society for Range Management (SRM)
The Society for Range Management (SRM) has dedicated itself to the promotion of the professional development and continuing education of members, the public, and the stewardship of rangeland resources. SRM North Central Stations includes Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, and the Canadian provinces of Quebec and Ontario. Our respect and passion for managing rangelands brings people together to ensure we pass on healthy, productive, and diverse landscapes to our future generations.

Cason & Associates, LLC
Our goal at Cason & Associates, LLC is to provide our clients with effective, environmentally sound and sustainable solutions for aquatic resource management challenges. We provide professional consultants, services and tools for managing lakes, ponds, rivers and wetlands. Our staff includes biologists, limnologists and commercial applicators. Cason & Associates, LLC serves Wisconsin, Upper Michigan and Northern Illinois.

Minnesota Waters
Minnesota Waters provides the training, connections, and support to empower citizens to take action to save our lakes and rivers.

Ovivo USA
Ovivo USA offers a complete range of products serving the power, industrial, municipal, irrigation, pumping station and all other water and wastewater markets. We provide non-physical barriers for guidance and handling systems for protection of native fish and other marine life. In addition, the barriers are used as a deterrent and diversion for invasive fish species. We are a solutions provider for both macro and micro fouling of circulating water systems and heat transfer equipment using in-line, on-line equipment.

Prairie Restorations, Inc.
With six locations across Minnesota, we are a full service restoration company specializing in the installation and management of native plant communities. Management activities include prescribed burning and invasive species control utilizing a variety of mechanical and chemical techniques. We also grow and provide local ecotype seed and plant materials.

Stantec (formerly NRC)
Stantec provides professional consulting services in environmental sciences, planning, engineering, architecture, interior design, landscape architecture, surveying, project management, and project economics for ecological, infrastructure and facilities projects. We support public and private sector clients in a diverse range of markets, at every stage, from initial concept and financial feasibility to project completion and beyond. Our services are offered through over 10,000 employees operating out of more than 150 U.S. and international locations. Stantec is One Team providing Infinite Solutions.

APHIS
The Animal and Plant Health Inspection Service (APHIS) is a multi-faced Agency with a broad mission area that includes protecting and promoting U.S. agricultural health, regulating genetically engineered organisms, administering the Animal Welfare Act and carrying out wildlife damage management activities. These efforts support the overall mission of USDA, which is to protect and promote food, agriculture, natural resources and related issues.

Applied Biochemists
For complete control of water weeds and algae, we have your lake and pond management solution. Our complete line of products includes algaecides, herbicides, colorants and bacterial products. Applied Biochemists will help get your water the way it should be, able to be used for swimming, fishing, watering, drinking or just enjoying the aesthetic beauty in your backyard. Applied Biochemists: Quality Products for Water Quality.

USDA - Forest Service Northern Research Station
The Northern Research Station extends across 20 states, comprising both the most densely populated and most heavily forested portion of the US. We envision a region where trees and natural resources support a high quality of life; wildlife, fish, and plant communities thrive; clean water abound; and people work together to sustain and restore the health of forests. To achieve this vision, the people and communities of the Northeast and Midwest need high quality scientific information. The Northern Research Station is dedicated, organized, and staffed to provide that scientific information in a form that people can use.

Wisconsin Department of Agriculture, Trade and Consumer Protection
The Wisconsin Department of Agriculture, Trade and Consumer Protection works to prevent the introduction and spread of plant pests (insects and diseases) that are harmful to agricultural crops, forests, or urban landscapes.

The Prairie Enthusiasts
The Prairie Enthusiasts (TPE) is a non-profit committed to the preservation, protection, and management of native prairie and savanna of the Upper Midwest. We now have 10 chapters in Illinois, Minnesota, and Wisconsin.

Bonestroo

A threat to the health of any eco-system, invasive species can out compete native species, cause water quality issues, reduce native fish and wildlife populations, and cause navigational problems for recreational boaters. Based on your unique situation, Bonestroo staff can determine the most cost-effective invasive species control solution with an ultimate goal of reestablishing native plant communities. Control methods include bio controls, hand removal, and herbicide control, followed with assistance in the reestablishment of native plant communities.

Stop Aquatic Hitchhikers!™

Stop Aquatic Hitchhikers!™ is a national campaign that helps recreational users prevent the spread of aquatic invasive species. Over 870 partners have joined including public, private and non-profit organizations. Let the campaign work to help your organization protect our valuable waters. Stop by and learn what you can do. Resources produced by campaign partners will be displayed.

Minnesota Department of Agriculture

The mission of the Minnesota Department of Agriculture's Plant Protection Division is to prevent, detect, and respond rapidly to invasive or exotic plant pests that threaten Minnesota's agriculture or the environment. Plant Protection Division also inspects and certifies plant products and commodities as being free of certain pests and pathogens for purposes of trade or export.

Plan of Attack Sponsors

Minnesota Department of Natural Resources
The Minnesota Department of Natural Resources Invasive Species Program booth will include information about invasive species prevention and management, samples of aquatic invasive species, a video about invasive species prevention, and informational products for conference participants. DNR invasive species staff will be present to answer questions.

Wisconsin Department of Natural Resources
The Wisconsin Department of Natural Resources' mission is to protect and enhance our natural resources: our air, land, and water; our wildlife, fish, and forests; and the ecosystems that sustain all life. To provide a healthy, sustainable environment and a full range of outdoor opportunities. To ensure the right of all people to use and enjoy these resources in their work and leisure. To work with people to understand each other's views and to carry out the public will. And in this partnership consider the future generations to follow.

Dow AgroSciences, LLC
Dow AgroSciences LLC, based in Indianapolis, is a top-tier agricultural company providing innovative agrochemical and biotechnology solutions globally. The company, a wholly owned subsidiary of The Dow Chemical Company, has sales of $4.5 billion. Learn more at www.dowagro.com. Field specialists experienced in invasive species and natural areas restoration can provide product and application recommendations and literature at our booth. Sign up for our email list to receive regular updates on topics of interest to you.

Identification Sponsors

Minnesota Sea Grant
Minnesota Sea Grant funds research and provides public education, in part, on harmful aquatic invasive species (sometimes called "biological pollution"). Our extension, education and communication experts develop tools to help people learn how to prevent and minimize the impacts of aquatic invaders. We provide training, fact sheets, videos, CDs, DVDs, Web and youth eduction curricula. Established in 1975, we are part of a nationwide network of 30 university-based programs administered through the National Oceanic and Atmospheric Administration.

Identification Sponsors

Wisconsin Sea Grant
Wisconsin Sea Grant is a statewide program of basic and applied research, education, outreach, and technology transfer dedicated to the stewardship and sustainable use of the nation's Great Lakes and ocean resources. Wisconsin Sea Grant annually supports about $1.8 million in Great Lakes research. Our outreach activities are carried out in the Advisory Services and Communication Subprograms via enhancements to teacher training, displays, workshops, conferences for out-of-school adults, publications, distance learning, radio programs, video and other electronic media. In addition to aquatic invasive species, our outreach specialists focus on GIS, coastal engineering, habitat and water quality, and marine safety and education.

The National Park Service
The National Park Service is working to preserve biodiversity by restoring ecosystems, controlling invasive species, practicing integrated pest management, and through other conservation measures. Preserving biodiversity-from the dung beetle to the grizzly bear- allows us to ensure genetic diversity, understand how the pieces of an intact ecosystem fit together, and detect long-term changes in our environment. In preserving biodiversity we also ensure that our future citizens, artists, and explorers of science experience our lands as the founders of the parks did long ago.

Prevention Sponsors

The Nature Conservancy
The Nature Conservancy works throughout the United States and in over 30 other countries to protect ecologically important lands and waters for nature and people. The mission of The Nature Conservancy is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. Invasive species are a major threat to natural communities in nearly every habitat including those found in the Upper Midwest. The Conservancy is committed to reducing the impacts of invasive species in order to achieve its mission in Minnesota, Wisconsin, and elsewhere.

Prevention Sponsors

StarHill Jawz
Star Hill Jawz (Grabbing Tool), introduced in 2005, is the premier skidsteer style attachment designed specifically for pulling invasive shrubs and trees, including roots, from the ground. This stout tool, patented and manufactured in the U.S., is an essential component in the land manager's "toolbox" of methods to be employed when facing the challenge of removing larger invasive plants and shrubs such as buckthorn, honeysuckle, black locust, Russian olive and multi-flora rose. We have many satisfied public sector customers, including the: FS, BLM, NWS, NPS, Cimarron National Grassland, Wisconsin Department of Natural Resources, Native American reservations, open space districts, municipalities, parks, and conservation districts. We are a GSA contract holder and look forward to meeting with you at the MNWIISC 2010 conference.

Minnesota Nursery & Landscape Association
The Minnesota Nursery & Landscape Association is the largest green industry trade organization in the north central region. Serving a broad range of nursery and landscape professionals in five states, MNLA is proactively involved on a number of environmental issues including invasive plants and pests, water conservation, stormwater management, and promoting the right plant for the right place. Learn more about MNLA at www.MNLA.biz

The University of Wisconsin Extension
University of Wisconsin-Extension provides statewide access to university resources and research so the people of Wisconsin can learn, grow and succeed at all stages of life. UW - Extension carries out this tradition of the Wisconsin Idea - extending the boundaries of the university to the boundaries of the state - through its four divisions of continuing education, cooperative extension, entrepreneurship and economic development, and broadcast and media innovations.

The University of Minnesota Extension
University of Minnesota Extension - taking University research and education to the people of Minnesota, discovering real-world solutions to real-life problems. Extension is a 100 year old partnership between federal, state and county governments - providing scientific knowledge and expertise to the public. Extension faculty and staff live and work across the state, in regional and county offices as well as University campuses and research and outreach centers creating a network organized to help Minnesotans make better decisions, take positive action and address key issues in their lives and communities.

THANK YOU TO OUR SPONSORS

Plan of Attack Sponsors $4,000 - $5,000

Identification Sponsors $1,500 - $2,000

Prevention Sponsors $1,000 - $1,200

Visit us after the conference at www.minnesotaswcs.org.
Please remember to fill out an evaluation form and leave it at the registration desk.

Thank you for attending the Minnesota-Wisconsin Invasive Species Conference!

Appendix B

MNWISC
Minnesota-Wisconsin Invasive Species Conference
2010

Working Together to Control Invasive Species

Presenter Biosketches

Crowne Plaza St. Paul Riverfront Hotel
St. Paul, Minnesota
November 8-10, 2010

Abrahamson, Mark
Mark.abrahamson@state.mn.us
651-201-6505
Minnesota Department of Agriculture
Entomologist
Mark Abrahamson has been an entomologist at the Minnesota Department of Agriculture since 1999 working on a variety of projects including field crop pest survey, map and database development and invasive species issues. He has also been the Emerald Ash Borer Project Manager since 2006.

Bajer, Przemek
bajer003@umn.edu
612-626-4964
University of Minnesota
Research Associate
Przemek 'Shemek' Bajer is a research associate at the University of Minnesota. His work focuses on population dynamics of invasive fish. More specifically he is interested in why certain species of fish become invasive in some geographic regions, but not in others and what mechanisms regulate this process.

Balfour, Martha
Martha.balfour@wi.gov
608-221-6350
Wisconsin Department of Natural Resources
Research Technician
Martha Balfour is a Research Technician for Wisconsin Department of Natural Resources in Madison, WI, where she conducts aquatic plant community surveys to answer questions about the abundance and distribution of native and invasive aquatic plants in Wisconsin lakes. She conducted invasive aquatic plant research in Connecticut before moving to Wisconsin earlier this year. Before studying aquatic plants, she earned her Master's degree in Biology from the University of Central Florida where she researched sea turtle reproductive ecology and habitat restoration for five years.

Becker, Roger
becke003@umn.edu
612-625-5753
University of Minnesota
Professor, Extension Weed Scientist
Roger Becker is a professor and Extension Weed Scientist at the University of Minnesota. His specific areas of responsibility include weed management strategies in annual and perennial systems in disturbed and undisturbed habitats. Roger's current projects include management of purple loosestrife in wetlands; garlic mustard and buckthorn in woodlands; and Canada thistle in native prairies, pastures and right-of-ways. Also working on prairie establishment, weed management in forages and in processing vegetables, and the environmental impacts of herbicide and non-herbicide weed management systems.

Boos, Thomas
Thomas.boos@wi.gov
608-266-9276
Wisconsin Department of Natural Resources
Forestry Invasive Plant Coordinator
Thomas Boos lives in downtown Madison with a partner of 8 years. Thomas has a B.S. in Landscape Architecture from UW-Madison. He has been working with the DNR for twelve years, starting with the State Natural Areas crew. He has a great deal of experience in waterway permitting and utility permitting. He currently works in the Forestry department as the Invasive Plant Coordinator. He enjoys gardening and is an active volunteer with the Invasive Plants Association of Wisconsin and the Prarie Enthusiasts.

Branstrator, Donn
dbranstr@d.umn.edu
218-726-8134
University of Minnesota Duluth
Associate Professor
Donn Branstrator received the BA from Lawrence University of Wisconsin and the PhD from the University of Michigan. He is an associate professor in the Biology Department at the University of Minnesota, Duluth. His research investigates the ecology and evolution of freshwater zooplankton with particular emphasis on the invasive spiny water flew (Bythotrephes longimanus). He teaches undergraduate and graduate courses in ecology, limnology, and plankton biology, and advises MS and PhD students.

Brutscher, Laura
lmbrutsc@cord.edu
320-360-5435
Concordia College
Research Assistant
Laura Brutscher is an undergraduate student at Concordia College in Moorhead, Minnesota. Her research interests involve invasive plant management and human biology. She plans to pursue graduate research in nutrition.

Buck, Wiley
wbuck@greatrivergreening.org
651-665-9500
Great River Greening
Restoration Ecologist
Wiley Buck (M.S., Wildlife Conservation, University of Minnesota) is the Restoration Ecologist at Great River Greening, managing restoration projects and program grants since 2004. From 1998 to 2004, Wiley was with the MN-DNR, managing Minnesota's 140 SNAs, and before that volunteered extensively with the Chicago Wilderness initiative and landed his first paid job with McHenry County (IL). Wiley has restored scores of sites in the Midwest and particularly the Twin Cities area, spending far too much time battling invasive species. His interests include early detection/rapid response, vectoring and sanitation protocols, cheatgrass (Bromus tectorum), and garlic mustard (Alliaria petiolata) control in the St. Croix Valley.

Byrne, Maggie
mbyrne@tnc.org
219-981-9183
The Nature Conservancy
Conservation Coordinator
Maggie Byrne is a Conservation Coordinator with The Nature Conservancy's Southern Lake Michigan Rim Project, based in Merrillville, Indiana. She has been with the Conservancy since 2005. As part of her job responsibilities, Maggie has been the Coordinator for the Indiana Coastal Cooperative Weed Management Area since its formation in 2009. She spends time in the field, working on oak savanna restoration and killing lots of weeds in the dune and swale remnants of Gary; East Chicago; and Hammond, Indiana. Maggie also works with landowners to explore conservation options benefitting the preservation of the biodiversity of northwest Indiana. Her introduction to coordinating CWMAs came more than ten years ago as a SCA intern, working with the Bureau of Land Management, the U.S. Forest Service, and the National Park Service in Cody, Wyoming. Maggie is a graduate of Ball State University, and holds a BS in Natural Resources and Environmental Management.

Christianson, Drew
chri1855@d.umn.edu
218-626-5444
University of Minnesota
Intern
Drew Christianson is a senior undergraduate student from the University of Minnesota-Duluth. A biology major and psychology minor, he wants to pursue a career in Dental Therapy here in Minnesota. Drew is part of an invasive earthworm research team working in the Cass Lake area, in north-central Minnesota. His 2010 research investigated the activity of resort guests around disposal of earthworm bait. The research design included educational treatments, collection of bait containers and surveys from resorts guests, and accumulation of earthworm bait sales. Drew is also assessing disposal behavior of tournament anglers to help provide further information on the spread of invasive earthworms.

Christianson, Lindsey
Chri1203@umn.edu
612-624-3670
University of Minnesota
Undergraduate Research Assistant
Lindsey Christianson has been studying at the University of Minnesota for 5 years, and will be graduating with a degree in Fisheries & Wildlife in Spring 2011. She plans to start graduate school in the Department of Entomology next fall. Lindsey has been working on the Light Brown Apple Moth project since March 2010.

Clark, Tammy
tclark@viterbo.edu
608-796-3470
Viterbo University
Assistant Professor

Tammy Clark is currently an Assistant Professor of Chemistry at Viterbo University. Her background is in Medicinal Chemistry, as she worked at GlaxoSmithKline Pharmaceuticals in drug development for several years before entering into academia. She has recently developed a collaboration with the Upper Midwest Environmental Science Center in La Crosse, Wisconsin to develop a selective carp toxicant that may be used to control populations of the invasive species.

Clasen, Benjamin
Clas0033@umn.edu
651-216-2279
University of Minnesota
Horticultural Science
Benjamin Clasen is a Research Fellow in the Department of Horticultural Science at the University of Minnesota. Benjamin received his BS in Environmental Horticulture and MS in Applied Plant Sciences at the University of Minnesota. His Master's thesis focused on the genetic diversity of Tanacetum vulgare (common tansy) and developing strategies to reduce the invasive potential of popular landscape plants. Ben specializes in the use of tissue culture, biotechnology and mutation breeding for landscape plant improvement.

Coon, Cheryl
ccoon@fs.fed.us
740-753-0101
Wayne National Forest
Forest Botanist
Cheryl Coon has been the Forest botanist on Wayne National Forest for seven years overseeing the Native Plant and Non-Native Invasive Plant programs. She is a Board member of the Ohio Invasive Plant Council (OIPC). Cherly received her MS in Plant Biology from the University of Maryland and a BA in Biology from Hiram College, Ohio. She is working with the SE Ohio Interest Group to begin a Cooperative Weed Management Area that addresses invasive species issues across all land boundaries.

Cortilet, Anthony
Anthony.cortilet@state.mn.us
651-201-6538
Minnesota Department of Agriculture
Weed Scientist
Anthony Cortilet is the coordinator of the Minnesota Noxious Weed Program for the Minnesota Department of Agriculture. He has worked professionally with invasive weed research, management, and regulation for over 20 years. Anthony received his BS in Fisheries and Wildlife Biology and MS in Agronomy Weed Science from Iowa State University.

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Research Associate
Dr. Alycia W. Crall recently completed a PhD within the Nelson Institute of Environmental Studies at the University of Wisconsin-Madison. Her degree focused on the development and evaluation of a national invasive species citizen science program. She has also worked over the past ten years on several projects as a researcher with the National Institute of Invasive Species Science. She coordinates the NIISS citizen science program and existing partnerships with local, state, and general agencies to improve data collection and sharing among diverse stakeholders.

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Research Forester
Susan Crocker is a Research Forester with the USDA Forest Service, Northern Research Station, Forest Inventory and Analysis (FIA) program in St. Paul, Minnesota. She received a BS in Natural Resource Management from Rutgers University and a MS in Entomology from the State University of New York, College of Environmental Science and Forestry. Sue is the FIA analyst for Illinois and New Jersey. Her current research focuses on exotic insects and forest health.

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Ecological Resources Grants Coordinator

Wendy Crowell obtained her MS degree from the University of Minnesota in 1992. Her thesis was on the effects of milfoil harvesting in Lake Minnetonka. She worked for the Minnesota Department of Natural Resources from 1993 to 2008 as an Aquatic Biologist for the Invasive Species Program, with work focused on the control of Eurasian watermilfoil, curlyleaf pondweed and purple loosestrife. For the last two years she has worked for the Minnesota Department of Natural Resources as the Ecological Resources Grants Coordinator. As part of that job she is responsible for coordinating all of the invasive species grant programs for both prevention and management activities.

Cutright, Noel
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We Energies
Retired
Retired as a Senior Terrestrial Ecologist with We Energies in Milwaukee in 2006 after 28+ year and now has an Emeritus Scientist relationship with the company. Received his BA from Miami University in botany, MS from Cornell University in plant pathology, and Ph D from Cornell University in wildlife science. Past-President and current Historian of the Wisconsin Society for Ornithology, Founder of the Riveredge Bird Club and Western Great Lakes Bird & Bat Observatory, and Board member for the Ozaukee Washington Land Trust. Completed a breeding bird marathon, the Quad 30 Campaign 9www.quad30campaign.org), in 2004. Served as Senior Editor for the Atlas of the Breeding Birds of Wisconsin. Received the Silver and Green Passenger Pigeon awards from the Wisconsin Society for Ornithology. Received a Lifetime Achievement Award in 2007 for Citizen-based Monitoring Efforts from the WDNR. Noel is a native of southern Ohio and has lived for 33 years in rural Ozaukee County, Wisconsin.

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Ryan deRegnier received his B.A. in Biology from Ripon College in Wisconsin. He is currently working on a MS degree in Environment and Resources from the Nelson Institute for Environmental Studies at the University of Wisconsin, Madison. His current program is conducting research involving invasive species in riparian zones, specifically reed canary grass and other cool season grasses. His specific areas of interest include the biology, ecology and management of infested systems; integrating invasive weed management and restoration/re-vegetation methods.

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Invasive Forest Insect Program Coordinator
Dr. Andrea Diss-Torrance has worked as a forest health specialist since 1992 for the Wisconsin Department of Natural Resources. Since 2006 she has been a leading contributor to efforts to reduce movement of firewood and the invasive it carries through the innovative use of regulation, wood vendor certification, and public education. Dr. Diss-Torrance has a Ph D in Entomology from the University of Massachusetts and a Masters from the University of Michigan.

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Plant Health Safeguarding Specialist
Carlos Dominguez has been working with the Animal and Plant Health Inspection Service (APHIS) for approximately three years on a variety of different domestic and emergency response programs. He initially started work with APHIS on the Asian Longhorned Beetle Eradication Program in New York City as a technician inspecting trees for signs of the insect. He also volunteered to travel on TDYs to Massachusetts to work as part of the Asian Longhorned Beetle survey and regulatory crews there as well. After that Carlos worked for a short time as a technician on the Citrus Health Response Program in Haines City, Florida surveying orange groves for a variety of different Invasive diseases. Currently he works with the Emerald Ash Borer Cooperative Program out of La Crosse, Wisconsin to regulate primary and secondary wood users in the Wisconsin, Minnesota, and Iowa tri-state area.

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Samantha Dusek is an undergraduate student at Concordia College in Moorhead, Minnesota. Her research interests involve the biology and management of invasive aquatic plants.

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Invasive Species Specialist
Joe Eisterhold has been an Invasive Species Specialist for the Minnesota Department of Natural Resources since October 2008. He graduated from St. Cloud State University with a Master's in Natural Resources with an emphasis on invasive species in the spring of 2008. In the past he has worked for the National Park Service and the US Fish and Wildlife Service as a biological technician.

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Wildlife Biologist
Miles Falck is a wildlife biologist for the Great Lakes Indian Fish and Wildlife Commission based in Odanah, Wisconsin. Miles has been involved with invasive species issues in the Chippewa-ceded territories of northern Minnesota, Wisconsin, and Michigan since 1997 and is a former member of the Invasive Species Advisory Committee. Miles' interests include ecological applications of information technologies, especially GIS and Internet GIS. He has a MS from Colorado State University and a BS from UW-Stevens Point.

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Field Manager
Katie Farber is a field manager for Fortin Consulting. She conducts and manages many of their field projects including plant surveys, exotic species control, native plantings, and river and wetland monitoring. She is also a certified herbicide applicator, and spends much of her time controlling invasive species such as buckthron, purple loosestrife, and narrowleaf bittercress. Katie is a graduate of Cornell College pursuing a degree as Master of Biological Sciences from the University of Minnesota. Along with invasive species control and plant surveys, she has spent much of her career conducting field research and endangered species surveys, and performing stormwater and water resources education.

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Gull Chain of Lakes Association
Board Member
Dr. Ronald Faust grew up in New Orleans; his love for biology began at Loyola University in that city. He went on to graduate from medical school at LSU. In 1973 he came from the mouth of the Mississippi to Minnesota for anesthesiology residency. He joined the staff at Mayo in 1976 and is currently an Emeritus Professor of Anesthesiology at Mayo Medical School. He has served on the Gull Chain of Lakes Association Board of Directors and the Lake Shore Environmental Committee for three years.

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Executive Director
Bob Fitch has been the executive director of the Minnesota Nursery & Landscape Association since 1996. He is past president of both the Nursery & Landscape Association Executives of North America and the Minnesota Grown Promotion Group. A graduate of Augustana College in Sioux Falls, S.D., Fitch has served on invasive plants committees and councils at the state, regional and national level. He is a native of South Dakota and now lives in suburban St. Paul with his wife, son and grandson.

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Clay Frazer has a strong background in native plant ecology, comprehensive land management, and project planning based on com-

mon-sense and sustainable solutions to complex challenges. After a two-year Peace Corps stint in West Africa working in agricultural development, Clay began his land management career as a Wildlife Technician for The Wisconsin Department of Natural Resources. Several years later, this work led to a four year post as a Private Lands Biologist with Pheasants Forever in Southeastern Wisconsin. In 2008, Clay came on board with EC3 Environmental Consulting Group as a Land Management Consultant. Through the design and implementation of multi-faceted approaches, Clay has acquired a significant "hands-on" knowledge base in the control and eradication of invasive species.

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Susan Galatowitsch is on the faculty at the University of Minnesota. She is a restoration ecologist specializing in aquatic systems: wetlands, rivers and lakeshores. This research has led her to study the management of invasive species in a variety of aquatic systems throughout the Midwest, Great Plains, and South Africa.

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Extension Rangeland Specialist
Roger N. Gates was born in Nebraska, attended college in Pennsylvania and graduate school in South Dakota and Nebraska, completing his Ph.D. in 1985. He spent nearly 20 years working with introduced forages in the humid Southeast: Louisiana and Georgia. In 2002, Gates returned to South Dakota where he is Extension Range Specialist at the SDSU West River Ag Center in Rapid City. In his extension role, Gates works to provide technical expertise and support to extension educators, producers and natural resource managers to promote utilization of rangeland vegetation for economic and resource stability. Recent research efforts have included investigation of the biology of yellow flowered alfalfa, evaluation of contrasting populations of alfalfa in arid rangeland and establishment of yellow flowered alfalfa in crested wheatgrass. Gates received the Merit Award from the American Forage and Grassland Council and the Gamma Sigma Delta Extension/Outreach Faculty Award from the SDSU Chapter.

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Senior Manager of Wildlife
Laurence Gillette has a BS in Biology from Union College in New York and a MS in Wildlife Ecology from the University of Wisconsin, Madison. He has worked for Three Rivers Park District in Minnesota for the past 37 years as a biologist and wildlife manager. The park District owns over 27,000 acres of land just west of Minneapolis, most of which has been restored to or is managed in a natural state. A long career at one location has provided him with an opportunity to monitor transformations in wetland communities, which is the basis of his presentation.

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Lakes Management Coordinator
Susan Graham has a BA in Botany, and an MS in Water Resources Management, both from the University of Wisconsin, Madison. She has enjoyed working on inland lakes in Wisconsin for the Wisconsin DNR since 1989 on topics ranging from aquatic plant management and protection, water quality monitoring and assessment, citizen assistance and education, and lake restoration.

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Douglas Grann is the President/CEO of Wildlife Forever. Grann's responsibilities include the leadership of Wildlife Forever, plus creation and development of national campaigns. He was instrumental in creation of the "Threat Campaign" an Invasive Species outreach effort targeted to America's anglers and hunters, reaching over 700 million impressions. Grann is a frequent speaker at national conferences. He is host of Silent Invaders TV on Versus and is a frequent guest on NA Outdoors Radio.

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Angela Gupta is a Forestry Extension Educator with the University of Minnesota Extension, located in Rochester. She's been with Extension doing forest management and invasive species work with family forest landowners, loggers, and forestry and tree care professionals for six years. Prior to joining Extension Angela worked for Louisiana-Pacific as a procurement forester in Michigan and was an Agroforestry Extensionist in the U.S. Peace Corps in Kenya, East Africa. Angela holds a Masters in Organizational Management from Spring Arbor University in Spring Arbor, MI and a Bachelors degree in Forestry from the University of Kentucky in Lexington. Angela has been a program leader for Minnesota Forest Pest First Detector program since it's initiation in 2007.

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Mary Halstvedt is a Field Research Scientist for Dow AgroSciences in the Vegetation Management (Non-Crop) Business. Her responsibilities include technical expertise on a rangeland business management team, coordinating research on new grassland herbicides, and providing technical support to sales personnel. Her territory includes Montana, Wyoming, North and South Dakota, and Minnesota and she resides in Billings, Montana. Mary received a BS degree in Chemical Engineering from the University of Wyoming in 1981 and started her career with Dow that year. Mary has held several positions including sales, technical service, and research and development. She has worked on invasive species management for her 29 year career and was involved in developing the field research data to support labeling aminopyralid (Milestone VM) in the US. Mary's focus has been working with natural area land mangers and leads the forb tolerance research project to support invasive weed management on grasslands and prairie restorations.

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Restoration Ecologist
Retired FHWA
Bonnie Harper-Lore taught restoration and management at the University of Minnesota as Ecological Principles of Design for 9 years. While teaching, she worked in Minnesota-DOT's Environmental Services for 4 years. Her interest in purple loosestrife control and funding led her to the Minnesota Purple Loosestrife Coalition and legislation that created the Minnesota DNR Invasive Species Program. For nearly 17 years at FHWA/USD she served as the technical resource for all State DOTs, and as the national roadside program manager, focusing on vegetation management and restoration, policy and research for 12 million acres of roadsides. Bonnie was a founding member of the Federal Interagency Committee for Management of Noxious and Exotic Weeds (FICMNEW). This was the group who wrote the Executive Order 13112 on Invasive Species.

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Graduate Student
Julie Hendrickson is a native Minnesotan who enjoys seeing ash trees in their natural environment. She has a BS in Biotechnology from North Dakota State University and spent several years doing research in a molecular biology lab at the University of Minnesota before enrolling in the Natural Resources Science and management Master's Program at the University of Minnesota. She is advised by Dr. Andrew David in the Forest Resources Department. Dr. David is involved in collecting ash seed from across the state of Minnesota as a genetic conservation program in light of the emerald ash borer. For her thesis project, Julie is using genetic markers to evaluate a portion of the ash seeds for genetic diversity and efficiency of collection method.

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Roadside Vegetation Manager
Chris Henze has 15 years of experience in roadside vegetation management, invasive species control, prairie restoration, and prescribed burning with a BS in Wildlife Ecology.

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Citizen Lake Monitoring Network Educator
Laura is the Statewide Coordinator for the Citizen Lake Monitoring Network. She works for the University of Wisconsin Extension-Lakes office which is run out of the University of Wisconsin-Stevens Point. She oversees the training of volunteers who monitor water clarity, water chemistries, native aquatic plants and aquatic invasive species. Laura became involved in Aquatic Invasive Species issues in 1990 and has continued her work with invasives ever since. Laura was a member of the Species Assessment Group (SAG) which reviewed species to be included in Wisconsin's DNR rule NR 40- Invasive Species Identification, Classification and Control. She continues to train staff, trainers and volunteers in Aquatic Invasive Species issues and monitoring protocols.

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Laura Herman is the Statewide Coordinator for the Citizen Lake Monitoring Network. She works for the University Wisconsin Extension – Lakes office which is run out of the University of Wisconsin - Stevens Point. She oversees the training of volunteers who monitor water clarity, water chemistries, native aquatic plants and aquatic invasive species. Laura became involved in Aquatic Invasive Species issues in 1990 and has continued her work with invasives ever since. Laura was a member of the Species Assessment Group (SAG) which reviewed species to be included in Wisconsin's DNR rule NR 40 – Invasive Species Identification, Classification and Control. She continues to train staff, trainers and volunteers in Aquatic Invasive Species issues and monitoring protocols.

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PhD Candidate
D. Jo Heuschele earned a masters degree from the University of Wisconsin – Eau Claire in 2005. After completion of her masters she worked for a nonprofit environmental education and citizen science research stations as the Aquatic Invasive Species Coordinator for 5 counties in Western Wisconsin. She helped build relationships between state agencies and lake shore owners. In 2008 Ms. Heuschele returned to academia to pursue her PhD at the University of Minnesota studying the physiology of Curlyleaf Pondweed.

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Aerial Photo Program Consultant
Mike Hoppus has been using remote sensing and aerial photo techniques to map forest land features for almost thirty years. He has worked for EPA's remote sensing lab, the Remote Sensing Applications Center and the Northern Research Station of the U.S. Forest Service. He now works as an aerial photo consultant for the Minnesota's Department of Natural Resources. Mike has spent a fair amount of this time in airplanes as photographer and pilot. He has authored over 30 publications. Mike has a MS in Forestry is from the University of Idaho and a BS is in Oceanography from the University of Washington.

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Invasive Species Specialist
Darrin Hoverson is an Invasive Species Specialist with the Minnesota DNR. He has a MS in water resources from the University of Wisconsin, Stevens Point and a BS in aquatic biology from St. Cloud State University. Darrin is responsible for the management and prevention activities for aquatic invasive species in northwest Minnesota.

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Midwest Invasive Plant Network Coordinator
Kate Howe is the Coordinator of the Midwest Invasive Plant Network (MIPN), an organization based in Indianapolis, Indiana that is

focused on reducing the impact of invasive plant species in the Midwest. MIPN is a network or public and private agencies, corporations, organizations, and individuals working on invasive plant control, prevention, research, and education across the region. Kate has been in her current position for five years. She has a BA in Biology from Macalester College, an MS in Ecology from the University of Minnesota, and a PhD in Biology from the University of Washington.

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US Geological Survey
Chemist
Dr. Terrance Hubert is a 1980 graduate of Ripon College and received a doctorate in organic chemistry from the University of Iowa in 1985. He worked as a research scientist in the Agrochemicals Division of Hazleton Laboratories America, Inc. from 1986 to 1992. At Hazleton his responsibility was to conduct plant metabolism studies to support the registration of agricultural pesticides with the U.S. Environmental Protection Agency (EPA). He joined the U.S. Geological Survey in La Crosse, Wisconsin in 1992. He led the effort to reregister the lampricides TFM and niclosamide with EPA. Dr. Hubert is team leader for the laboratory's Aquatic Invasive Species Team. His responsibilities include technical support of the Great Lakes Fishery Commission Sea Lamprey Management Program and directing research on the control and management of aquatic invasive species. He is co-lead of the laboratory's research program to investigate method methods of control of Asian carps and zebra mussels.

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Resource Conservationist
Gina Hugo has worked with Sherburne Soil & Water Conservation District for the past eleven year. During that time she has been responsible for promoting, designing, and installing best management practices on public and private lands that reduce erosion, protect water resources and improve wildlife habitat. Gina provides technical assistance to homeowners, agricultural producers and government units. In recent years she has done several rain garden and shoreland buffer designs and installations and has taught shoreland buffer maintenance workshops for lakeshore owners. She has also planned and installed hundreds of acres of native prairie on private, county, city and township park land. Prior to coming to work for the Soil & Water Conservation District Gina worked in the forest resources field in northern Minnesota.

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William James has been a research aquatic biologist with the Engineer Research and Development Center for 31 years and currently manages R&D at the ERDC Eau Galle Aquatic Ecology Laboratory in Spring Valley, Wisconsin. William's interests are in nitrogen and phosphorus cycling, lake management, alum treatment, aquatic plant management, and large river ecology.

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University of Minnesota Sea Grant Program
Aquatic Invasive Species Coordinator
Doug Jensen joined the University of Minnesota Sea Grant Program in 1993. As AIS program coordinator, he specializes in strategic outreach and evaluation aimed at preventing the spread of AIS through behavior intervention. He co-leads HabitattitudeTM, a national campaign aimed to prevent the release of aquarium fish and plants. In collaboration with partners, Doug also leads implementation of Stop Aquatic Hitchhikers! TM, another national campaign aimed at preventing AIS spread. He is current chair of the Information & Education Committee of the Great Lakes Panel on Aquatic Nuisance Species and is a member of the Minnesota Invasive Species Advisory Council. He co-chaired the first Minnesota Invasive Species Conference 2008 in Duluth. Doug earned an MS in Education and a BS in Biology from the University of Minnesota-Duluth.

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Water Resource Enforcement Officer
Officer Jensen has been a DNR Conservation Officer since 1991. He has had patrol stations in central Minnesota as well as the Twin

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James Johnson received a B.S. in Zoology and Biological Aspects of Conservation and M.S. in Water Resources Science Program from the University of Minnesota – Twin Cities. Over the past 15 years he has worked with various State and local agencies in Wisconsin and Minnesota. Most recently he has been working as a private consultant for local government groups and citizen lake associations (Freshwater Scientific Services, LLC). His professional work has focused predominantly on invasive aquatic plant management (particularly curlyleaf pondweed), stormwater monitoring and analysis, watershed modeling, and general water quality management. He is presenting work that he recently completed as a part of his Masters degree program at the University of Minnesota – Twin Cities.

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Office Manager
Luan Johnsrud's previous experiences include dairy farming, regional planning for homelessness prevention, non-profit management, grant writing and grant administration for various housing programs. All of these experiences led Luan to Pope SWCD as their office manager. Several of the conservation programs that Pope SWCD develop and administer are funded through a competitive grant process with partners providing matching funds. These partnerships are invaluable for program success and continuation.

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Graduate Research Assistant
Kevyn Juneau is a graduate research assistant with the Invasive Plant Ecology Lab at Michigan Technological University and is pursuing a Ph.D. in forest science. His research focuses on the ecology and integrated pest management (IPM) of Canada thistle, Cirsium arvense, and common reed, Phragmites australis. He received a B.S. in biological science from the State University of NY at Plattsburgh. After a short period working in the pharmaceutical industry, he went on to receive an M.S. in entomology and nematology from the University of Florida while working for the IPM Florida cooperative extension. There he helped develop and implement the University's IPM program, which is currently under review for Green Shield certification.

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Undergraduate Student
Jenna Kallestad is a senior undergraduate student from Hamline University. As a social science major with a concentration in policy, she is interested in a career in the non-profit sector. Jenna is part of an invasive earthworm research team working in the Cass Lake area in north-central Minnesota. Her 2010 research investigated activity of resort guests around disposal of earthworm bait. The research design included educational treatments, collection of bait containers, surveys from resort guests and accumulation of earthworm bait sales data. Jenna has also researched current regulatory policy regarding earthworms. She interviewed relevant personnel at federal, state and local agencies to determine authority, plans and actions for regulation of invasive earthworms.

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Entomologist
Steve Katovich has been a forest entomologist with the U.S. Forest Service, Forest Health Protection unit in St. Paul, Minnesota since 1990. He holds a PhD in entomology from the University of Minnesota, MS degree in entomology from the University of Wyoming, and a BS degree in forest management from the University of Wisconsin – Stevens Point. Steve is also an adjunct faculty member in the Forest Resources Department at the University of Minnesota. He has worked on various aspects of emerald ash borer management

since the beetle was first reported in Michigan in 2002.

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Invasive Plant Coordinator
Kelly Kearns has a BS in Horticulture and Landscape Design from Purdue University and an MS in Restoration Ecology from the Landscape Architecture Department of the University of Wisconsin – Madison. She has worked at the Bureau of Endangered Resources, Wisconsin Department of Natural Resources since 1984. She is primarily responsible for coordinating DNR activities regarding ecologically invasive plants. These responsibilities include education and outreach, policy and rule revisions, working with partners and researchers, sharing control information, and supervising the Wisconsin Early Detection Project for Invasive Plants. She worked with a team since 2004 to develop the comprehensive invasive species rule, NR 40.

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Dr. Kelly is at the US EPA's Mid-Continent Ecology Division (Duluth MN) and is also Adjunct Professor in the Integrated Biosciences Graduate Program, University of Minnesota-Duluth. Jack has been involved in coastal marine and freshwater environmental issues, nationally and internationally, for about 30 years. His EPA research group has been leading development of some new regional-scale monitoring and assessment approaches for the Laurentian Great Lakes.

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Research Ecologist
Kathleen grew up in the beautiful mountains of West Virginia where her love of the outdoors began. Kathleen earned bachelor's degrees in Biology and in Music Performance from Hiram College, where she became interested in plant ecology. She received her PhD from the University of Minnesota in Ecology, Evolution, and Behavior, working with Dr. Peter Reich. Her dissertation focused on common buckthorn (Rhamnus cathartica) invasion in Minnesota and black cherry (Prunus serotina) invasion in Poland. Kathleen's research with the USDA Forest Service Northern Research Station lab in Delaware, Ohio has focused on the emerald ash borer (EAB). The work includes studying the effects of EAB on forest ecosystems, developing ash seed collection techniques, collaborating with a local middle school to design a citizen science program for EAB research and parasitoid detection, and restoration of ash ecosystems with native plants including Dutch elm disease-resistant elm.

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Graduate Student
Karrie A. Koch received her BS degree in environmental science and biology in 2005 from the University of Wisconsin-Green Bay in and her M.S. degree in entomology in 2008 from the University of Minnesota. Currently she is a PhD candidate in entomology at the University of Minnesota, studying with Dr. David Ragsdale. In addition to her entomology major, she is pursuing a minor in risk analysis of introduced species and genotypes as part of her participation in the Integrative Graduate Education and Research Traineeship (IGERT). Karrie's research interests include biological control and integrated pest management of agricultural pests. Her dissertation research focuses on the role of fungal insect pathogens in the management of soybean aphid, an invasive pest of cultivated soybean. She plans to complete her PhD in 2011 and pursue a career in research at a government agency or in private industry.

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Research Associate
Kent Kovacs is with the University of Minnesota and has been researching the economics of forest invasive species since 2008. This research includes detailed tabulation of the expenditures and losses by four poster pests and diseases such as the emerald ash borer, hemlock wooly adelgid, gypsy moth, and sudden oak death. His collaborators for the research on emerald ash borer include the Forest Service and Michigan State University.

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Minnesota Waters
Program Director
Clyde Clement is a resident of Crow Wing County that works tirelessly on AIS issues. He was recently presented with the Water Warrior Award, sponsored by the Crow Wing County Lakes and Rivers Alliance (LARA) and 1,000 Friends of Minnesota, which recognized his efforts to prevent the spread of invasive species. Through various initiatives, including the creation of BLAISTF (Brainerd Lakes Area Invasive Species Task Force), Mr. Clement has been instrumental in developing educational seminars for Courtney Kowalczak, the Program Director for the statewide non-profit Minnesota Waters. Minnesota Waters provides the training, connections, and support to help citizens take action to save our lakes and streams. Currently Minnesota Waters is working with the Minnesota Department of Natural Resources on various aquatic invasive species initiatives including AIS monitoring and training for citizens and Lake Service Provider trainings to businesses across Minnesota.

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Research Scientist
Kathy is a plant pathologist with the Minnesota Department of Agriculture, Plant Protection Division. Having received her graduate degrees from the Department of Plant Pathology, University of Minnesota, she worked in research at the University, then at the US Forest Service Northern Research Station in St. Paul until moving to the Department of Agriculture in 2005. In addition to her work on Thousand Cankers Disease of Walnut, Kathy manages the state survey for potato cyst nematodes.

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USDA Forest Service
Natural Resource Specialist
Cassandra Kurtz worked for several years as a field technician measuring and monitoring invasive plant species throughout the Midwest with the majority of her work in Wisconsin. In the past few years she has analyzed the USDA Forest Service Phase 2 invasive and Phase 3 data and looked into various distribution and abundance questions. Her focus area increased from 11 Midwestern states to 24 states ranging from the plains states in the west across to the Atlantic states in the East (from Maine to Maryland). Aside form working with invasive plant data as part of her position, her Masters project focused on the effect of site and climate factors on invasive plant distributions in the Midwest. She is interested in the spread and distribution of invasive plants, factors influencing their success, and how climate change may affect their future distribution and rate of spread.

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Entomologist
John works as a forest entomologist for the US Forest Service, State and Private Forestry. He is based in St. Paul and provides technical assistance to state resource management agencies on a variety of forest health matters, including gypsy moth. Prior to joining the USFS in 2003, he worked for 2 years as a forest health specialist and regional gypsy moth suppression coordinator with the Wisconsin DNR in Milwaukee, during the first gypsy moth outbreak in southeastern Wisconsin. He is a graduate of the University of Iowa and the University of Minnesota. When not at work, he is an avid shade gardener and enjoys woodworking with insect- and disease-damaged wood.

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Private Landowner
John Lampe's family owns a small plot of land on the edge of an oak savanna in Washington County, Minnesota. His grandparents planted pine trees on a portion of the property. The buckthorn slowly infiltrated and John has been battling it for over fifteen years. In the process he has developed a number of techniques and tools. He holds over ten domestic and foreign patents, including one for a tool to remove weed trees. He currently works for a medical device company in the Twin Cities.

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US Geological Survey
Research Wildlife Biologist
Diane Larson has been a research biologist with the US Geological Survey for nearly 20 years. Her research has focused broadly on invasive plants but is increasingly including restoration methods either to limit invasion or restore function to previously invaded ecosystems. Diane works collaboratively with resource managers in the US Fish and Wildlife Service and National Park Service to address questions directly related to stewardship of natural resources on public lands.

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Invasive Plant Early Detection Specialist
After two year of working for the Wisconsin DNR through and AmeriCorps program, Wisconservation Corps, Courtney is now employed at the Wisconsin Department of Natural Resources working on Invasive Plant Education, Early Detection, and Mapping. In 2006, she graduated from Edgewood College with a Bachelor of Science in Biology, after which, she volunteered with the Door Country Invasive Species Team.

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Research Associate
Hang Kyo Lim received a doctoral degree in Entomology from the University of Kansas and has been working as a research associate with Professor Peter Sorensen at the University of Minnesota for the past 3.5 years. He is responsible for identifying sex pheromones in common carp and developing a pheromone-based carp specific attractant which can be used in carp removal effort.

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Environmental Sentry Protection, LLC
President
Eric Lindberg, has a background in a variety of computer and software technologies and 25 years in the technology industry. Five years ago he developed an automated video inspection and education system that is being used at numerous boat launches in Minnesota and Wisconsin to increase awareness amongst boaters of the need to inspect and clean boats. The company works with lake associations to develop Aquatic Invasive Species prevention programs to help protect lakes from the costly impact of new invasives.

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PhD Candidate
Scott Loss completed undergraduate degrees in Biology and Wildlife Ecology at the University of Wisconsin - Stevens Point before working as a field technician on several avian ecology research projects, including studies of forest birds in the Missouri Ozarks and Michigan's UP, and of raptor migration on the Texas Gulf Coast. After these experiences, Scott completed his master's degree at the University of Illinois where his thesis research investigated associations between Chicago's urban landscape and bird diversity and between bird communities composition and West Nile virus transmission. Currently, Scott is nearing completion of his PhD degree at the University of Minnesota in the Conservation Biology Graduate Program, where he is studying impacts of invasive earthworms on songbirds in the Northwoods of Wisconsin and Minnesota. He is also a trainee in the NSF IGERT program at the University of Michigan, which focuses on risk analysis for invasive species and genotypes.

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Invasive Species Project Coordinator
Laura MacFarland is the Aquatic Invasive Species Project Coordinator for the River Alliance of Wisconsin, a statewide non-profit organization. It is her role to educate Wisconsin's river enthusiast (paddlers, anglers, and riparian landowners) about the threats posed by

invasive species in riparian corridors and to advocate for resources to help protect Wisconsin's rivers. She holds a B.S. in biology from William Woods University and M.S. in Watershed Management from the University of Wisconsin.

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Mississippi State University
Associate Professor
Dr. John D. Madsen is Associate Extension/Research Professor in the Geosystem Research Institute and the Department of Plant and Soil Sciences, Mississippi State University since 2003. Previously, he was an Assistant Professor of Biology at the Minnesota State University, Mankato from 2000 to 2003; and a Research Biologist in the Environmental Laboratory, U.S. Army Engineer Research and Development Center, Vicksburg, MS from 1991 to 2000. Dr. Madsen has a Bachelor of Science (1980) degree from Wheaton College, Wheaton, IL, and Master of Science (1982) and Doctor of Philosophy (1986) degrees in Botany from the University of Wisconsin-Madison. Dr. Madsen has been studying the biology, ecology, and management of aquatic plants since 1980, authoring over 70 peer-reviewed articles. He is an Associate Editor for Invasive Plant Science and Management.

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Assistant Professor
Michelle D. Marko is an Assistant Professor at Concordia College in Moorhead Minnesota. She received a PhD in Water Resources Science from the University of Minnesota in 2006. Dr. Marko teaches courses in ecology and limnology. Current research interests include biological control of invasive aquatic plants, aquatic plant ecology and chemical ecology.

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Conservation Biologist
Mark Martin has a BS in Wildlife Management from University of Wisconsin Stevens Point. He began working for the DNR in 1971 and since 1983 has worked with the State Natural Areas program in the Bureau of Endangered Species. Mark and coauthor Joe Henry have worked on phragmites and lyme grass control since 2005. Mark and his wife Sue are the resident managers of Madison Audubon Society's Goose Pond Sanctuary.

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Supervisor
Teresa McDill supervises the Pest Detection and Response Unit in the Plant Protection Division, Minnesota Department of Agriculture. The Unit's efforts are directed toward trying to keep new and emerging plant pests out of Minnesota, using the strategies of prevention, early detection and rapid response. After obtaining degrees in Soil Science and Rangeland Management at the University of Wyoming in 1985, she worked at the Minnesota Department of Agriculture on agricultural chemical enforcement, emergency incident response, and soil and water contamination cleanup. Since becoming supervisor of the Invasive Species Exclusion Unit in 2004, she has been applying her 20 years of experience in emergency response and regulatory investigation to boosting the strength of the program with an emphasis on sound science, fair regulation, and program transparency.

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Aquatic Invasive Species Volunteer Coordinator
Erin was hired in May 2007 as the Aquatic Invasive Species Volunteer Coordinator with University of Wisconsin Extension Lakes. She attended college in Kentucky, studying English and Environmental Studies, before moving to Wisconsin where she earned her Master of Science degree in Natural Resources from the University of Wisconsin – Stevens Point. Erin supports the Clean Boats, Clean Waters Watercraft Inspection program and helps coordinate watercraft inspection efforts across the state. In working with dedicated volunteers and the Wisconsin Lakes Partnership on watercraft inspection efforts, she hopes to engage Wisconsin's citizens in AIS prevention and help preserve Wisconsin's water bodies for future generations.

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Northwoods Cooperative Weed Management Area
Darienne McNamara is the Coordinator for the Northwoods Cooperative Weed Management Area in northern Wisconsin. She received her Bachelor's degree in Environmental Studies from Northland College in 2004, and since then, has held a variety of natural resource positions with federal agencies, municipalities, and nonprofits in northern Wisconsin and Minnesota. Invasive species control and education have been the focus of her work for most of the past 5 years. She lives near Lake Superior in Washburn, Wiconsin with her husband, and they are expeecting their first child in February.

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Junior Scientist
Will Menzel is a junior scientist in Adrian Hegeman's Plant Metabolomics Laboratory in the Microbial and Plant Genomics Institute and the Department of Horticultural Science at the University of Minnesota-Twin Cities. He completed his Honors thesis on using metabolomics to investigate molecular determinants of invasiveness in Lythrum salicaria (purple loosestrife). In addition to continuing his work with purple loosestrife, Will is developing methodological improvements for metabolomic analysis. Will is applying to combined MD/PhD programs and plans to pursue a career in systems and computational biology.

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Research Scientist
Alison Mikulyuk is a scientist in the Wisconsin DNR's Fisheries & Aquatic Sciences Research Section, where she helped develop and implement a statewide aquatic plant sampling methodology as well as the new legislative rule regulating invasive species in Wisconsin. She is currently investigating questions regarding long- and short-term management of Eurasian watermilfoil and is also exploring the use of new multivariate and spatial analysis techniques to describe variation in native and invasive plants alike.

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Student
Rebecca Mosel is a recent graduate of Edgewood College with a major in Biology and minor in Environmental Studies. As a student, Becky lead work crews for the grounds department and gained hands on experience and an interest in invasive species managing buckthorn, honeysuckle, garlic mustard and other invasive plants on the 55-acre campus. As president of Wood's Edge, a student-led environmental studies organization at Edgewood, Becky organized many woodland restoration and invasive plant removal projects. In her senior year, Becky conducted research at the UW-Madison Arboretum with Professor Tim Kuhman investigating the distribution and spread of a relatively recent invader in the Midwest, Oriental bittersweet. Becky is currently working for a local horticultural firm where she is finding a huge demand in the private sector for invasive species management and ecological restoration. She is presently looking towards graduate school and is interested in the development of biological controls.

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Fisheries and Invasive Species Specialist
Phil has been the Fisheries and Nonindigenous Species Specialist for the University of Wisconsin Sea Grant Institute Since 1999. Based in the Manitowoc field office, he works with Great Lakes commercial, sport and charter anglers as well as inland lake groups to address fisheries and aquatic invasive species concerns and to provide research information to Great lakes user groups. Phil holds a doctorate in zoology from Southern Illinois University at Carbondale. He is currently chair of the Great Lakes Aquatic Nuisance Species Panel. Before coming to Wisconsin, Phil worked for the Chicago District Army Corps of Engineers and was the first project manager for the Chicago dispersal barrier project. He remains involved as Co-Chair of the Dispersal Barrier Advisory Panel, co-chair of the Safety Workgroup and as a member of the Monitoring and Response Workgroup.

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Lake Research Scientist
Michelle Nault moved to Wisconsin in 2002 to attend the University of Wisconsin-Madison and graduated with degrees in Biology, Zoology, Conservation, and a certificate in Environmental Studies. For the past 4.5 years, she has worked as a lakes research scientist for the Science Services division of the Wisconsin Department of Natural Resources where she conducts research on aquatic plant ecology and invasive species management throughout the state.

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Graduate Student
Michael Nelson earned his BS from Bowling Green State University in Ohio in 2006. He then worked for several years as a microbiologist in a medical device testing lab before starting his PhD work in the Plant Biological Sciences graduate program at the University of Minnesota. His research interests include plant population biology, ecology, and evolution and his PhD project focuses on reaction norm evolution and invasiveness in reed canary grass (Phalaris arundinacea L.).

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Research Biologist
Dr. Michael Netherland is a Research Biologist for the US Army Engineer Research and Development Center (ERDC). He received a Master's degree from Purdue University in 1989 and a PhD from the University of Florida in 1999. Mike worked in private industry research from 1999 to 2003. In 2004, ERDC stationed him at the University of Florida Center for Aquatic & Invasive Plants. His 20 years of research have focused on biology & selective control of hydrilla, milfoil, & other invasive aquatic plants.

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Professor
Ray Newman is a Professor in the Department Fisheries, Wildlife and Conservation Biology at the University of Minnesota. He has a BS in Biology from Slippery Rock University and an MS and PhD in Fisheries from the University of Minnesota. His research focuses on aquatic ecology with significant efforts in the ecology and control of aquatic invasive species. He is Director of Graduate Studies for the university-wide Water Resources Science graduate program and is coordinating a group of over 50 faculty and students on an NSF IGERT program and free-standing minor on Risk Analysis for Introduced Species and Genotypes.

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Bemidji State University
Mathematic/Education Undergraduate
David Northbird is a Mathematics and Professional Education Undergraduate at Bemidji State University. This summer, he interned with the University of Minnesota, conducting a human behavior experiment. The experiment measured the effectiveness of labels on earthworm bait containers. The labels educated anglers on the invasive earthworm issue, and instructed them to throw unused containers in the trash. Early in the summer season, data was slow, due to the ineffectiveness of night crawlers (earthworms) as fishing bait. After interviewing local fishing guides, and professional fishermen an understanding was reached as to why the demand for night crawlers increased through the summer fishing season. Using mathematics Dave has created an equation using sales data collected from a bait shop and water temperatures dating back five years. The equation will aid future educational efforts by targeting anglers at the height of earthworm bait demand to maximize effectiveness.

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Gypsy Moth Trapping Coordinator
Natasha Northrop has been with the MDA since 2005. She started off with the Weed Biological Control program as a Research Scientist, and is currently wrapping up her second field season with the Gypsy Moth Unit. Prior to that, she was a Plant Protection Technician with USDA, APHIS, PPQ in Bloomington, Minnesota. Natasha obtained her BS in Biology in her hometown at St. Cloud State University.

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Postdoctoral Research Associate
Michelle Ohrtman received a M.S. in Botany at California State University, Chico. She conducted her Ph.D. research in plant invasion ecology at University of Denver, Colorado where she studied the relationship between Tamarix spp. invasion and soil and groundwater salinity. She has three publications in preparation related to this dissertation research. Dr. Ohrtman has over 10 years of experience in ecological studies, three of which were spent performing habitat restoration in riparian and associated grassland ecosystems in California. She has authored dozens of reports that document restoration techniques in these habitat types. She is currently a first-year Postdoctoral Research Associate at South Dakota State University where she is examining the impacts of range management techniques on non-native plant invasions and soil properties. Dr. Ohrtman's primary research interests include the environmental impacts of non-native plant invasions and restoration of degraded habitats.

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Student
Casey Olson is an undergraduate student at Concordia College in Moorhead, Minnesota. He is majoring in Biology and Environmental Studies. Casey's research interests involve aquatic ecology and the management of aquatic invasive species. He plans to pursue graduate research in natural resources management or fisheries/invasive species management.

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USDA Forest Service
Ecologist
Cassandra Olson is an ecologist with the USDA Forest Service, Northern Research Station, Forest Inventory and Analysis (FIA) program in St. Paul, Minnesota. She received her BS in Natural Resources and Environmental Studies from the University of Minnesota in 1998. Cassandra works on various aspects of the Forest Health Monitoring (P3) vegetation diversity and invasive species surveys, including data collection, conducting crew trainings, and performing quality assurance checks. She wrote a field guide to aid in identification of 43 invasive species FIA collects data for entitled, "A Guide to Nonnative Invasive Plants Inventoried in the North by Forest Inventory and Analysis".

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Graduate Student
Jake Osborne is a graduate student in the University of Minnesota's Conservation Biology program. He is interested in how management of exotic invasive species may be achieved through an integrated approach exploiting specific aspects of a target species' ecology. His current research efforts focus on the role of "nursery lakes" in determining carp population dynamics in interconnected lake systems and on how such systems might be sampled for recruitment most efficiently.

Osgood, Dick
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Osgood Consulting
Owner
Dick Osgood is educated as a scientist (MS Aquatic Ecology & Geology) and is a Certified Lake Manager (one of 60 in the world). Dick specializes in developing lake management plans, invasive species programs, diagnostic studies, modeling and alum dosing. Dick has authored numerous scientific journal papers, made hundreds of presentations at professional meetings, and frequently serves as an expert witness. Dick is Past-President of the North American Lake Management Society and Vice-President of Minnesota Waters. Dick was an invited delegate to the Symposium on the Ecological Basis for Lake and Reservoir Management at the University of Leicester, England (1996), has authored a chapter in the book 'Managing Lakes and Reservoirs', and Osgood Consulting was named the North American Lake Management Society's 'Outstanding Corporation' in 2005.

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Associate Research Specialist
Brendon Panke is a research specialist in the Renz lab at the University of Wisconsin – Madison. His role has focused on research and extension of information with respect to invasive terrestrial plants in Wisconsin. Research efforts have included evaluating the effectiveness of common control methods on many invasive species, such as garlic mustard and Canada thistle and what impacts control methods have on desirable plants. In addition, Brendon is also developing a number of invasive species educational materials including identification videos and control factsheets as well as conducting trainings to stakeholders on how to remain in compliance with the new invasive species rule implemented in Wisconsin last year.

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Ecologist
Dr. Noel B. Pavlovic is a research ecologist with the U.S. Geological Survey, stationed at the Lake Michigan Ecological Research Station in Porter, Indiana. He received his PhD in biological sciences from the University of Illinois at Chicago and a MSc. in ecology from the University of Tennessee. His dissertation focused on the biology and demography of fame flower (Phemeranthus rugospermum), a Midwestern endemic succulent plant. His research has focused on fire effects on the structure and he is currently investigating the potential for hybridization between the invasive Oriental bittersweet (Celastrus orbiculatus) and the native American bittersweet (C. scandens). Ongoing work examines the impact of fire on the invasion and spread of Oriental bittersweet and the distribution and abundance to exotic plants in three Great Lakes National Parks to better develop early detection programs.

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Student
Kristina Prescott is a graduate student in the Ecology, Evolution and Behavior department at the University of Minnesota. She is interested in the ecological effects of introduced species and in particular how interactions with introduced predators impact native predators. Kristina is currently focusing on interaction between the multicolored Asian lady beetle and the native twelve spotted lady beetle. She is also a trainee in a NSF graduate training program for risk assessment of introduced species and genotypes. Through this interdisciplinary program she has had the opportunity to consider social and economic perspectives on invasive species issues in addition to the biological.

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Water Resources Specialist
Scott Provost has been with the Wisconsin DNR for the last 10+ years and as a water quality specialist in the private sector prior to that. Scott's experience and interests are water quality and aquatic habitat improvement and AIS management. Of particular interest, he is using water level management as a tool to enhance aquatic habitat and manage AIS simultaneously, using a holistic approach.

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Graduate Student
Gina Quiram is a PhD candidate at the University of Minnesota in the department of Ecology Evolution and Behavior where she is advised by Drs. Ruth Shaw and Jeannine Cavender-Bares. She is also a trainee in the Invasive Species and Genotypes IGERT. Her research focuses on the ecological and evolutionary effects of invasive species management decisions. She is currently working on projects looking at the efficacy of Oak Wilt management programs in Minnesota as well as the evolutionary response of Purple Loosestrife to the introduction of biological control agents. Prior to starting at the University of Minnesota, Gina worked for Citizens for a Healthy Bay restoring salt marsh systems in the Puget Sound. Outside of research she is very interested in scientific education and outreach activates.

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Associate Researcher, Director
Euan Reavie received a PhD from Queen's University, Department of Biology Post-doc, University of Toronto, Department of Geology Research focuses on algal indicators of human impacts, with particular applications to cultural eutrophication, hydrologic manipulation, invasive species, climate change and paleoecological concerns. A recent focus has been the development and application of methods to assess the effectiveness of ballast water treatment technologies on the control of algae and other microscopic organisms.

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Aquatic Invasive Species Prevention Coordinator
Jay Rendall is currently the Aquatic Invasive Species Prevention Coordinator for the Minnesota Department of Natural Resources. He was the Invasive Species Program Coordinator from 1991 to 2007. His responsibilities include state invasive species policy, public awareness, prevention grants, and coordination with regional and national invasive species activities. He has been a member of several state, regional, and national committees related to invasive species including chairing the Minnesota Interagency Exotic Species Task Force and both the Great Lakes and Mississippi River Basin panels on aquatic nuisance species. He is currently the co-chair of the Minnesota Invasive Species Advisory Council. Before moving to Minnesota, he was a resident of Madison, Wisconsin and a graduate of the University of Wisconsin.

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PhD Candidate
Michael Rentz is a PhD Candidate in Conservation Biology at the University of Minnesota nearing completion. A life-long Minnesotan he has lived throughout the state but is now thrilled to call Duluth home and the North Shore and Superior National Forest his backyard. In his off time he enjoys exploring this backyard with his wife, huge dog, and 3 incredible junior scientists. The work he will be presenting is part of his dissertation research on the ecological effects of woody biomass harvest.

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Extension Weed Scientist
Mark Renz received both his BS in Botany and his PhD in Plant Biology and Weed Science from the University of California, Davis. He has held several positions in research and extension, and currently is an Extension Weed Scientist at the University of Wisconsin, Madison. His current program is conducting extension and research in the management of weeds in perennial cropping systems and natural areas. His specific areas of interest include the biology, ecology and management of perennial weeds; integrating invasive weed management and restoration/revegetation methods; and root biology of perennial weed species. Mark is currently the President of the Midwest Invasive Plant Network (MIPN).

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Invasive Species Coordinator
Ted Ritter has been employed by 3M in St. Paul, Minnesota for 14 years. He moved to St. Germain, WI in 1986. He has been the owner/operator of a Vilas County lakeside family resort for 24 years and commissioner on little St. Germain Lake Protection & Rehabilitation District for 23 years. Ted has been involved in management of two invasive aquatic plant species on Little St. Germain Lake. He served as St. Germain Town supervisor for 4 years and created Vilas County's first Town Lakes Committee. In 2005 he was employed by Vilas County as Wisconsin's first full time, state funded, Aquatic Invasive Species County Coordinator. He is presently employed on a full time basis as Vilas County Invasive Species Coordinator challenged with county-wide coordination of both aquatic and terrestrial species.

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Aquatic Ecologist
John Rothlisberger is an aquatic ecologist with the Eastern Region of the USDA Forest Service, based in Milwaukee, WI. Rothlisberger received a PhD in ecology from the University of Notre Dame in 2009. His research focused on strategies and tactics for slowing the human-mediated dispersal of aquatic invasive species (AIS), as well as assessing the broad-scale impacts of AIS in the Great Lakes. Rothlisberger spent the past summer on the Ottawa National Forest in Michigan's western Upper Peninsula. While there, he worked to implement a recreational boat inspection and cleaning program on and around the forest. John has a Masters in stream ecology from Utah State University and a degree in Conservation Biology from Brigham Young University.

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Forest Pathologist
Kyoko Scanlon is a forest pathologist with the Wisconsin DNR. She is stationed in Fitchburg. Kyoko works on a variety of forest pest problems, specifically forest disease issues that affect the health of forests in Wisconsin. Before she started with her current position in 2003, she worked as a DNR forest pest specialist in Rhinelander for 6 years. She has a Master's degree in Forestry with an emphasis on Forest pathology from the University of Minnesota.

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Team Leader- Watershed Management
Carroll Schaal is the Lakes Team Leader for the Wisconsin Department of Natural Resources, in Madison, where he has worked in a similar capacity for 16 years. For six years prior, he was a natural resources planner in Lake County, IL specializing in storm water and watershed management. He has a Masters in Community and Regional Planning with a minor in Water Resources from Iowa State University and a BA in Environmental Biology from Luther College. He lives in Mt. Horeb and is active with the Blue Mounds Area Project, a local non-profit conservation organization.

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Eric Schlender is a wildlife biologist and expert in wildlife habitat management including prairie restoration, prescribed burning, food plot management, invasive/exotic species control, wetland restoration, and storm water management. Eric is also well versed in writing and executing land management plans, writing permits and is a certified burn boss. His ten years of environmental experience and diverse background in land management makes him one of EC3's more versatile assets. Throughout his tenure, Eric has been studying all phases of wildlife biology and habitat management through the University of Wisconsin Stevens Point. Aside from his formal education, Eric has gained most of his practical knowledge through field experience. Eric is currently a managing partner of EC3 and the Director of Land Management for EC3's Private Sector. Eric's efforts are focused on habitat and wildlife management. Eric obtained a B.S. in Wildlife Biology from the University of Wisconsin.

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Laboratory Coordinator
Tina Seeland is currently the laboratory coordinator for the Plant Protection Division of the Minnesota Department of Agriculture. She is also the program manager for the agricultural pest surveys and the cereal cyst nematode field survey.

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PhD Candidate
Leah Sharpe received her BA from Williams College and an MS from the University of Minnesota, working on cyprinids responses to bile acids. She is completing a dissertation focused on environmental risk assessment and decision support regarding control and management of aquatic invasive species. She is currently a National Science Foundation Trainee in an Integrative Graduate Education and Research Traineeship program focusing on Risk Analysis for Introduced Species and Genotypes.

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Vegetation Specialist/Landscape Ecologist
Dan Shaw is a Vegetation Specialist and Landscape Ecologist with the Minnesota Board of Water and Soil Resources. His work focuses on conservation, restoration and invasive species control programs. He administers two grant programs, the Native Buffer Cost-share Program and the Cooperative Weed Management Area program. He is author and illustrator of several publications including, " Plants for Stormwater Design" and, "Native Vegetation in Restored and Created Wetlands". He is also an Adjunct Assistant Professor at the University of Minnesota where he teaches a class on Minnesota Flora.

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Graduate Student
Justin Silbenagel is currently a second year Master's student studying Conservation Biology at the University of Minnesota. His research is focused on exploring the effects of predation on the early life history stages of common carp. Justin graduated from Oregon State University in 2008 with an Honors Bachelor of Science in Biology and a specialization in Marine Biology. He has been involved in research projects studying community ecology in the rocky intertidal zone of Oregon, foraging and migratory behavior of salmonids in high gradient streams of the Cascade Mountain Range, habitat preference of shortnose sturgeon in coastal rivers of Georgia, and predator-prey interactions between great white sharks and cape fur seals in South Africa. He is interested in the ecology of fishes, especially predator-prey interactions and their effects on populations.

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Supervisor
Luke Skinner is the supervisor of the Minnesota Department of Natural Resources Invasive Species Unit, Division of Ecological and Water Resources. For nearly two decades, he has worked on the prevention and management of invasive species including purple loosestrife, Eurasian watermilfoil, zebra mussels, buckthorn, garlic mustard, and others.

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US Army Engineer Research and Development Center
Research Physical Scientist
John Skogerboe has been employed at the US Army Engineer Research and Development Center for 33 years as a member of the Chemical Control Technology Team. He is stationed at the Eau Galle Aquatic Ecology Laboratory, Spring Valley, WI, where he conducts research into aquatic plant management using herbicides to selectively control invasive exotic plants.

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Dow AgroSciences
Field Research Scientist
Byron Sleugh has been a Field Research Scientist for Dow AgroSciences Range/Pasture and Vegetation Management group since 2006. Byron has a BS in Agronomy and Environmental Science from Delaware Valley College in Pennsylvania and MS and PhD degrees in Crop Production and Physiology from Iowa State University. Prior to joining Dow AgroSciences, Byron was an Associate Professor of Agriculture at Western Kentucky University in Bowling Green, KY. Byron is currently engaged in field research related to new product development, support of current products, and serves as technical support for sales representatives, customers, and the public in Iowa, Nebraska, Missouri, Wisconsin, and Illinois. One of the major focuses of Byron's work is noxious and invasive weed management in natural areas, rangeland and pastures, and other non-crop areas.

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Ph D Student
David J. Smith is a Ph.D. student in the Applied Economics Department at the University of Minnesota, Twin Cities. He received a BA in Environmental Studies and Political Science with a concentration in environmental policy from the University of Minnesota, Duluth. His current research focuses on natural resources and environmental economics. He has worked on projects ranging from economic impact of oak wilt in Minnesota to bioenergy production in sustainable agriculture. He is a research assistant with the Center for Integrated Natural Resources and Agricultural Management and astudent fellow with the National Science Foundation (NSF) funded Integrative Graduate Education and Research Traineeship (IGERT) program for Risk Analysis for Introduced Species and Genotypes.

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Kaveh Someah is the General Manager at Ovivo-USA, formerly known as Eimco Water Technologies, and responsible for all products related to water intake business within the power, Petrochemical, Industrial, Drainage, Flood Control, Irrigation, and similar markets. Kaveh is a Chemical Engineering graduate from University of Wisconsin-Madison. Kaveh has spend his last 30 years of career in water intake and issues related to Water and Wastewater treatment, water screening & Filtration, as well as environmental concern about the protection and deterrent of marine life within the water intake. Kaveh has been working closely over the last several years with US Federal and State Agencies, including USBR, USACOE, and CA Dept. of Water Resources in laboratory testing and full scale field demonstration of utilizing non physical barriers for the protection of endangered and deterrent of invasive fish species.

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Barb Spears is the Woody Biomass Project Coordinator for the Minnesota Department of Natural Resources, Division of Ecological and Water Resources. Barb developed a pilot project to link ecological restoration to bio-energy that has since expanded to identify other potential local market opportunities to strategically utilize the ecologically inappropriate woody plant material. Barb holds a BS degree in Urban Forestry from the University of Minnesota and is a Certified Forester with the Society of American Foresters. She previously worked for Tree Trust, the Institute for Agriculture and Trade Policy, and the USDA Forest Service.

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Jennifer Statz earned a Bachelor of Science in Urban Forestry from the University of Wisconsin - Stevens Point. She worked as a municipal arborist for six years in the Chicago metro area. For the past two and 1/2 years she has worked for the Wisconsin Department of Agriculture, Trade and Consumer Protection as the Emerald Ash Borer Program Coordinator. Jennifer coordinates all aspects of EAB survey work and administers the budget for survey, regulatory and outreach operations. Jennifer is also part of the state's Emerald Ash Borer Operations Group and assists with statewide EAB response preparation, planning and implementation.

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Justin Sykora graduated from the University of Wisconsin at River Falls in 2003 with a degree in Conservation. He started with Prairie Restorations that summer working with the land management division. As the years passed, Justin became Land Management Coordinator for the Scandia office. Currently he oversees around 200 different projects form prairie to wetlands and woodlands.

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Jyneen Thatcher is a Natural Resource Specialist with the Washington Conservation District (WCD), in Stillwater, Minnesota. She has worked with the WCD for 15 years. Most of that time was dedicated to implementation of wetland regulatory programs, but she has found time to work directly with private landowners on land management projects. Jyneen has degrees in Landscape Architecture and Environmental Design from the University of Minnesota, with emphasis on the restoration and management of natural resources and native plant communities. She is a member of several professional and conservation organizations, and a frequent speaker at their meetings, and is the main author of the WCD Plant of the Week featured on their web-site (www.mnwcd.org).

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Amy Thorstenson graduated in Water Resources from UW-Stevens Point in 1997, and spent 4 years in the private sector before joining Golden Sands Resource Conservation & Development Council, Inc., a non-profit conservation organization in Stevens Point, WI. There, she is a Regional AIS Coordinator working with lake groups in four counties and has studied milfoil weevils since 2004. She is currently completing her graduate degree in Natural Resources at the UW-Stevens Point College of Natural Resources.

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Anett Trebitz is an aquatic ecologist with U.S. EPA's Mid-Continent Ecology Division in Duluth, Minnesota. Besides working on early detection strategies for invasive aquatic species, she works on the ecology of coastal wetlands and nearshore Great Lakes and their responses to eutrophication and other stressors.

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Scott Van Egeren currently works as a Natural Resource Scientist at the Wisconsin Department of Natural Resources coordinating aquatic invasive species monitoring throughout the state and studying aquatic plant communities. He holds a MS degree in Environmental Studies from UW-Madison where he studied the interactions between watershed land-use and zooplankton community structure. He has conducted limnological research on the interactions between humans, lakeshore development and riparian and littoral zone ecology as a research specialist for the UW-Madison Center for Limnology and undertaken a variety of limnological monitoring as both a Water Resources Management and Fisheries Management specialist for the Wisconsin Department of Natural Resources. He has over seven years of professional experience conducting water resource monitoring on a large number of lakes each year.

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Laura Van Riper is the terrestrial invasive species coordinator for the Ecological and Water Resources Division of the Minnesota Department of Natural Resources. Laura started at the DNR in March 2010. Previously, Laura earned a Ph.D. in ecology from the Uni-

versity of Minnesota. Her dissertation research focused on the effects of yellow sweetclover invasion at Badlands National Park, South Dakota and its impacts on soils and native and nonnative species. Recently, Laura spent 4 years working as a post-doctoral research associate at the U of MN studying garlic mustard invasion in Minnesota forests. Over her career, Laura has enjoyed working in prairies and forests of Minnesota, South Dakota, and North Dakota.

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Dr. Robert C Venette is a Research Biologist with the USDA Forest Service, Northern Research Station and Adjunct Associate Professor in the Department of Entomology, University of Minnesota. He specializes in the areas of invasion biology and pest risk assessment. His research primarily focuses on the development and application of methods to predict the potential geographic distribution and impact of non-native organisms that are not known to occur in the United States (yet) or are present but of limited distribution. Recent work has focused on emerald ash borer, goldspotted oak borer, Mediterranean pine engraver, light brown apple moth, reed canary grass, and the causal agent of sudden oak death. Dr. Venette also helped to pioneer the development of a graduate curriculum on risk analysis for introduced species and genotypes at the University of Minnesota. Dr. Venette received his PhD in 1997 in Ecology from the University of California, Davis.

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Bob Wakeman is the Aquatic Invasive Species Coordinator for the Wisconsin Department of Natural Resources. His earlier positions as a Water Resource Manager, Lake Management Specialists, and Aquatic Habitat Coordinator enable Bob to draw from a broad spectrum of experiences to guide the growth of this statewide program. Bob is a strong proponent of partnerships in managing environmental issues. Without assistance from the public, local governments, consultants and environmental organizations

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Becker County Agriculture Inspector
Marsha graduated from North Dakota State University with a degree in Vocational Agriculture Science Education and Horticulture. Marsha is enjoying the Becker County Agriculture Inspector position in northern Minnesota. This position has given Marsha the opportunity to write four grants for invasive plant management. These grants were received through Pulling Together Initiative Grant from the United States Fish and Wildlife Foundation 2006-2010 and Cooperative Weed Management Grant through Board of Water and Soil Resources 2008-2011. An invasive plant inventory and treatment program was developed. This program leads to establishing a gravel pit certification program and the start of an ATV and Snowmobile Trail program for Becker County. Marsha was also elected District 1 representative for County Agriculture Inspectors and currently serves on the MN County Agriculture Inspector Board.

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Jacqueline Welch studied Natural Resources at the University of Wisconsin-Stevens Point eventually graduating from Colorado State University in Microbiology. She worked at the Arboviral Diseases Branch at the Centers for Disease Control and Prevention in Ft. Collins, Colorado for 2 years. Jacqueline returned to the Midwest to raise 4 sons incorporating many activities associated with education, biology, and nature studies including homeschooling, volunteer work, and 2 years living off the grid in Northern Minnesota. She entered the graduate program in Water Resources Sciences at the University of Minnesota-Duluth with an opportunity to work on a Microbial Ecology project that utilizes a lifetime interest in Natural Resources, experience in Microbiology, and a new found interest in shipping related issues in the Great Lakes. Jacqueline taught Microbiology and General Biology as a Graduate Teaching Assistant and was honored with a GTA of the Year Award from the UMD-Biology Department.

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Mindy Wilkinson joined the Wisconsin Aquatic Invasive Species Team July 19, 2010 as an outreach specialist. She got started working on invasive species issues Honolulu in 1996 to when attending graduate school. After receiving her doctorate in Botany she worked from 2002 – 2010 for the Hawaii Department of Land and Natural Resources as the Invasive Species Coordinator and was the program manager for the Invasive Species Committees and staff to the Hawaii Invasive Species Council. In addition to program development in Hawaii and around the Pacific she spent a year with the National Invasive Species Council in Washington DC on a work detail to build communications between state invasive species councils and national invasive species programs.

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Brock Woods earned his M.S. in Botany-Plant Ecology from UW Madison. He Spent 12 years at UW-Madison's Arboretum working to remove invasive plants and restore native plant and animal communities. Brock has been with WDNR and UW-Madison Extension for the last 15 years, first researching the safety and efficacy of loosestrife biocontrol in Wisconsin, and then developing a state citizen-based biocontrol program. He is now concerned with preventing and/or curbing all invasive wetland plants in the state.

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Shauna Wuaghtel graduated with a B.S. in Biology from Northern State University in Aberdeen, South Dakota in 2006. In the summers of 2006 and 2007, she was employed at the Oura National Wildlife Refuge near Vernal, Utah, as a Biological Technician. She worked implementing existing IPM plans, invasive weed inventory, GPS/GIS location and percent coverage of weeds on the refuge, herbicide management, monitoring established plots, collection and release of tamarisk beetles, and attended the Tamarisk Symposium held by the Tamarisk Coalition in Grand Junction, CO. She began her graduate studies in Weed Science at South Dakota State University in the summer of 2009. She is currently conducting an experiment to evaluate the effects of fire, herbicide, and added nitrogen to restore pasturelands to native grass populations.

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Maureen Ziskovsky has worked with the invasive species program of the Minnesota DNR since 2007. During 2007-2008 she worked as a watercraft inspector in the East Metro and Minnetonka areas. In November 2008 she was hired as the Watercraft Inspection Program Assistant in St. Paul. Maureen graduated in 2007 from Century College with her associate's degree with a natural resource background and in 2008 with an associate's degree in Criminal Justice.

Appendix C

MNWISC
Minnesota-Wisconsin Invasive Species Conference
2010

Working Together to Control Invasive Species

Conference Abstracts

Crowne Plaza St. Paul Riverfront Hotel
St. Paul, Minnesota
November 8-10, 2010

Conference Abstract Book

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* Asterisk indicates presenting author(s).

Table of Contents

Monday November 8, 2010

Weed Laws and Policies: 1:20 pm - 2:35 pm

The Revised Minnesota Noxious Weed Law

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During the 2009 legislative session significant changes were made to the Minnesota Noxious Weed Law. Most of the changes consist of additions to existing statutes with a few revisions and one repeal (18.81 Subd. 1). The majority of changes occur in statutes 18.79 (Duties of the Commissioner), 18.80 (Inspectors), and 18.81 (Duties of Inspectors). Three new sections have also been added: 18.89 (Noxious Weed and Invasive Plant Species Assistance Account), 18.90 (Grant Program), and 18.91 (Advisory Committee; Membership). These new sections will dramatically change the way that noxious weeds are classified, listed, and enforced. The purpose of revising the law was to make the law more consistent with modern weed issues, to provide greater transparency in how decisions for listing species are made, to involve more stakeholders in the decision making process, and to be more consistent with procedures that have shown great success in western rangeland states.

Wisconsin's New Comprehensive Invasive Species Rule

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After five years and the active involvement of hundreds of people, Wisconsin now has a comprehensive invasive species classification rule. Plants, animals and pathogens – aquatic and terrestrial – are all covered in one rule, although there are parts of the rule that relate to only one group of organisms. This new rule uses science-based assessments to classify and regulate exotic invasive plants, animals, and disease-causing microorganisms, as well as the various pathways by which invasives can be transported across the landscape. In 2001 the state legislature authorized the development of an advisory Council and required DNR to create an invasive species classification rule. The Wisconsin Council on Invasive Species created several subcommittees to provide a wide range of input into the rule-making process. The Research Committee developed a science-based set of criteria upon which to assess each species for classification. The following criteria are used: 1) current status and distribution, 2) establishment potential and life history traits, 3) damage potential, 4) socio-economic effects , and 5) control and prevention potential. Species Assessment Groups, comprised of experts and stakeholders, were formed for each group of species to review the literature and recommend a legal classification for each species. Extensive public review of the rule allowed diverse stakeholders to provide valuable input and lent credibility to the process, leading to wide-ranging acceptance and support of the final rule. Due to the large number of species listed, the need for staff training and public outreach is extensive.

Minnesota's State Management Plan for Invasive Species

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Under the leadership of Minnesota Invasive Species Advisory Council (MISAC)—a diverse group with a common interest in battling invasive species in Minnesota—an ad hoc team developed a plan framework to address terrestrial and aquatic invasive species issues in the state. Minnesota Statutes require the Departments of Agriculture and to establish statewide coordinating programs for invasive species. The statutes also require them to prepare this statewide invasive species management plan to coordinate the aspects of invasive species activities in Minnesota. This plan is intended to cover the full range of species: aquatic animals, aquatic plants, terrestrial animals, terrestrial plants, and pathogens. This plan is intended to address invasive species issues in the entire state of Minnesota. The primary purpose of this plan and its addendums is to provide a framework to coordinate and guide efforts to prevent the introduction, to reduce the spread, and to promote appropriate management of invasive species populations within the State of Minnesota by state, federal, tribal, and local governments, as well as the private sector. The benefit of implementing a state plan will be: "Minimizing the negative impacts caused by invasive species to native plants and animals, natural ecosystems, recreation, tourism, agriculture, businesses, and human health in Minnesota". Many other invasive species plans exist or are being developed at the national, regional, state, and local levels. This plan is intended to work along with those plans and not replace them.

Biology and Impacts of Invasive Species: 1:20 pm- 2:35 pm

Principles of Invasion Biology and Their Role in Invasive Species Management

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Invasion biology is the study of species that occur outside their native range and has the goal of providing more information about the fundamental ecological processes that all invasions have in common. Understanding these processes is critical for effective, long-term invasive species management. In general, invasion biology research has focused on processes that affect the entry, establishment, spread, and/or impacts from non-native species. Yet, the discipline of invasion biology is only 50 years old. Some early insights continue to be reaffirmed as new invasions occur, yet other firmly-held notions about invasion processes are coming into question. This talk will briefly review some of the common principles that have emerged from invasion biology and how this information can improves invasive species management strategies.

Invasive Earthworm Impacts on Ground-Nesting Songbirds in Northern Hardwood Forests

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European earthworms (Family: Lumbricidae) have invaded previously earthworm-free hardwood forests of the northern Midwest, dramatically altering soil composition, the forest floor litter layer, vegetation cover, and ground-layer plant diversity. Whether these primarily human-assisted invasions impact the songbirds using forested habitats remains unknown. Earthworm-mediated changes to understory plant cover may increase susceptibility of ground nests to predation while reduction of invertebrate abundance may cause food shortages for ground-foragers. We conducted avian point count surveys and nest searching/monitoring at study sites representing both invaded stands and earthworm-free wilderness areas in the Chequamegon-Nicolet National Forest, Wisconsin. Sites were similar with regard to soil type, dominant tree species, age, and land use history. Results indicate that Ovenbirds (*Seiurus aurocapillus*) and Hermit Thrushes (*Catharus guttatus*), two common, but declining, ground-nesting species in the region, may indeed be negatively impacted by earthworm invasions. Densities of these species were significantly lower in invaded forests compared to earthworm-free stands during both 2008 and 2009. Nest survival models provide strong evidence that 2009 Ovenbird nest survival rates were inversely-related to the mass of one particularly damaging species, the Red Worm (*Lumbricus rubellus*). Ongoing research will clarify the mechanisms for this apparent impact of earthworms to nest survival and whether earthworm invasions pose a significant regional threat to the conservation of ground-nesting and ground-foraging forest songbirds.

Garlic Mustard (*Alliaria petiolata*) Invasion & Impacts: Implications for Management & Restoration

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To determine whether the invasive herb garlic mustard (*Alliaria petiolata*) is driving or responding to declines in native species, I am investigating the effects of garlic mustard and its removal on native herbs, and the effects of native herbs on garlic mustard invasion in oak woodlands (Minnesota). To test garlic mustard's impact on herbs, I planted native species into invaded and non-invaded plots in which existing vegetation was either removed or left intact. Plant growth was measured over two years and analyzed with repeated measures ANCOVA using light level as a covariate. Native plant size did not differ significantly across invasion or removal treatments, suggesting that garlic mustard may not have a strong impact on herb growth. To determine if native plants affect garlic mustard's invasibility, I planted garlic mustard seeds into field plots ranging in native richness and cover and measured establishment, survival, biomass and silique production, as well as environmental variables. Analyses with regression and structural equation models suggest that native plant cover and understory light levels have a significant negative effect on garlic mustard invasion. While species

richness had little direct effect on garlic mustard, it does significantly affect native cover and thus has an indirect negative effect on garlic mustard invasion. If garlic mustard is not causing native herb decline, control efforts may not be sufficient to restore native diversity. However, restoring native herb communities may help decrease the vulnerability of woodlands to garlic mustard invasion.

Interrupting Pathways: 1:20 pm - 2:35 pm

Using Technology to Prevent Invasive Species Introduction at Boat Accesses

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Over 1000 lakes in Minnesota have been invaded by some form of Aquatic Invasive Species (AIS). Negative ecological impacts are quickly followed by adverse effects on recreation and property values. The cost of AIS management in a contaminated lake is significant. In 2008 The Gull Chain Of Lakes Association installed automated boat inspection cameras at the three busiest launch sites on Gull Lake. The Internet Landing Installed Devices (I-LIDS) are activated by motion detectors to take short video clips of boats and trailers as they enter the water. Boat numbers and any hanging aquatic vegetation are recorded. The devices work during all daylight hours. The clips are transmitted wirelessly to the device's manufacturer and placed on the company web site for subsequent review. This project complemented a program employing DNR trained interns to provide personal inspection efforts. Participation in this project was supported by the Lake Association, county enforcement and the DNR. Although the technology can be used for enforcement, educational advantages are thought to be much more important. Significant improvements in boater clean-off behavior have been documented. Local newspapers covered the AIS issues extensively. After two years of service, the feedback on the program from boaters has been 100% positive.

Effects of Fishing Tournaments in Minnesota's Laurentian Region

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Fishing tournaments have the possibility to increase the spread of invasive earthworms in Minnesota's Laurentian region. Minnesota has over 350 fishing tournaments within the region. With high concentration of anglers in one area, there is potential for increased impact in regions where tournaments are held. Addressing the issue of potential introduction of earthworms through tournaments will allow development of prevention projects to arise, and also increase public awareness on the invasive earthworm issues. An interview study was conducted to understand tournament angler behavior that included a set of 10 to 12 questions focused on tournament angler's behavior and disposal practices of unused bait. The time frame was based on the summer months and walleye fishing tournaments. Walleye fishing was targeted because it is the most heavily targeted fish in Minnesota, and also earthworms are the preferred bait in the warm summer months. Early results show there is little evidence that tournament anglers are more likely to spread earthworms more than the average angler. The tournaments do not provide bait to their participants, and anglers are likely to keep their unused bait because of cost. Because of the large concentration of anglers, intense focus on fishing and the gathering of anglers at registration and weighing stations, tournaments would provide an opportunity for presenting educational material.

Invasive Aquatic Species on Our Door Step: The Need For Vigilant Neighbors

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Invasive species can alter ecological relationships among native species and can affect ecosystem function and structure as well as the economic value of ecosystems. The state of Wisconsin has recently implemented a statewide program to identify, classify and control its non-native invaders. Chapter NR 40, Wisconsin's Invasive Species Identification, Classification and Control Rule helps citizens learn to identify and minimize the spread of non-native plants, animals and diseases that can invade our lands and waters and cause significant damage. Educating citizens about the invasive species already established in the state is important for stopping the spread of these species, however, being able to identify what species are the next major invaders is crucial for rapid response and to ultimately prevent the establishment of new invaders. Four prohibited aquatic plant species have recently been located

in Wisconsin's waters: Yellow floating heart (*Nymphoides peltata*), Brittle naiad (*Najas minor*), Hydrilla (*Hydrilla verticillata*), and Brazilian waterweed (*Egeria densa*). Species identification, as well as the response and results of each case will be discussed. These case studies set the stage for future response efforts as invasions begin to occur in currently unmonitored waters such as backyard ponds and water gardens which provide pathways for invasive species to enter our lakes and rivers.

Biology of Invasive Submersed Plants: 1:20 pm - 2:35 pm

Seasonal Water Quality Patterns in Curly-Leaf Pondweed Plots

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Curly Leaf Pondweed (CLP) life cycle is unusual in that it reaches peak biomass and senesces in early summer. In eutrophic north-temperate lakes, dieback of CLP is often followed by nuisance algal blooms, suggesting a linkage between breakdown of CLP tissue phosphorus and uptake by algae. However, similar patterns can occur in lakes that have no CLP, suggesting that other factors may be important in summer algal dynamics. This research examined phosphorus dynamics and algal response in CLP plots during a period of senescence in order to provide more insight into possible roles that CLP beds play in water quality.

Invasion Trajectories and Population Trends of Eurasian Watermilfoil (*Myriophyllum spicatum*) in Wisconsin

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Populations of Eurasian watermilfoil (EWM) have been reported in 539 Wisconsin lakes and rivers since the 1960s, and we have surveyed about a quarter of the known populations. In lakes surveyed, time since discovery of EWM explains only a small proportion of the observed variation in frequency of occurrence. This implies the existence of different invasion trajectories. Accordingly, we report lakes in which milfoil rapidly achieves dominance as well as lakes that have maintained low levels of the plant over a long period of time. Related population trends and observations will be discussed, and patterns in statewide distribution of EWM and native plant species will also be presented.

Control of Dormancy in Curly-leaf Pondweed (*Potamogeton crispus L.*) Turions

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Vegetative buds (turions) of Curly-leaf Pondweed (*Potamogeton crispus*) are the major source of propagation for this aquatic invasive. We are investigating the sprouting of turions as a control measure. From lab experiments we conclude that turions undergo two stages of dormancy. Current season turions collected in the spring were found to be photosynthetically active and accumulated starch over a 6 week period. They are in a quiescent state and presumably go into deep dormancy later in summer. In contrast, turions that have overwintered are not photosynthetically active, have stable starch levels and are in deep dormancy. Approximately 60% of Current Season turions and Overwintered turions sprout under autumn light conditions (10:14- light hrs: dark hrs). We conclude that all turions reach deep dormancy by the end of the summer. Dormancy in flowering plants is under hormonal control; we assume that abscisic acid (ABA) maintains dormancy in vegetative buds. We find that dormant turions will sprout at an increased rate compared to controls when treated with gibberellic acid, an ABA antagonist, and fluridone, an ABA synthesis inhibitor. We propose treatment to break dormancy of turions in autumn will be effective in preventing turion carry over to the next season.

Management of Invasive Aquatic Plants 1: 1:20 pm - 2:35 pm

Determining Treatment Areas for Curlyleaf Pondweed and Eurasian Watermilfoil

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If a partial treatment for non-native aquatic plants is being considered for a lake, then what are the most efficient techniques to delineate areas to control in a given season? The areas heavy growth should be the highest priority areas to control. Several assessment techniques can be used including early season scouting, use of plant growth histories, and conducting lake sediment surveys. Pre-treatment surveys are essential, but can be supplemented with using plant growth histories and sediment surveys. After an initial grow-out phase (6-8 years) non-native aquatic plant communities become relatively stable. A record of areas of light, moderate, or heavy growth from previous surveys helps zero in with the pretreatment survey to delineate control areas. Eight lakes with annual surveys conducted for ten years illustrate the stability of plant communities with seasonal variations. A third technique is the use of lake sediment surveys to determine what parts of a lake are conducive to light or heavy growth of curlyleaf (*Potamogeton crispus*) or milfoil (*Myriophyllum spicatum*). For example, a high sediment pH and low iron concentrations are correlated with heavy growth of curlyleaf pondweed. Whereas a high nitrogen and low organic matter content are correlated with heavy growth of Eurasian watermilfoil. These correlations were found for over 50 lakes that were tested. When all three techniques are available, delineations have resulted in partial lake treatments that effectively controlled the heavy growth of curlyleaf and/or milfoil.

Past, Present, and Future Efforts to Manage Flowering Rush (*Butomus umbellatus*) in Minnesota

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Flowering Rush is a perennial aquatic plant native to Europe and Asia that was sold for many years as an ornamental garden plant in North America. Its introduction to lakes and rivers was likely through humans planting them in the lake bed. Flowering rush is found in a number of locations across Minnesota but is causing problems for some lakes and rivers more than others. These plants can grow into dense stands and interfere with swimming, boating, and other activities on the water. Recently, efforts have been initiated to try and better understand this invasive aquatic plant to try and develop a strategy and method to better manage it.

Purple Loosestrife (*Lythrum salicaria*) Management in Minnesota

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Purple Loosestrife (*Lythrum salicaria*) is an invasive wetland plant growing in over 2000 sites in Minnesota that displaces native plants and causes ecological damage. A Purple Loosestrife Management Program was established in the Minnesota Department of Natural Resources in 1987. Management of Purple Loosestrife was initially accomplished through extensive application of herbicide. Expense and concern over large-scale herbicide use drove research toward and implementation of a biocontrol program utilizing insects. Research determined a weevil and two beetles were effective at controlling Purple Loosestrife in its native range but did not harm native plants or cause unexpected ecological problems in Minnesota. Since the inception of the biocontrol program in 1992 millions of beetles have been released throughout Minnesota. Biocontrol is now the primary method used to manage Purple Loosestrife in Minnesota although small-scale herbicide application is still used on new, small populations.

Terrestrial Invasive Plant Management-Early Detection & Rapid Response: 1:20 pm - 2:35 pm

Identification and Management of Weedy Umbels

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White umbelliferous plant species have been invading various habitats in Wisconsin ranging from dry prairies and roadsides to riparian corridors for several years and still they are hard to distinguish from one another. During this talk we will compare similarities and differences between these species and why they are a threat to the native biodiversity of the state. Species included will be: Giant hogweed (*Heracleum mantegazzianum*), Japanese and spreading hedge-parsley (*Torilis japonica; T. arvensis*), Queen Anne's lace (*Daucus carota*), poison hemlock (*Conium maculatum*), wild chervil (*Anthriscus sylvestris*), and burnett-saxifrage (*Pimpinella saxifrage*).

Narrowleaf Bittercress (*Cardamine impatiens*) – A Newly Recognized Invasive Plant in Minnesota

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Narrowleaf Bittercress is a recent discovery in Minnesota. It is an incredibly aggressive shade loving plant first observed in 2008 in a confined patch near the Mississippi River in the City of St. Paul Park. Because of its unusual and sudden appearance it was identified and determined as an invasive plant but one not yet documented in Minnesota. A USDA map in 2008 showed its range from the eastern seaboard; west to Michigan; south to North Carolina and north to Ontario. Since the initial discovery in 2008, it has spread in patches to over two acres of the park. Shortly after identification, action was taken to combat the spread of the plant. Massive hand-pulling efforts and herbicide treatments have been applied to control the infestation. A 1.5 percent mixture of Triclopyr (Garion 3) was used in late fall and early spring. The herbicide mixture worked on some of the plants, but only burned the leaves on others not killing the roots. This fall other herbicides and herbicide mixtures will be tested to find an appropriate solution. Though this plant has been well documented in the eastern U.S., a thorough defense against its spread has not been prepared, studied, or enacted. Being that its discovery in Minnesota was within a managed woodland, great care and concern is being used to discourage its spread within the natural area. Organizations such as the Minnesota Department of Natural Resources, Minnesota Department of Agriculture and the National Park Service have been notified of this new invasive plant.

Japanese Stiltgrass Ecology and Management: A Report from the Stiltgrass Summit

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Japanese stiltgrass (*Microstegium vimineum*), a new invasive species in the Midwest, is rapidly invading forests in Indiana, Illinois, Missouri, and Ohio. Its rate of spread and formation of monocultures in forest understories are of great concern to natural resource professionals. In August 2010, the River to River Cooperative Weed Management Area convened a Stiltgrass Summit to share the latest information on the ecology, spread, and management of Japanese stiltgrass. The Summit brought in 91 participants from 12 states. This talk will summarize the information provided at the Summit, including its current distribution and means of spread, habitat characteristics of areas most likely to be invaded by Japanese stiltgrass, community and ecosystem impacts of stiltgrass invasion, and methods for stiltgrass prevention and control.

Best Management Practices: 3:05 pm - 4:20 pm

Best Management Practices for Terrestrial Invasive Species

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Advisory committees of stakeholders and partners, with assistance from the US Forest Service, developed four tracks of Best Management Practices to limit the introduction and spread of terrestrial invasive plants: Forestry, Recreational Users, Urban Forestry, and Utility and Transportation Corridors. The overarching goal was to develop simple voluntary guidelines to limit the introduction and spread of invasive plants, insects, and disease. I will describe how the process started, the funding sources, how we got concurrence from partners, how you can integrate the DMPs according to your needs and the education efforts taking place.

Rights-of-ways and Invasive Species Best Management Practices

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Tim Ramburg*, St. Croix County, Wisconsin
Crystal Koles*, American Transmission Company
Tina Markeson*, Minnesota Department of Transportation

An advisory committee made up of utility and highway stakeholders developed Invasive Species Best Management Practices to limit the introduction and spread of terrestrial invasive plants in Utility and Transportation Corridors. The overarching goal was to develop simple voluntary guidelines to limit the introduction and spread of invasive plants, insects and disease. A panel consisting of highway and utility representatives will briefly describe the development process; implementation challenges; training efforts; and pilot projects. Plenty of time for interaction will be allowed

Outreach and Prevention 1: 3:05 pm - 4:20 pm

Prevention Through Policy and Partnership

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Prevention of invasive species' movement and introduction continues to fail. What have government agencies missed? This author contends that agencies lack authorities and appropriations to make prevention complete. What can we do? A basic piece of the puzzle is "awareness". Only if the public understands this issue will agencies get public the regulation/policy and funding needed to make prevention happen. We have pieced together partnerships across the nation to accomplish success and cooperation. More is needed to overcome current obstacles. The author will suggest answers through examples based on thirty years of experience with the issue of invasive species in the public and private sectors.

Outreach Efforts Around Recreational Pathways for Terrestrial Invasive Species

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As part of a US Forest Service grant two studies were implemented to describe current behaviors, attitudes and knowledge of terrestrial invasive species among Minnesota recreationists. The first was a series of nine focus groups targeting three specific

user groups in three different geographical regions. These were motorized trail users, non-motorized trail users and campers. Participation was excellent (nearly 100% attendence) and the responses were enlightening. Then a phone survey was carried out with two purposes, 1) to verify and quantify the responses we got in our focus group study and 2) provide baseline understanding with which we can measure and monitor future outreach campaigns. The results of both studies will be presented and discussed here. The results mirror much of the data collected in the context of the Stop Aquatic Hitchhikers program. As a result, the core team of cooperators working on the project have decided to use that program as a model in future branding and outreach efforts.

Gravel Pit Certification, ATV and Snowmobile Trail Invasive Plant Management

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Hear what Becker Soil & Water Conservation District is doing to battle invasive plants in their county! The Gravel Pit Certification Program was developed in 2008 through the Pulling Together Initiative (PTI) Grant to prevent the five invasive plants chosen by the PTI Committee from being spread throughout Becker County. The Gravel Pit Certification program was implemented in 2009. December of 2009, the PTI Committee chose to add the ATV and Snowmobile Trail Management Program that is being developed in 2010. The invasive plants on Becker County's management list are: Leafy Spurge (*Euphorbia esula*), Crown Vetch (*Coronilla varia*), Spotted Knapweed (*Centaures stoebe* spp *micranthos*), Common Tansy (*Tanacetum vulgare*), Wild Parsnip (*Pasinaca sativa*).

Interrupting the Boating Pathway: 3:05 pm - 4:20 pm

Invasive Species Prevention through Watercraft Inspection

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Heidi Wolf, Minnesota Department of Natural Resources

This presentation will cover the Minnesota Department of Natural Resources watercraft inspection program as an important tool in the effort to prevent the spread of aquatic invasive species. We will discuss the goals and approach of the program, history and evolution of the program, in response to the changes in invasive species populations and public perception, as well summarize inspection results. We will also discuss collaborative efforts with lake associations and local units of government through grants, contracts and training volunteers will be shared.

Launching Clean Boats and New Career Opportunities

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In the summer of 2009, a portion of the American Recovery and Reinvestment Act (ARRA) funding initiative was appropriated to give young adults ages 18-24 years job experience and to develop skills that would increase their value in the job market. Wisconsin Governor Doyle provided $88,000 of discretionary ARRA Workforce Investment Act funding to the Wisconsin Department of Natural Resources (WDNR) to hire youths as watercraft inspectors in the Clean Boats Clean Waters program. In the process of educating boaters on the St. Croix and Mississippi Rivers regarding responsible boating practices to avoid the spread of aquatic invasive species, these young adults learned basic job skills, public outreach skills, accumulated and reported important scientific data, and gained experience working with multiple agency partners. To encourage local involvement and ensure the safety of the youths when the supervisor was not available, the WDNR water guards, the National Park Service Law Enforcement Division, and local police departments and business owners in the communities of Pepin, Prescott and Hudson, WI were solicited and agreed to be available in the event of any emergency. This 2009 initiative was so successful that the program was re-funded in the summer of 2010 by the Wisconsin Department of Workforce Development even though the Stimulus funds were not renewed.

Cleaning of Recreational Boats to Slow the Spread of Aquatic Invasive Species

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Trailered boats have been implicated in the spread of aquatic invasive species. There has been, however, little empirical research on the type and quantity of aquatic invasive species being transported, nor on the efficacy of management interventions (e.g., inspection crews, boat washing). In a study of small-craft boats and trailers, we collected numerous aquatic and terrestrial organisms, including some species that are morphologically similar to known aquatic invasive species. Additionally, a mail survey of registered boaters (n=944, 11% response rate) and an in-person survey of boaters in the field (n=459, 90% response rate) both indicated that more than two-thirds of boaters do not always take steps to clean their boats. Furthermore, we used a controlled experiment to learn that visual inspection and hand removal can reduce the amount of macrophytes on boats by 88%±5% (mean±SE), with high-pressure washing equally as effective (83%±4%) and low-pressure washing less so (62%±3% removal rate). For removing small-bodied organisms, high-pressure washing was most effective with a 91%±2% removal rate; low-pressure washing and hand removal were less effective (74%±6% and 65%±4% removal rates, respectively). This research supports the widespread belief that trailered boats are an important vector in the spread of aquatic invasive species, and suggests that many boaters have not yet adopted consistent and effective boat cleaning habits. Therefore, additional management efforts may be appropriate. In this regard, the Ottawa National Forest, with funding from the Great Lakes Restoration Initiative, conducted a demonstration project this summer to enhance boat inspection and cleaning activities.

Biology of Invasive Emergent Plants: 3:05 pm - 4:20 pm

Possible Negative Impacts of Hybrid Cattail on Wetlands in South Central Minnesota

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The author has monitored the same wetlands in Minnesota for the past 37 years. Significant changes have occurred in the diversity and function of these wetlands as broad-leaved cattail (*Typha latifolia*) has been replaced by narrow-leaved (*t. angustifolia*)/hybrid (*T. glauca*) cattails. (Narrow-leaved and hybrid cattails are both included under the name of hybrid cattail in this presentation.) While there may be numerous causes for this transition, nutrient enrichment is suspected to be one of the most significant factors. Hybrid cattail permanently occupies the zone of normal water level fluctuation, which greatly reduces the abundance of annual moist soil plants, eliminates an important food source for wildlife and retards the rapid natural decomposition cycle that supports an abundance of invertebrates in the spring. Muskrat populations have declined, and their ability to influence wetlands by removing emergent vegetation has been diminished. It appears muskrats don't consume hybrid cattail. Utilization by amphibians has decreased in wetlands infested with hybrid cattail. Plant diversity has been reduced. Even other invasive species like purple loosestrife may not be able to compete against this invasive. This presentation is intended to serve as an alarm call. The impact of hybrid cattail has not been studied adequately, and the impacts it is having on wetlands are not fully appreciated. More research is needed to assess the impacts of hybrid cattail, and wetland management practices need to be modified in infested wetlands to maintain diversity and function.

Ecological and Genetic Variation of Purple Loosestrife Following Introduction of Biocontrol Agents

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Purple loosestrife (*Lythrum salicaria*) is an invasive wetland plant introduced to the U.S. in the early 1800's. Today it is classified as a prohibited noxious weed in Minnesota. In 1992 a classical biocontrol program was launched introducing leaf feeding beetles from Germany to manage invasive populations and as a result of this program, two species have established in Minnesota. Variable

success has been achieved in wetlands throughout the state with some populations routinely subject to 90-100% defoliation of purple loosestrife and others with little to no observed effect of the biocontrol agents. In this study vegetation dynamics in invaded Minnesota wetlands were tracked for two years. Three sites were examined that consistently experienced historically high levels of herbivory as well as three sites experiencing historically low levels of herbivory by the biological control agents. Purple loosestrife was taller, accumulated greater biomass and compromised a greater proportion of the total vegetation in sites with historically low levels of herbivory. Herbivore damage increased throughout the growing season and a corresponding decline in plant health was observed. Seeds from these wetlands were then grown in experimental gardens to determine if the populations were genetically differentiated in vigor, competitive performance and herbivore defense traits. Contrary to the patterns observed in the field, purple loosestrife from sites with historically high levels of herbivory accumulated greater biomass and produced more inflorescence biomass. Future work will quantify the heritability of this variation to model the future evolutionary trajectory of these traits with continued biological control.

Exploring Molecular Determinants of Invasion in Purple Loosestrife (*Lythrum salicaria*) using Metabolomics

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Adrian Hegeman and Gina Quiram, University of Minnesota

Some benign environment hypotheses credit purple loosestrife's colonization of US wetlands to favorable environmental conditions, but common garden experiments in which American and European genotypes were grown in identical conditions indicate an evolutionary divergence between US and European populations. Competing theories ascribe invasive characteristics in US populations to (1) resource reallocation from secondary metabolism to anabolic processes, increasing the plants' growth and reproductive capabilities; (2) production of novel secondary metabolites that inhibit biological competition; (3) introgressive hybridization with native, related taxa; or some combination of the three. We describe the combination of spectrometric and statistical tools in a novel application: the search for biochemical determinants of invasiveness. We used liquid chromatography/ mass spectrometry (LC-MS) techniques to obtain metabolic profiles of plants originating from the US and Europe, which were grown in a common garden. Multivariate data analysis (MDA) was used to identify metabolic contributors to variation between US and European populations. Our analysis indicates a greater metabolite diversity in European plants compared to their US conspecifics, which we argue is the result of selective pressures from increased herbivory. In addition, US plants subject to high herbivory had metabolic profiles that were more similar to European plants than to the US plants that experienced low herbivory. This study represents one of the first applications of metabolomics methodologies toward understanding the ecology and evolution of invasive plants.

Aquatic Invasive Species Public Awareness: 3:05 pm - 4:20 pm

Stop Aquatic Hitchhikers!™ From Theory to Application

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Preventing the spread of aquatic invasive species (AIS) starts with changing behavior. Over the past decade, community-based social marketing (CBSM) has emerged as an effective framework for promoting programs that foster sustained behavior. Most widely used in health care, it is also being applied in waste reduction, water and energy efficiency, and pollution prevention. Based on CBSM, Stop Aquatic Hitchhikers!™ is a national campaign to prevent the spread of AIS by boaters, anglers, and other recreationists. It uses strategic communication and outreach tools to promote sustainable behavior change. Campaign approaches used rely on guidelines designed to remove barriers for inaction, replacing them with simple, convenient, and effective actions. Communications, materials, and messages target each recreational audience. Reinforcing desired behavior through personal and social norms is critical to fostering desired behavior change. This presentation will reveal the theoretical underpinnings of the campaign's applications providing insights into its success. Evidence from boater surveys indicates that Stop Aquatic Hitchhikers!™ is effective as a behavior intervention campaign. It is currently in use by more than 870 partners nationwide and continues to spread—a testimonial to its success as a model intervention strategy to prevent the spread of AIS.

Aquatic Invasive Species Prevention through Public Awareness: Examples from Minnesota DNR and its Partners

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Public awareness is a key strategy to address prevention and containment of aquatic invasive species. Minnesota DNR, partners such as Minnesota Sea Grant and Wildlife Forever, and prevention grantees have used many tools to attempt to raise public awareness about aquatic invasive species and prevention actions the people can take. Some of the tools, such as billboards, are targeting travelers into and throughout the state. Other tools, such as ads in local newspapers and are intended to reach local users of our lakes and rivers. Examples of these tools, including fish rulers, door mats, billboards, radio spots, and banners, will be presented to acknowledge our partners efforts and provide ideas for additional partners.

Great Lakes Invasive Species Outreach Partnerships

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Invasive species are making headline news. From flying carp to zebra mussels, their prevalence in the media is growing - a good news / bad news scenario. People are becoming more aware, but invasive species are spreading. Diverse and innovative partnerships are helping to combat these invaders by linking the talents and resources of multiple partners. This collective, comprehensive approach is saving money and raising awareness. Across the Midwest and into the Great Lakes there is a renewed investment into resource protection and restoration. One of the most critical elements of this work is outreach and education. Wildlife Forever started such a partnership five years ago called the Threat Campaign. Today, there are multiple partners; lake associations, sportsman's clubs, universities, state and federal agencies, as well as non-government organizations, and large private business. Creatively capturing the resources of many, this partnership has invested $1.86 million into outreach across the Midwest and Great Lake states. Through traditional and nontraditional outreach such as television, print ads, news paper articles, radio interviews, billboards, events at professional angler tournaments, retail store promotions, youth fishing clinics, and a unique art contest called the State Fish Art Contest; over 500 million invasive species prevention impressions have been made. We have found there is not one method for reaching the masses, but by using the partnership mass we can reach millions. Join us.

Terrestrial Invasive Plant Management Workshop - Prairie: 3:05 pm - 4:20 pm

Canada Thistle (*Cirsium arvense*) Management in Minnesota Native Prairies

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Numerous cooperative studies were conducted on management of Canada thistle (*Cirsium arvense*) in native prairies. Best Management Practices were studied within non-disturbance goals for optimum waterfowl production. Most native forbs survived clopyralid (Transline, Stinger) applications, although flowering and seed production were reduced or eliminated during the treatment season. Native sunflowers reestablished after herbicide applications ended. Canada thistle was controlled but situationally are reinvading. In herbicide trials, thistle control was most consistent with aminopyralid (Milestone), while native forb tolerance appears similar to that of clopyralid. During establishment, prairies are vulnerable to invasion. Studies are on going to compare time of seeding and native plant functional groups and the resultant ability to resist invasion by Canada thistle. Fall planting appeared most conducive to establishment of Canada thistle seedlings, spring planting the least. Cool season plantings dominated by native grasses

were more resistant to invasion than warm season plantings, and cool/warm season mixtures. Warm season plantings initially had a high percentage of bare ground open to invasion. Clopyralid treated plots initially had more native grass cover and fewer Canada thistle plants, but differences diminished with time. The movement of Canada thistle seed was studied. The contribution of wind dispersal to the spread of Canada thistle was largely local. Most seed fell near parent plants, relatively few traveled 6 m. Over 90% of trapped pappi were barren, and the percentage of barren pappi increased with distance from the source. The relative amount of seed distributed long distances by wind is minor, but may be important on a landscape scale in areas lacking an historical presence of Canada thistle.

Another Tool for the IPM Toolbox? Assessing Wetblade Technology to Manage Canada Thistle

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Canada thistle (*Cirsium arvense*) is a non-native, invasive plant commonly found in dense populations on roadside right-of-ways. We are comparing herbicide application with the Diamond wetblade to traditional broadcast spray application at various rates of aminopyralid (3, 5, and 7 oz/acre) for the management of Canada thistle along roadsides in the Twin Cities. The Diamond wetblade is a combination mower that applies herbicide directly to plant stems as it cuts. Preliminary data of this ongoing project suggest wetblade technology kills Canada thistle as well as broadcast application with less herbicide drift produced. The investigators will continue to monitor Canada thistle regrowth at the treated sites for three growing seasons.

Controlling Spotted Knapweed (*Centaurea Stoebe)* in NW Minnesota State Parks and Trails

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Spotted knapweed is an aggressive, introduced, short lived perennial weed species that rapidly invades road and trail edges, natural areas with light soils or areas disturbed by fire or mechanical means. The weed is a prolific seed producer with 1000 or more seeds per plant, seed can remain viable in the soil five years or more, and infestations may occur a number of years after vegetative plants have been eliminated. The plant releases a toxin that reduces growth of native species. The DNR Northwest Region Division of Parks and Trails (PAT) has waged a sustained and effective war on spotted knapweed over the last 10 years. NW Region PAT includes 70,000 acres of state park land spread over 16 management units across 4 ecological provinces as well as hundreds of miles of trail corridors and hundreds of public water accesses. Forests, prairies, and managed landscapes are all battle zones with spotted knapweed. Prevention, detection, mapping, control, monitoring and using native species establishment to prevent reinfestation are used. Control tactics include an integration of chemical, mechanical, cultural, and biological methods. Both successful and not so successful techniques have been tried over the years.

Tuesday November 9, 2010

Herbicides: 8:30 am - 10:10 am

Invasive and Noxious Weed Management With Aminopyralid

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With the introduction of aminopyralid, an innovative, non-restricted use active ingredient from Dow AgroSciences, successful strategies for managing many noxious and invasive species in some of the most ecologically sensitive sites can be developed. Aminopyralid is a pyridine carboxylic acid herbicide developed for selective broadleaf weed control in sites such as natural areas, rangeland, pastures, rights-of-way, and non-cropland and was registered under the Environmental Protection Agency's Reduced Risk Pesticide Initiative. Aminopyralid (Milestone VM® Specialty herbicide) has broad range activity on a number of key invasive species, such as Canada thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), spotted knapweed (*Centaurea maculosa*), common and giant ragweed (*Ambrosia spp.)*, teasel (*Dipsacus spp.)* and many others, and that spectrum is broadened even further when combined with certain other active ingredients. A new product with aminopyralid and metsulfuron (Opensight™ herbicide) has been developed for use on non-cropland sites including industrial sites, rights of ways, non-irrigation ditch banks, natural areas and grazed areas around those sites. This new combination will control additional noxious and invasive weeds such as wild parsnip, wild carrot, poison hemlock, sericea lespedeza, and multiflora rose. The data show that aminopyralid containing herbicides can be used in a long term integrated approach to managing noxious and invasive weeds in various habitats.®™Trademark of Dow AgroSciences LLC.Milestone is not for sale, distribution or use in New York state. Opensight is not registered for sale or use in all states. Contact your state pesticide regulatory agency to determine if a product is registered for sale or use in your state. Always read and follow the label.

Native Forb Tolerance to Aminopyralid (Milestone® VM) Applications for Invasive Weed Control

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Aminopyralid (Milestone® VM) is a broadleaf herbicide that has reduced risk to the environment compared with other herbicides, making it a desirable alternative for invasive weed control on wildland sites. Effect of aminopyralid on desirable forbs and shrubs is a consideration for land managers when making management decisions. Experiments were established at 10 locations in 4 states from 2004-2007 to determine long-term response of native forbs and shrubs to aminopyralid and to develop a tolerance/susceptibility ranking for native plants. Research locations were diverse plant communities with 29 plant families represented, with the greatest number of species (35%) in the Asteraceae family. Individual tolerance rankings to aminopyralid were established for 98 native forb species and 19 shrubs. Four ranking categories were developed: susceptible (S - 75% or more reduction), moderately susceptible (MS - 75 to 50% reduction), moderately tolerant (MT- 49 to 16% reduction) and tolerant (T – 15% or less). Of the 98 forb species categorized, 28, 17, 25, and 28 were ranked S, MS, MT, and T, respectively one year after application. Results from second year evaluations on 68 species showed most forbs had recovered with 77% of the species either MT or T. Shrubs were mostly tolerant to aminopyralid with 15 of the 19 shrubs ranked either MT or T after one year. Since most native forb and shrub species were moderately tolerant to tolerant, or quickly returned following treatment, land managers can use aminopyralid to restore the plant community by controlling invasive plants while minimizing non-target plant injury.

Herbicide Use Questions? Ask the Experts

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Most people working to control invasive plants turn to herbicides as one of the tools in their arsenal. Unfortunately, too many depend on only a few well-known herbicides when others might be more effective, safer and better suited for their specific plant problems. There are many herbicides that can be used for most invasives and new herbicides are being developed. Herbicide efficacy trials and operational scale treatments have been conducted that demonstrate utility and suitability of various herbicide products to control invasive plants that threaten natural areas. Extension agronomists,herbicide company representatives and an experienced contractor will be on hand to share information about herbicide and application technologies and to answer questions you might have about these technologies and the best herbicides for your problem species.

Forest Early Detection and Rapid Response: 8:30 am - 10:10 am

Forest Pest First Detector a Voluntary Early Detection Program in Minnesota

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The Forest Pest First Detectors program is part of the federal National Plant Diagnostic Network (NPDN). This First Detector program is designed to identify the first incidence of emerald ash borer (*Agrilus planipennis*, EAB), gypsy moth (*Lymantria dispar)*, *Sirex* wasp (*Sirex noctilio)*, and Asian longhorned beetle (*Anoplophora glabripennis)* in Minnesota and each county. Forest Pest First Detector volunteers are one of the first lines of defense against the establishment of these forest pests by helping identify their first occurrence quickly. First Detectors also help disseminate information to the public about forest invasives and preventing their introduction. This first-in-the-United-States program is a joint project between the Minnesota Department of Agriculture (MDA), University of Minnesota Extension, and the Minnesota Department of Natural Resources. The program began in 2008, to date 483 participants have been trained and 321 have committed to the program. First Detectors utilize a step-by-step process to identify the signs and symptoms of forest pests. If a pest is suspected the MDA is notified. Confidentiality must be maintained for all suspected incidences. First Detectors may visit properties, correctly collect and safely mail samples, collect ash seed, and help educate and inform the public about these immerging forest pests. EAB was discovered in St. Paul, MN on May 13, 2009 via the First Detector Network. The program worked as was intended for the first EAB find in Minnesota. In 2009, First Detectors also volunteered 1281 hours and traveled 7650 miles for a total public value of almost $27,000.

Predicting the Distributions of Invasive Plants across Northern Wisconsin

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Non-native, invasive plants and animals have become major agents of environmental change. In Wisconsin alone, 29% of the approximately 2189 vascular plant species listed in the state's official checklist are not native to the state. These nonindigenous plants vary greatly in their distribution, habitat requirements, ability to invade and impact natural ecosystems, and feasibility of control. Starting in the mid-1990s, the Great Lakes Indian Fish & Wildlife Commission (GLIFWC) has conducted surveys for invasive

plants and aquatic invertebrates across northern Wisconsin and western Upper Michigan. Using these data and those of regional partners, GLIFWC is employing species distribution modelling techniques to predict the current and potential distributions of invasive plants across northern Wisconsin. Model outputs are GIS grids with cell values representing probability of occurrence. These models can be combined with other relevant GIS layers to help identify which species pose the greatest threats to native ecosystems and tribal resources, and target invasive plant management efforts in a way that maximizes their cost-effectiveness.

Determining the Potential Range of Forest Invaders Using Freely-Available Software and Climate Information

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The potential distributions of introduced species have been predicted by climate envelope models (CEMs). This approach uses the simplifying assumption that range is completely dependent on climatic factors but may also include other macroscale components, such as topography. Despite the simplicity, CEMs can provide valuable information to help focus mitigation efforts. Using freely-available software and data, CEMs can be constructed for any introduced species for which the spatial extent of the native range is known. In order to illustrate this technique, we constructed CEMs for emerald ash borer (*Agrilus planipennis Fairmaire*) and Sirex woodwasp (*Sirex noctilio* F.) and determined zones of climatic equivalency in Minnesota and Wisconsin. In addition, we fused climate information with tree data from the USDA Forest Service's Forest Inventory and Analysis program in order to provide more detail about forest resources in the predicted range.

Invasive Plant Survey and Modeling to Support Forest Management Planning

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MNDNR Forestry designed and implemented a road based survey of certain invasive plants along all maintained roads within state forest boundaries and DNR administered gravel pits. Survey methods were developed and training protocols designed to manage 2 to 5 survey crews over each of the last three years. Cold and hot checks of the survey data were also performed as a method of quality control to ensure the accuracy of the data. A simplified risk model was developed with the resulting data to assist field foresters in identifying and then prioritizing areas in need of additional inventory work to support planned management activities. The survey methods and the structure of the risk model will be presented and potential uses of each discussed.

Ballast Water: 8:30 am - 10:10 am

Great Lakes Ballast Water Collaborative Update Panel Session

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In 2009, the U.S. Saint Lawrence Seaway Development Corporation initiated the formation of the Great Lakes Ballast Water Collaborative, in conjunction with the International Joint Commission, to bring together industry and state and federal regulators on the issue of ballast water and invasive species in the region. One of the primary goals of the Collaborative is to share relevant, useful, and accurate information and foster better communication and collaboration among the key stakeholders engaged in the effort to reduce the risk of introduction and spread of aquatic nuisance species. A particular emphasis of the Collaborative has been to bring state representatives together with marine industry representatives and respected scientists to find workable and effective solutions

to the aquatic invasive species challenge as they relate to the Great Lakes St. Lawrence Seaway System. The aim of the Collaborative is not to take away from any preexisting efforts in this regard, but rather to complement those efforts. The Collaborative provides a forum for discussing regulatory policy issues with a focus on workable and effective solutions. The Collaborative also recently assisted in data collection for WI DNR's ballast water treatment feasibility assessment. For more information, visit: http://www.greatlakes-seaway.com/en/environment/ballast_collaborative.html.

The Great Ships Initiative: Performance Assessment of a Candidate Ship-Board Treatment System

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Ballast water discharge from ships is a significant source for the introduction and spread of aquatic invasive species. Using a land-based facility in Duluth/Superior Harbor, the Great Ships Initiative (GSI) is evaluating candidate shipboard treatment systems for their ability to prevent the introduction of freshwater nuisance species. Testing at the facility meets International Maritime Organization (IMO) guidelines and is the only system dedicated to testing ballast water treatment applications in fresh water. Testing scenarios involve accurate simulations of ship-board activities (e.g., pumping rates, water volumes, ballast holding times). Numbers of surviving ambient organisms in treated discharge are evaluated using an array of methods, and standard operating procedures are available on the project website, www.greatshipsinitiative.org. Specific GSI methods for sampling and assessing live microorganisms in size classes relevant to the IMO standards will be detailed. Results from the evaluation of a candidate treatment system will be presented relative to its ability to neutralize heterotrophic bacteria, protists (10-50 μm group) and zooplankton (>50 μm group). GSI test findings will support the development of ship-board treatment systems that meet and surpass IMO standards for preventing ballast-mediated aquatic species introductions.

Management of Invasive Submersed Plants - Herbicide Use: 8:30 am - 10:10 am

Management of Invasive Aquatic Plants in Minnesota: Defining Success

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Aquatic plant management in Minnesota includes activities intended to reduce, enhance or otherwise alter populations of aquatic plants by means of herbicides, biological agents, mechanical devices, physical alteration or transplanting. Beginning in the late 1980s, concern among waterfowl hunters and conservationists about purple loosestrife, *Lythrum salicaria*, prompted efforts to improve management of this non-native, invasive emergent plant. Partnerships among the Minnesota Department of Natural Resources (MnDNR) and other agencies led to development of an effective biological control program for purple loosestrife. Eurasian watermilfoil, *Myriophyllum spicatum*, was discovered in Minnesota in the late 1980s. Almost immediately, matted Eurasian watermilfoil interfered with use of Minnetonka and other lakes, which led to concern among owners of lakeshore property and boaters. Soon after discovery, the MnDNR began to work with lake associations and local units of government to manage the problems caused by Eurasian watermilfoil. In the late 1990s, research by the Corps of Engineers Aquatic Plant Control Research Program showed that curly-leaf pondweed, *Potamogeton crispus*, could be controlled by treatment with herbicide when water temperatures are low. In recent years, the MnDNR has invested ever-increasing amount of resources into pilot projects designed to evaluate the potential to selectively control curly-leaf pondweed on a lake-wide basis in Minnesota. Definitions of 'success' of management will be considered form a variety of perspectives.

Sampling of Herbicide Residuals Confirms Extended Exposure to Low Concentrations of 2,4-D and Triclopyr

can Control Eurasian Watermilfoil

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Eurasian watermilfoil (*Myriophyllum spicatum* L.) and curlyleaf pondweed (*Potamogeton crispus* L.) are invasive submersed plants found throughout the Great Lakes Region. Herbicide programs targeting selective control of these species in Minnesota and Wisconsin have recently relied on the systemic auxin mimics triclopyr and 2,4-D, and the contact herbicide endothall. In conjunction with numerous operational treatments, a rigorous herbicide residue sampling program has been implemented to improve our understanding of how treatment scale and timing can impact herbicide concentration and exposure time relationships. Recent data generated in mesocosm systems indicate that Eurasian and hybrid watermilfoil can be controlled following extended exposures to low concentrations of triclopyr and 2,4-D (50 to 250 µg L^{-1}). Field sampling of herbicide residues has shown that larger scale applications can result in whole lake use patterns that result in extended exposures to the lower concentrations described above. While the efficacy of this use pattern has been documented at a lake-wide scale, the factors that influence selectivity remain under investigation. In contrast to large-scale applications, smaller spot applications in larger lake systems have resulted in significant variation in herbicide residuals and a resultant wide range of treatment outcomes. Despite many anecdotal claims of variable efficacy results being linked to factors such as milfoil hybridity, our sampling efforts suggest that large differences in water exchange rates within treatment plot have the greatest impact on treatment efficacy. Examples from operational treatments in Minnesota and Wisconsin will be discussed in conjunction with recent mesocosm data generated to simulate the concentration and exposure time profiles observed in the field.

Aquatic Herbicide Use Patterns: Differences in Restoration, Nuisance Control, and Eradication Strategies

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Aquatic herbicides have a long history of use in the upper Midwest with a recent emphasis being placed on selective control of submersed invasive plants such as Eurasian watermilfoil (*Myriophyllum spicatum* L.) and curlyleaf pondweed (*Potamogeton crispus* L.). Following successful establishment and spread of these plants within public waters, there is often considerable public pressure to initiate management or "eradication" efforts. This sentiment to initiate large-scale management is often counter-balanced by concerns that treatments will have undesired impacts on native vegetation or biota. Moreover, many agency resource managers as well as private angling and waterfowl interests often promote invasive plants as habitat that provides an ecological service. In the midst of this debate, aquatic plant managers within the Minnesota and Wisconsin DNR must often decide when to initiate or approve large-scale management efforts that target invasive plants with a goal towards habitat restoration, short term nuisance relief (invasives and natives), or implementing an eradication program to completely eliminate a new infestation. Aquatic herbicides have proven to be versatile, and several registered herbicides can be used as a major component of restoration, nuisance relief, or eradication plans. While versatile, aquatic herbicide use rarely proves to be a one-time effort, and restoration, nuisance relief, and eradication all generally require treatments over multiple years to achieve management objectives. Building a consensus on the outcomes of large-scale restoration efforts has proven particularly challenging. Specific examples with 2,4-D (registered in 1959) diquat (1962), endothall (1960), fluridone (1986), and triclopyr (2003) will be discussed.

Effects of Whole Lake Early Season 2,4-D on Eurasian Watermilfoil (*Myriophyllum spicatum*)

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Eurasian watermilfoil (*Myriophyllum spicatum*) is a non-native aquatic plant that is currently known from 539 lakes and rivers in Wisconsin, and oftentimes outcompetes and displaces native species, alters water quality, and interferes with recreational activities. Recent research efforts have attempted to move away from short-term management techniques (i.e. nuisance relief) towards more strategic management techniques involving long-term goals of potential lake restoration and possible eradication. We will discuss

the results of a controlled experimental study using a low dose (0.5 mg/L ae), whole lake, early spring liquid 2,4-D treatment on Eurasian watermilfoil. Application at this rate resulted in no Eurasian watermilfoil being detected during the past 3 survey years, though this has also resulted in significant declines in several non-target native species. In addition, chemical residuals were observed in the system for much longer than expected, and discussion on potential mechanisms for this persistence and future research will be presented.

Aquatic Invasive Species Control - Technology and Efforts: 8:30 am - 10:10 am

Reducing Spread of Invasive Species Through In-Line Screening

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The Minnesota DNR required a shutdown of the Snail Lake Flow Augmentation System in 2008 to prevent the spread of invasive zebra mussels (*Dreissena polymorpha)* from Sucker Lake source water, which has supplemented Snail Lake's water supply since the early 1990s via a 1,800-gallon-per-minute pumping intake. The City of Shoreview, Minnesota DNR, and SEH, Inc. considered five alternatives for improved pumping processes that would prevent the transfer of zebra mussels into Snail Lake, ranging from chemical disinfection to filtration systems. The in-line screening facility option with a single 250 micron screen followed by two-25 micron self-cleaning screens selected was implemented in late 2009. The spring 2010 pumping period has provided a restoration of Snail Lake water levels with zebra mussel free water supply. This technology could provide similar solutions to reduce the spread of zebra mussels and other aquatic invasive species at other waters in the Midwest and beyond.

Response to Appearance of the Red Swamp Crayfish (*Procambarus clarkii*) in Southeast Wisconsin

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The Wisconsin DNR confirmed reports of populations of red swamp crayfish (*Procambarus clarkii*) in two Southeast Wisconsin manmade ponds in August and October of 2009. Red swamp crayfish is one of the most successful invaders in the world and DNR realized that it must act quickly to control the species. DNR, UW-Madison and UW-Parkside staff and students were brought together to conduct a multi-tiered integrated pest management plan. A request was made to Wisconsin Department of Agricuculture, Trade and Consumer Protection (DATCP) and the EPA for permission to use chemicals to control crayfish in an aquatic environment. Crayfish were trapped for population control and monitoring in both ponds prior to chemical treatment revealing important information about the age structure and reproductive status of the populations. Catch rates dropped sharply in one of the ponds but reproduction continued while catch rates were lower but consistent in the other pond. Following chemical treatment of both ponds with sodium hypochlorite, trapping revealed that catch rates were reduced by 89% and 82% compared to pre-treatment, but crayfish persisted in the ponds. Lessons learned from trapping and chemical treatments of this species will be discussed.

Development of Methods to Orally Deliver Biocides to Control or Limit Invasive Aquatic Animals

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Aquatic invasive organisms are a serious problem throughout the United States, causing billions of dollars in losses to economies that depend on aquatic resources. Natural resource managers consistently list the lack of chemical tools to control aquatic invasive species as one of their top concerns. Currently, only four chemicals, the general piscicides antimycin and rotenone and

the lampricides 3-trifluoromethyl-4-nitrophenol and niclosamide are registered with the U.S. Environmental Protection Agency for control of aquatic pests. Though Asian and common carp, as well as most other invasive fish species, are sensitive to antimycin or rotenone, the current formulations do not offer selective control of these species. Applications of antimycin or rotenone are thus limited only to those aquatic systems where a complete fish kill may be tolerated. Present application methods, which rely on dissolution of a piscicide in the water column, limit management applications to small aquatic habitats of limited volume. This limitation effectively permits invasive aquatic animals to move unchecked through large aquatic systems such as the Great Lakes or Mississippi River. The development of targeted delivery systems to deliver bioactive agents to specific invasive aquatic animals could facilitate the development of integrated pest management programs. Developing alternative delivery systems presents a unique opportunity to enhance the selectivity of general piscicides and substantially reduce effects on non-target species.

Key Points from the 2010 International Symposium on Genetic Biocontrol of Aquatic Invasive Species

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This international symposium explored the use of genetic biocontrol to manage established invasive finfish species. Genetic biocontrol refers to release of genetically manipulated organisms designed to disrupt the survival or reproduction of a targeted invasive species. Genetic biocontrol strategies have the capability to be more effective and targeted than current control methods but turning genetic biocontrol methods into practical tools requires identifying and successfully addressing obstacles and concerns. The symposium assembled scientists from fish genetics and biotechnology to risk assessment science and ecology, and professionals working in various facets of managing aquatic invasive species to address three key issues: 1) the status of genetic biocontrol technologies, including chromosome-based, gene-based and other targeted methods, and methods for combining genetic biocontrol with other control tools; 2) scientific risk assessment of these technologies; and 3) the regulatory and economic contexts surrounding development of these technologies. This presentation will recap key points emerging from the presentations of the symposium.

Terrestrial Invasive Plant Management - Prairie & Wetlands: 8:30 am - 10:10 am

Reed Canary Grass – Why is it So Successful and How Can it be Controlled?

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Reed canary grass (*Phalaris arundinacea*) has been challenging wetland managers for decades. More recently it has been expanding into forests and grasslands; not only in wet soils, but also in uplands. This talk will cover an overview of recent research on the biology, spread and control of this persistent grass. Reed canary grass has several characteristics that allow it to be so successful. Knowing how and why it spreads is key to preventing or controlling it, and to prioritize sites for control. There are many control methods that may be useful depending on the site conditions. We will discuss the range of techniques to help participants identify the best combination of methods for any specific site. Participants will receive a publication with comprehensive control information.

Large Scale Control of Phragmites and Lyme Grass in Wisconsin on Lake Michigan

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Phragmites, also known as common reed grass, is a major invader of Lake Michigan costal wetlands in Northeast Wisconsin. The Wisconsin Department of Natural Resources has been successful in controlling phragmites by working with partners using four control methods (bundle, cut and treat; ground spraying; and aerial spraying) on small and large populations in a variety of wetland types. The Department has also been successful in controlling Lyme Grass with ground spraying and is beginning a three year EPA funded grant of a large scale phragmites and Lyme grass dcontrol program in six counties.

Cheatgrass (*Bromus tectorum*) Management for High Diversity Dry Prairies in Minnesota

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Control of non-native invasive cheatgrass is progressing at a high-diversity sand-gravel prairie complex in east-central Minnesota using a combination of methods. Data collected from monitoring plots are being used to document effectiveness of individual techniques and their combinations, including "very late cutting", burning, and herbicide applications. Based on the data collected, a preliminary prescription for cheatgrass control in high quality prairies in the upper Midwest will be presented. Cheatgrass, the dominant invasive plant over millions of arid and semi-arid acres in the western U.S., has been recently documented in at least two high-quality Minnesota dry prairies, underscoring the importance for expeditiously developing regional control techniques.

Management of Invasive Species of the Prairie

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Basic management techniques for three prairie invasive species (exotic cool season grasses, bird's foot trefoil, and common tansy) will be discussed.

Biocontrol of Terrestrial Invasives: 10:40 am - 11:55 am

The Minnesota Department of Agriculture's New and Established Biological Control Programs

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Biological control can be a cost-effective and sustainable pest management tool. In partnership with other agencies, the Minnesota Department of Agriculture (MDA) initiated biological control of emerald ash borer (*Agrilus planipennis*) with three wasp species (*Spathius agrili*, *Tetrastichus planipennisi*, and *Oobius agrili*) and gypsy moth (*Lymantria dispar*) with a fungal pathogen (*Entomophaga maimaiga*). The efficacy of emerald ash borer biocontrol has yet to be determined. Successful programs are established for leafy spurge (*Euphorbia esula*) with beetles (*Aphthona lacertosa* and *A. nigriscutis*) and spotted knapweed (*Centaurea biebersteinii*) with a combination of seedhead weevils (*Larinus minutus* and *L. obtusus*) and root weevils (*Cyphocleonus achates*). MDA also coordinates the development of biological control for common tansy (*Tanacetum vulgare).* These programs are cooperative and involve multiple agencies, universities, and landowners.

Biological Control of Garlic Mustard (*Alliaria petiolata)* and Buckthorn: an Update

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Use of biocontrol agents to control garlic mustard would provide long-term control and management of this invasive biennial weed. Extensive host specificity testing on a potential biocontrol agent, the stem and crown-boring weevil, *Ceutorhynchus scrobicollis,* has been completed at CABI Bioscience in Switzerland and at the University of Minnesota. Results of these tests indicate that *C. scrobicollis* is a highly specific herbivore. At the University of Minnesota, the Level 2 High Security Containment Facility is currently the only location in the country where work on *C. scrobicollis* is being conducted. At this facility, we have been rearing and conducting host specificity testing with *C. scrobicollis* for the past five years. After completion of a series of vigorous host range tests, we have applied to the Technical Advisory Group (TAG) for Biocontrol of Weeds for approval for field release of *C. scrobicollis* and are now testing some additional native mustards at reviewers' request. We will discuss the current status of our garlic mustard biocontrol project with *C. scrobicollis* as well as our work with *Ceutorhynchus alliariae*, another potential biocontrol insect. This talk will also give a brief update on the status of the biological control research on common and glossy buckthorn (*Rhamnus cathartica* and *Frangula alnus*).

Status of Biological Control Development for Several Invasive Wetland and Terrestrial Plants

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In addition to plant species with established biological control programs, there are several other species with ongoing research that this presentation will highlight. Most biocontrol work for invasive plants is done by CABI – Europe, a private organization headquartered in the UK and Switzerland. Researchers there are working on dozens of species that are invasive in North America. Additional research is underway at Cornell University in cooperation with other institutions. Some of the species with ongoing research of interest to the Upper Midwest include: Japanese knotweed (*Polygonum cuspidatum*), phragmites/giant reed grass(*Phragmites australis*), tansy (*Tanacetum vulgare*), houndstongue (*Cynoglossum officinale*), swallow-worts (*Vincetoxicum* spp.), buckthorns (*Rhamnus cathartica, Frangula alnus*) and several other species more common in western states.

Forest Insect Pests: 10:40 am - 11:55 am

An Overview of Asian Longhorned Beetle (*Anoplophora glabripennis*) in the United States

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Asian Longhorned Beetle, an invasive insect pest from China, has become established in parts of New York, New Jersey and Massachusetts. Introduced to the US through wood packing material, this insect has a large host range which can have a devastating effect on hardwood forests in the US. With its introduction in the Northeastern US, this insect could have very large ramifications for the Midwest and its hardwood forests if it were to become established throughout the nation. USDA-APHIS-PPQ in cooperation with state and local governments is underway in eradicating this pest through a cooperative eradication programs in NY, NY and MA. This cooperative program has developed a strategic plan in an attempt to successfully eradicate this pest including detection, regulation, control, outreach/education, research and restoration. This strategic plan's successes and failures will determine what plan will have to be taken in order to prepare for a potential Asian Longhorned Beetle outbreak.

Wood and Phloem Feeding Insects in Lake States Forests

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Some of the most significant threats to trees in the Lake States are from invasive insects that feed in the wood and phloem. This presentation will give a brief introduction to the main groups of wood and phloem feeding insects and the damage that they cause.

Gypsy Moth (*Lymantria dispar*) Trapping & Treatments in Minnesota - MDA Program Update

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The gypsy moth is one of North America's most destructive tree pests. The Minnesota Department of Agriculture tracks its movement into the state and treats localized infestations to protect the state's forests, local property values, and vital tourism industry. The update will provide current trapping and treatment information about this invasive species and an overview of the changes occurring in Northeastern Minnesota's Slow the Spread (STS) Action Area as moths are being detected in higher numbers.

Aquatic Invasive Species in Lake Superior: 10:40 am - 11:55 am

Comparing Planktonic Bacterial Communities in Ship Ballast Water and the Duluth-Superior Harbor

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Ship ballast water has been shown to be a potential vector for spreading exotic or invasive microorganisms and the Duluth-Superior Harbor receives more ballast water discharge than any other harbor within the Great Lakes. Currently, little is known about the diversity of natural microbial communities within this harbor, yet this information is crucial for identifying future introductions of potentially harmful microorganism via ballast water discharge. To characterize planktonic bacterial communities within the harbor, water samples were collected at six sites along a transect from Lake Superior, through the Duluth-Superior Harbor, and into the lower St. Louis River. Additional water samples were collected from ship ballast water and the Western Lake Superior Sanitary District because discharges from these sources may alter the composition of bacterial communities within the Duluth-Superior Harbor. DNA was extracted from microbes collected on membrane filters and used for T-RFLP DNA fingerprint analysis to compare the molecular similarity of bacterial communities in the harbor with potential sources of bacteria to this harbor from the lake, river, ballast water, and wastewater effluent. DNA fingerprint analysis indicates the bacterial communities discharged into the harbor by ship ballast water can be different than those bacterial communities found within the harbor. In addition, bacterial communities in freshwater ballast water were different than bacterial communities in saltwater ballast water. To further characterize bacterial community composition, 16S rRNA gene clone libraries were created for one of the harbor sites and three ship ballast water samples including both freshwater and saltwater sources.

Status of Aquatic Non-Indigenous Species in the Duluth-Superior Harbor

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As part of a study to develop recommendations for aquatic non-indigenous species (NIS) monitoring in Great Lakes areas at risk of invasion, we conducted comprehensive, multi-gear sampling in the Duluth, MN-Superior, WI harbor and lower St. Louis River in 2005-2007. This effort represents the most spatially and taxonomically comprehensive NIS survey of this complex, invasion-vulnerable

Great Lakes subsystem to date. The objectives of this presentation are to report which NIS were detected, describe their abundance and distribution, and evaluate which sampling gears were most effective in detecting them. Our findings confirm that this major shipping port remains a NIS invasion "hotspot". Ten of the 41 fish species and 19 of the ~240 benthic invertebrate taxa recorded were non-indigenous. Eight of the benthic invertebrates, including the New Zealand mud snail (*Potamopyrgus antipodarum*), a Eurasian-origin amphipod (*Echinogammarus ischnus*), and the quagga mussel (*Dreissena bugensis*), were first-detection records. Notably, zebra mussel [Dreissena polymorpha], round goby [*Neogobius melanostomus*], and Eurasian ruffe [*Gymnocephalus cernuus*] were found to be abundant and widespread in the system ("invasive"), while most NIS were uncommon and localized ("non-invasive"). A few NIS were extremely rare and required considerable sampling effort to detect. Because the sampling gear differed substantially in the habitats covered and the species composition recovered, monitoring multiple habitats with multiple gear types provided the most complete and nuanced picture of aquatic NIS status.

Lake Superior Aquatic Invasive Species Complete Prevention Plan

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Canada and the United States share responsibility for protecting Lake Superior from the introduction of new aquatic invasive species (AIS). To address the risk of AIS, the Lake Superior Binational Program developed the Lake Superior AIS Complete Prevention Plan (Plan), which outlines actions that need to be implemented to close existing vectors and pathways of introduction. Current vectors of AIS introduction include: maritime commerce, agency activities, illegal activities, organisms in trade, fishing and aquaculture, canals and diversions, tourism and development, and water recreation. At present, domestic shipping is considered to pose the greatest threat of spreading AIS to Lake Superior from the lower Great Lakes. The Plan proposes a comprehensive binational program of education, monitoring, and regulation (including inspection and enforcement) that recognizes the importance of shipping, port operations, and trade and commerce to both the Lake Superior region and the American and Canadian economies. Members of federal, state, provincial and tribal agencies were involved in the development of the Plan, which integrates the existing Great Lakes AIS prevention efforts of various agencies into a common plan for Lake Superior. The actions and recommendations outlined in the Plan serve as a basis for agencies and others with a role in AIS prevention to develop work plans in support of the Plan. These work plans will reflect the institutional and legislative differences between Canada and the United States but will focus on the needs of the Lake and will create the domestic decision frameworks necessary to lead to actions on the ground.

Management of Curlyleaf Pondweed: 10:40 am - 11:55 am

Attempts to Improve Water Quality by Management of Curlyleaf Pondweed in Minnesota

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A brief summary of monitoring of lake-wide treatments to control curlyleaf pondweed in an attempt to improve water quality will be presented. Lake-wide treatments with herbicides reduced the frequency, biomass, and surface matting of curlyleaf pondweed. More study is needed to determine the longevity of control of curlyleaf pondweed after lake-wide treatments are stopped. Though the average density of turions in the lake sediments tended to decrease after years of treatment, significant numbers of turions remained in the lakes after as many as five years of treatment. Overall, most native aquatic plants were not harmed by lake-wide treatments of curlyleaf pondweed with endothall herbicide. In lakes treated to control curlyleaf pondweed, there did not appear to be a strong and consistent pattern of increases in the amount of area occupied by native submersed plants during late summer. In some treated lakes, abundance, as reflected by biomass, of native plants appeared to increase over time. The principal species that increased included coontail, elodea, and chara. Overall, there did not appear to be a consistent trend of increasing water clarity in lakes following lake-wide treatments to control curlyleaf pondweed. In the future we expect to have a more complete assessment of the potential benefits of lake-wide treatment of invasive submersed plants based on additional analysis of the data that are summarized here as well as analyses of more data from additional lakes.

Control and Management of Curlyleaf Pondweed (*Potamogeton crispus)* in a Shallow Lake

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A research study was initiated in 2007 to treat Gleason Lake in Hennepin County Minnesota with Aquathol ® K herbicide to control and manage the curlyleaf (*Potamogeton crispus)* pondweed, a non-native invasive aquatic plant in Minnesota. The main objective of the research study was to determine if herbicide treatments are a viable long-term solution to control and manage the curlyleaf pondweed, reduce the internal nutrients loads, improve the water quality, and enhance the growth of native vegetation in Gleason Lake. Three years of whole lake treatment followed by two years of spot treatment were proposed for the study. Pre and Post treatment aquatic plant surveys were conducted to determine the effectiveness of the treatments. Fall season aquatic plant surveys were conducted to document the presence and growth of native aquatic plants. Post treatment aquatic plant survey data showed that herbicide treatment was effective in all three years of whole lake treatment as well as one year of spot treatment by eradicating curly-leaf pondweed after the treatment. Curlyleaf pondweed stem densities continue to decline and water quality monitoring data shows that water transparency has improved in the Gleason Lake. First four years of the study data will be presented.

Evaluation of Lake-wide, Early-season Herbicide Treatments for Controlling Invasive Curlyleaf Pondweed (*Potamogeton crispus*) in Minnesota Lakes

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Non-native curlyleaf pondweed (*Potamogeton crispus* L.) is widespread throughout temperate regions of North America. Its early-season growth, propensity to form dense surface mats, and ability to out-compete native aquatic plants allow it to degrade the ecological and recreational quality of lakes. Consequently, there is great interest in adopting lake-wide management strategies that can reduce the negative impacts of curlyleaf and provide some degree of long-term control. We collaborated with the Minnesota Department of Natural Resources in 2006 - 2009 to evaluate lake-wide, early-season herbicide treatments for curlyleaf management. Six curlyleaf-infested lakes were treated with endothall at 0.75 to 1.00 mg/L active ingredient (ai), or fluridone at 2 to 4 µg ai/L for at least three consecutive years. Three additional lakes with established infestations were selected to serve as untreated reference lakes. We annually assessed the frequency and biomass of curlyleaf in May and June, documented the production of new curlyleaf turions (reproductive buds) on standing plants, and tracked changes in the abundance and viability of turions in lake sediments. Frequency, biomass, turion production, and sediment turion abundance were all significantly lower in treated than in untreated reference lakes. However, viable turions remained in lake sediments after three consecutive years of treatment. These results suggest that serial lake-wide, early-season herbicide treatments can effectively decrease the negative impacts of curlyleaf and reduce the abundance of turions in lake sediments, but ongoing management will likely be required to maintain long-term control of curlyleaf.

Aquatic Invasive Invertebrates: 10:40 am - 11:55 am

Faucet Snails (*Bithynia tentaculata*): What They Are and Why We Should Care

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The faucet snail is an aquatic snail native to Europe that was introduced to the Great Lakes in the 1870's. It has since spread beyond the Great Lakes and is now finding its way into more and more waters across the midwest. These snails are hosts to three species of parasitic tremetodes or flukes that have a complex life history that includes both the snails and waterfowl. When waterfowl consume these infected snails the adult tremetodes attack internal organs that cause lesions and hemorrhages that many times lead to the death of the bird. The faucet snail, and the tremetodes that kill many 1,000s of waterfowl each season continue to be a relatively unknown invasive species to many and pose a big risk to migrating and local waterfowl populations across North America.

Preventing Between-lake Hitchhiking of the Spiny Water Flea (*Bythotrephes longimanus*)

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The spiny water flea (*Bythotrephes longimanus*) presents a serious threat to the health of native zooplankton assemblages in Minnesota and Wisconsin. Although only a handful of lakes have been invaded thus far by spiny water flea, there are thousands of lakes across the bi-state region with suitable habitat. Our goal was to identify an effective method to prevent human-assisted transfer of spiny water flea between lakes. Using a lab-based bioassay approach, we discovered that the resting eggs of spiny water flea do not survive 12 or more hours of drying at room temperature (17-18ºC) and typical summer humidity (40-70%). This was true whether we tested an individual free egg (e.g., those already released from the mother's brood chamber) or a batch of eggs being carried in the brood chamber of a mother. Freezing resting eggs prolonged their tolerance to drying. Our experiments with chlorine solutions, saline solutions, and a range of acidic and basic pH solutions had comparatively minor and sometimes no effect on hatching success of the resting egg. Our results point to overnight drying ($\geq$12 hours) at room temperature as the most effective method to kill resting eggs of spiny water flea. Although the method is both procedurally easy and inexpensive, it demands both time for drying and effort to ensure that contaminated surfaces are actually thoroughly dry for $\geq$12 hours.

Using Suitability Assessments to Determine the Degree of Zebra Mussel Colonization Potential

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A question from lake users regarding zebra mussels often is: What will the zebra mussels do if they come into our lake? Monitoring results from lakes with zebra mussels show different growth responses based on lake conditions. Three areas to assess to determine the suitability of zebra mussel colonization and growth are lake chemistry, substrate availability, and food quality. The key lake chemistry parameter that could limit zebra mussel growth is the calcium concentration but pH and alkalinity are often monitored as well. The best substrate for optimal zebra mussel growth is the presence of hard surfaces such as rocks or course woody habitat. Zebra mussels will grow on silt, sand, and even plants but not at optimal densities. Food availability as measured by chlorophyll, is also a factor supporting either optimal growth or limiting growth. Parameters from these three areas were calibrated with lakes with zebra mussels that had light or heavy growth. Then assessments were conducted in lakes without zebra mussels. We found several lakes in Wisconsin (Pike Lake Chain, Price Co) would be calcium limited whereas two lakes in Minnesota (White Bear Lake, Washington Co and Lake Sylvia, Wright Co) would be food limited. In Lake Minnetonka, where zebra mussels were found in July of 2010, all 26 bays were assessed and findings showed a mix of optimal to suboptimal growth conditions based on water column characteristics. However, the dominant substrate type was sand and silt in all the bays. This type of substrate generally supports only moderate zebra mussel growth. Lake suitability assessments are relatively inexpensive and much of the data that are needed are already available.

Terrestrial Invasive Plant Management Workshop - Forest: 10:40 am - 11:55 am

Japanese Knotweed (*Polygonum cuspidatum/Fallopia japonica*) – Biology, Impacts and Control Methods

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Japanese knotweed is one of the most problematic species along waterways in the UK and New England and it is becoming a serious threat to the wetlands and shores of streams and lakes in the Midwest. This aggressive clonal plant is generally thought to spread only vegetatively, but recent evidence shows some plants are producing viable seed, as well. Recent reports from around Wisconsin show that it is more widespread near and on shorelines than previously thought. Control needs to be well planned, targeting the entire clone and generally repeated for several years. The various control methods that are used will be covered. Participants will be encouraged to share their results of success or failure. A comprehensive WI DNR publication on this species will be available.

A Tale of Two Bittersweets: Ecology, Morphology, Invasion, Hybridization, Control and Conservation

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The invasive oriental bittersweet is expanding its range westward across central North America and in the process it is impacting the native American bittersweet as well as indigenous vegetation especially in forested habitats. In the Great Lakes, open sand dunes are refugia for American bittersweet, but at the ecotones with adjacent forests, the two preferred habitats for these species overlap. We will discuss these distributional patterns in relation to physiology and ecology of these two species. We will discuss the challenges of attempting to distinguish the two species based on morphology and the issue of their hybridization. We will discuss fire effects and control measures for eradicating oriental bittersweet.

Garlic Mustard, a Comparison of Management Options

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Garlic mustard (*Alliaria petiolata*) continues to spread throughout Wisconsin and Minnesota. While initial infestations were isolated to woodland habitats, new populations have recently been observed invading a wide range of habitats including prairies, wetlands and roadsides. While control methods for garlic mustard have traditionally focused on individual plant treatment methods, new techniques have now been tested to control garlic mustard dominated forests as well as these new habitats. This presentation will review management options for suppressing garlic mustard. Management methods compared will include herbicide applications, mowing, prescribed fire, hand-pulling, and manipulation of the environment as these all have shown to provide some level of suppression of garlic mustard. As part of the presentation, a discussion of the appropriate timing to conduct management activities, potential for non target injury, and ability to integrate with other techniques will be highlighted. The goal of this presentation is to highlight the positive and negative aspects of each management activity so a land manager can improve management of this common invasive plant.

Early Detection and Rapid Response 1: 1:30 pm - 2:45 pm

Terrestrial Invasive Plant Early Detection

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It is possible to eradicate target plant species with high invasive potential and very limited distribution. Preventing the establishment and spread of these species is cost-effective and minimizes environmental damage. Land management resources are too limited to survey for all invasive plant species. Providing land managers with information on which high priority species are likely to move into their areas and how to identify, find and control these species will enable strategic resource allocation and rapid response to emerging threats. An initial list of target species is at www.mda.state.mn.us/plants/pestmanagement/weedcontrol/terrestrial.aspx.

Increasing the Impact of an Early Detection Rapid Response Program

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Early Detection and Rapid Response (EDRR) staff and partnership teams that focus on active detection of newly establishing invasive species rely on highly trained taxonomists for identification and risk-based sampling followed by control conducted by professional staff. Models from the Hawaii Invasive Species Committees for developing EDRR capacity have included contracting private firms, agency partnerships and in-house specialist staff development. Review has determined that detection rates, target list development and follow up are most successful for full time "in-house" staff that are tied to an ongoing project. Maintaining these taxonomic and control specialists requires a significant commitment of time and resources but the additional benefits of developing this capacity are under reported. An argument is made based on the Hawaii partnerships that developing full time specialist positions has increased the presence and success of local invasive species prevention and control efforts through: nursery surveys, engagement with nursery industry groups and local municipalities, providing trainers for public "eyes and ears" programs. Based on this experience a recommendation is made to develop capacity for local projects to conduct EDRR utilizing full time trained specialists.

Common Lake Shore Weeds – A Guide for Identification and Control

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Native shoreland buffers have been a very useful tool in reducing erosion, protecting water quality and improving wildlife habitat on area lakes and streams. Additionally, raingardens planted to native species have also proven to be effective at reducing stormwater runoff and the subsequent water quality degradation associated with it. A major challenge associated with the establishment of native plants is knowing what to control and what to save; followed closely with how to control the unwanted plants. To assist landowners through the establishment period, the Sherburne SWCD in cooperation with U of M Extension compiled and published the spiral bound booklet: Common Lake Shore Weeds – A Guide for Identification and Control in Shoreland Buffers, Wetlands and Raingardens. The booklet has proven to be a resource that has enabled shoreland owners to successfully establish and maintain native shoreland buffers and rain gardens. The guide provides color photographs of 62 of the most commonly encountered species that tend to impede establishment of native species in restoration efforts. The photographs show each plant at seedling, flowering, and seed head stage. Information for each species includes: perennial, biennial or annual, plant family, flower color, leaf description, seed/fruit description, height, bloom time, other unique/interesting features, relative level of invasiveness, recommended control methods, method of spread and expected control time.

Invasive Pathogens: 1:30 pm - 2:45 pm

Three Year Efficacy of Oak Wilt Treatments in Minnesota

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Oak wilt, caused by the invasive fungus *Ceratocystis fagacearum*, is a serious disease of oaks, particularly among red oaks (*Quercus* spp.; section *Lobatae*), which experience frequent mortality as a result of infection. White and bur oaks (*Quercus* spp.; section *Quercus*) are also affected, but infections are rarely fatal. Several treatments, which address the belowground or aboveground mechanisms of spread, are available to prevent or delay tree damage and death. However, relatively little is known about their efficacy in an operational setting. This analysis was undertaken to elucidate the relative efficacy of oak wilt treatment combinations in preventing the spread of the disease from infected to healthy oaks in Minnesota in order to inform future management decisions.

We found that when fungicide injection was added to a treatment regime including potential spore-producing tree (PSPT) removal and vibratory plowing (VP), probability of successful treatment significantly decreased when compared to treatment regimes including PSPT removal alone or in combination with VP. We also found that successful oak wilt treatments were more likely to be located near other successful treatments. Thus, successful oak wilt management is spatially clustered and is associated with treatments including PSPT removal and VP, used alone or in combination. Increased understanding of the relative efficacy of oak wilt treatment options can allow tree care professionals to make more informed oak wilt treatment decisions.

Thousand Cankers Disease of Walnut: What, Where, and Why should we care?

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Thousand cankers disease occurs on walnut trees (*Juglans* species) and is caused by the combination of the walnut twig beetle (*Pityophthorus juglandis*) and an associated fungus, (*Geosmithia morbida*). While tunneling in the inner bark, the beetle introduces the fungus which causes cankers by killing the bark and phloem. Following mass attacks by fungus-bearing beetles, the resulting cankers coalesce and subsequently girdle and kill the affected branch or trunk. Black walnut (*J. nigra*) trees can die within 6 to 8 years of initial beetle invasion. The disease occurs mainly in western and southwestern United States on both native and non-native walnut trees; however, it has been recently confirmed in Tennessee. The disease is a threat to black walnut in its native range which covers all or parts of 30 states, including southeastern Minnesota and southern Wisconsin. Black walnut is a highly valued hardwood species for wood products as well as nut production. Major pathways for spread are movement of timber, firewood, wood packaging material, nursery stock and scion wood. To reduce the risk of spread and protect our black walnut resource, Federal and State agencies are collaborating on early detection survey and outreach efforts. In addition, Minnesota has joined several states in establishing regulations for the movement of walnut wood into the state.

Invasive Forest Pathogens in Wisconsin: Current and Future Concerns

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Though they may not receive as much attention as their insect counterparts, invasive pathogens have killed hundreds of thousands of trees in Wisconsin. First described in the 1940's, oak wilt continues to be a serious disease of oak in Wisconsin. Annosum root rot has been confirmed in 21 counties in Wisconsin since first detected in 1993. Beech bark disease was first found in Wisconsin last year; yet recent beech scale surveys have detected widespread low to very low populations of the insect in 7 eastern counties. Collaborative multi-agency/organization approaches have been effective for early detection, prevention, and management of invasive pathogens. For example, site-specific oak harvesting guidelines were recently developed and implemented in Wisconsin as a collaborative effort among USDA Forest Service, County, industry, and WI DNR foresters, and WI DNR Forest Health Protection, based on recent vector biology and climate data. Prevention for annosum root have been more widely accepted in forestry communities in Wisconsin due to tireless efforts by forestry professionals of various disciplines, such as researchers, forest health specialists, foresters, loggers, logging equipment manufactures, pesticide manufacturers, and landowners. The WI DNR has also been working closely with the WI DATCP, the University of Wisconsin, and USDA Forest Service for the detection of several major forest disease threats to Wisconsin, such as thousand cankers disease and sudden oak death. This presentation will be a summary of the efforts that have been taken to fight against invasive pathogens in Wisconsin.

Aquatic Invasive Species Programs and Partnerships: 1:30 pm - 2:45 pm

An Overview of Wisconsin's Aquatic Invasive Species Program

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Wisconsin's Aquatic Invasive Species Program is implemented through partnerships designed to utilize the best each partner has to offer. Funding sources include state ($4.5 million annually) and federal (variable). Funds are dispersed to local units of governments, lake organizations, non-profit conservation organizations, universities, tribes, and other state and federal agencies through grants, and contracts to achieve the objectives identified in the states Aquatic Nuisance Species Plan. Heavily diversified the state's AIS Program is flexible, responsive and supportive of local efforts to fight AIS. The program supports research, educational opportunities (Clean Boats Clean Waters), management (control and restoration), monitoring, and law enforcement. Areas of growth include; developing new partnerships with other organizations invested in the AIS arena, investigating other potential vectors for releasing aquatic invasive species, enhanced monitoring and data management, development of smart containment strategies at local levels and research for developing control strategies.

Clean Boats, Clean Waters: Citizens and Staff Work Together to Protect Wisconsin's Lakes

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Educating boaters and anglers at boat landings through watercraft inspection is a vital part of Wisconsin's aquatic invasive species (AIS) prevention efforts. With so many waterbodies and so few state resources, the success and continuation of our watercraft inspection program has been very reliant upon our enthusiastic, highly motivated citizens. Since the creation of the Clean Boats, Clean Waters program in 2004, thousands of citizens have been trained at inspection workshops on how to initiate boater education efforts at their local boat landings. These volunteers, as well as paid staff, collect data about the actions of boaters and anglers and share information about how to help prevent the spread of aquatic invasive species. The data that has been gathered over the past six plus years has revealed some fascinating, and exciting, trends in the AIS preventative behaviors and AIS awareness of people using our boat landings. By engaging citizens and local governments, providing education to boaters and anglers, and accumulating valuable data, watercraft inspections are a beneficial tool in preventing and containing the spread of aquatic invasives.

Aquatic Invasive Species Prevention Program Development in Burnett County, Wisconsin: Integrating Education, Outreach, Remote Sensing, and Enforcement

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Over 1000 lakes in Wisconsin have been invaded by some form of Aquatic Invasive Species. Impacts to ecology, recreation, and property values typically follow. Cost of AIS management to lake residents is significant. In 2006 Burnett County Lakes and Rivers embarked on a 2 year project to educate boaters to protect key lakes in the county. This project complemented Clean Boats Clean Waters in person inspection efforts with continuous video inspection of boat launches at 7 sites when volunteers were not present. Participation in this project happened from Wisconsin DNR, lake associations, county agencies, and commercial entities. Significant improvements in boater clean-off behavior were documented and rewarded. 5 citations and 10 gift certificates were issued based on a new county ordinance with adoption by other counties and strengthened AIS transport laws at a state level. Educational flyers were designed and distributed to all bait shops and marinas. Local newspapers covered the AIS issues extensively. We will discuss the project elements, lessons learned, and results over time.

Management of Invasive Aquatic Plants 2: 1:30 pm - 2:45 pm

Regional Collaboration on Invasive Species Management in the Cisco Chain of Lakes

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Invasive species management of Eurasian Watermilfoil (*Myriophyllum spicatum*) and Curlyleaf Pondweed (*Potamogeton crispus*) in the Cisco Chain of Lakes located near the Ottawa National Forest on the border of Wisconsin and Michigan is complicated by the numerous organizations that have overlapping jurisdictions in the area. Treatments have been spread out over the course of the last ten years and the Sigurd Olson Environmental Institute of Northland College performed an invasive species assessment on the Cisco Chain in July 2010 to determine effectiveness and further actions. It was determined that for any sort of long term management strategy to be enacted for the Cisco Chain of Lakes, a cooperative understanding is needed to be reached among the many stakeholders.

Ecology and Management of Flowering Rush in the Detroit Lakes Chain

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Flowering rush (*Butomus umbellatus* L.) is a lesser-known invasive aquatic plant, with infestations appearing in Flathead Lake, MT downstream into Idaho and Washington, and in the Detroit Lakes chain in Minnesota. While several genetic and taxonomic studies have been completed, little has been done on the ecology and management. We have initiated a two-year field study in May 2010 for the Detroit Lake chain, examining the phenology, depth distribution, and biomass allocation with depth in the five lakes of the Detroit Lakes chain. For the phenology study, we are sampling four sites every three weeks from May to October and every other month from November to April. Twenty samples of flowering rush per site will be taken using a 15-cm diameter biomass core sampler. In addition, twenty point samples will be recorded for phenological characteristics of hardstem bulrush (*Schoenoplectus acutus* (Muhl. ex Bigelow) A.& D. Löve). Ecological distribution will be evaluated using a point intercept survey in all five lakes in the chain, visiting points in a 100m grid interval throughout the system. At each point, plant species presence will be recorded and depth measured. At every other point, a sediment sample will be taken using a 5-cm diameter core for particle size analysis. Previous experience in managing flowering rush has shown that Imazapyr was effective at controlling emergent flowering rush, but did not control submersed plants. We initiated a field trial of endothall on flowering rush in May 2010. Twelve 0.5 ha plots were selected for treatment, with four untreated reference plots. Our trials included treatments of endothall once (May), twice (May and June), or three times (May, June, and July) with an initial target concentration of 3.0 mg ai/L in the water, or 0.44 kg ai/ha-m. Each treatment was replicated in four plots. Preliminary results of these three studies will be presented.

Assessment Techniques for Effect of Weevil Stocking on Eurasian Watermilfoil Populations in Two Coastal Lakes

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Myriophyllum spicatum, Eurasian watermilfoil, is among the most problematic invasive aquatic plant species throughout North America. Several treatment alternatives are available for milfoil control, including chemical, mechanical and biological control alternatives. The native milfoil weevil *Euhrychiopsis lecontei* is a specialist on watermilfoils that has been used as a biological control organism. However, the efficacy of stocking milfoil weevil eggs and small larvae is unclear. We monitored weevil and watermilfoil populations in two lakes stocked with weevil eggs and larvae by EnviroScience, Inc. (Stow, Ohio). The East Mitigation Pond, a 1.4 ha pond located in Olympia, WA completely covered with a continuous Eurasian watermilfoil bed, was stocked with approximately

12,000 weevils in August 2009. Indian Lake, a 79 ha lake in Sharon, CT plagued by many patches (often greater than 5 ha) of both Eurasian and/or variable-leaf watermilfoils, was stocked from 2007 to 2009 with 31,500 weevils. The milfoil weevil was not found in the East Mitigation Pond prior to stocking and had a density of 0.321 +/- 0.064 weevils per stem one year after stocking. Weevil populations in Indian Lake ranged from 0.11 to 1.84 weevils per stem. Weevil populations were higher on Eurasian than on variable-leaf watermilfoil ($F=34.32$, $p<0.0001$) . Stocked weevil beds did not have significantly more weevils than non-stocked beds. Weevil stocking increased weevil populations in the East Mitigation Pond. However, the impact of weevil stocking in Indian Lake is confounded by many factors. The impacts of weevil stocking on weevil and watermilfoil populations will be discussed.

Cooperative Weed Management Areas 1: 1:30 pm - 2:45 pm

Leveraging Time, Materials and Funding, Partnership Examples from Minnesota Cooperative Weed Management Areas (CWMAs)

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Since 2008 State funding has facilitated the creation of 21 new Cooperative Weed Management Areas in Minnesota. Funding has been coordinated through a Minnesota Board of Water and Soil Resources (BWSR) State Cost-Share grant program with Soil and Water Conservation Districts acting as fiscal agents. The new CWMAs have exercised flexibility in how they set up partnerships, and conduct education/outreach, early detection, mapping, and invasive species management. New CWMA have collaborated with a large number of partners, leveraging significant amounts of time, materials and funding. These new CWMAs have demonstrated great innovation and created new models for the establishment of strong partnerships and the management of invasive species.

Cooperative Weed Management Areas

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Local, state and federal agencies pooled their resources to form a Cooperative Weed Management Area to reduce the environmental, economic and health threats posed by invasive plants to the grasslands in Pope and Swift counties through education, documentation (mapping), treatment (including cost share), and monitoring. A Cooperative Weed Management Area allows improved effectiveness and efficiency of management activities, manage invasive species across jurisdictional boundaries, pool available resources, apply for grants and prioritize issues.

Northwoods Cooperative Weed Management Area

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The Northwoods Cooperative Weed Management Area (NCWMA) is a collective group of state and federal agencies, municipalities, tribes, nonprofits, community organizations, and individuals who have come together to combat invasive species in Wisconsin's northern four counties along Lake Superior. The NCWMA is an active forum where members share resources, collaborate on projects, coordinate regional efforts, and exchange information. The NCWMA was the first CWMA to form in Wisconsin, and has served as a model for similar groups throughout the state. The focus of the NCWMA has been on aquatic and terrestrial invasive plants. The presentation will provide an overview of NCWMA projects, strategies, funding, challenges, and successes over the past five years.

Emerald Ash Borer Workshop 1: 1:30 pm - 2:45 pm

Regulatory Tactics to Prevent Spread of Emerald Ash Borer (*Agrilus planipennis*)

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Mark Abrahamson and Paul Ahlen, Minnesota Department of Agriculture

Regulatory tactics are an important component in preventing the movement of emerald ash borer (EAB) to new areas. Minnesota has had three counties quarantined for EAB (Ramsey, Hennepin and Houston) since early 2009. The Minnesota Department of Agriculture works in concert with the USDA to maintain the quarantine for intrastate and interstate movement of regulated materials respectively. One of the primary tactics in regulating the quarantine in Minnesota has been educating businesses and private individuals as to how EAB can be moved in a variety of materials. MDA has employed a variety of techniques to undertake this effort from mass media advertising to visits to individual businesses to discuss how the movement of EAB can be prevented. Businesses that with a need to move regulated articles out of a quarantine area work with MDA and/or USDA through compliance agreements. Compliance agreements spell out the terms of movement and any treatment of materials that must occur. Compliance agreements are enforced through routine inspections, which are also performed on entities that are operating without compliance agreements. In 2010, some minor breaches have been documented by MDA and resolved, no serious breaches have been discovered. In addition to preventing the movement of materials out of quarantine, MDA has also worked to educate entities about avoiding the unnecessary movement of EAB within the quarantine in hopes that this will slow movement out of the quarantine as well.

Reducing the Risk of Invasive Species Introduction on Firewood: Regulation and Certification

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For wood infesting invasive pests and diseases, firewood is recognized as the most difficult vector to regulate. The industry is not as organized as are the nursery or timber industries and much is produced and moved by private individuals. This presentation will discuss how Wisconsin state agencies regulating trade (DATCP) and managing public forests (DNR) are working together to reduce the long distance movement of firewood and encourage the development of a safer firewood industry.

- Regulation of firewood entering state parks and forests to that harvested within 25 miles of the property or from certified dealers gives some protection from introduction of wood borne pests but also provides an opportunity for public education and a market for wood certified as treated to kill infesting organisms. The allowable distance for wood was reduced from 50 to 25 miles this spring in response to new models of the risk of introduction of new invasives with increasing distance moved by wood.
- State certification for firewood dealers allows several methods of wood treatment which kill a wide variety of pests and diseases. This could serve as a model for national a national certification program for firewood.
- State regulation of invasive species movement, NR 40, allows regulation of infested material within a quarantine area and the use of wardens in enforcement in addition to DATCP staff.

Minnesota Department of Natural Resources Firewood Program, History, Status and Future Directions

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EAB and its association with the movement of firewood highlighted the need to step up outreach efforts to change public behavior. In response, the MNDNR developed new regulations regarding the use of firewood on MNDNR administered lands. It was felt that even though the MNDNR owned only 15% of the recreational land in MN, the visibility of the state park system would go a long way toward gaining public attention and move not only the public, but other recreational land managers in a direction more conducive to sustainable management. The results have been mixed. In this talk, the MNDNR firewood program will be presented and discussed; what has worked, what has been a challenge and the lessoned learned. The difference between “MNDNR approved” and “MDA certified” vendors will also be explained and discussed.

Early Detection and Rapid Response 2: 3:15 pm - 4:30 pm

A National Scale Citizen Science Program for Invasive Species

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The National Institute of Invasive Species Science has developed a national scale invasive species program for citizen scientists linked to a publicly available cyberinfrastructure (www.citsci.org). The products of the program include: (1) A citizen science website that consolidates data on invasive species across regions; (2) Customizable online data entry forms and Personal Digital Assistant (PDA) programs that allow its users to rapidly collect and quickly disseminate invasive species data; (3) An invasive plant monitoring protocol with an accompanying quality assurance/quality control procedure; and (4) Online tutorials that teach citizen scientists how to use these online resources. Evaluation by its initial end users has proved initial success of the program and the tools that have been developed. As the program continues to grow, evaluation will continue to ensure the capability of the system to train citizen scientists to collect and publicly disseminate high quality invasive species data.

Early Detection System for the Great Lakes Early Region

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Mark Renz, University of Wisconsin – Madison
Carmen Chapin, National Park Service, National Institute of Invasive Species Science, Midwest Invasive Plant Network

The National Park Service (NPS), National Institute of Invasive Species Science (NIISS), Midwest Invasive Species Network (MIPN), and University of Wisconsin-Madison are collaborating in the development, implementation, and maintenance of an online database and early detection warning system for invasive species. This database will provide new users with the ability to store and access data online and allow users with existing databases to contribute their data to a larger database by automatically sharing data across the region. We will also create an alert system from this database to inform users when new invasive species are reported. Alerts will be sent to users via email and can be tailored by the user using criteria such as species, area within the region, and/or habitat type. This session will outline the basic form and functions of the planned database and culminate in small group sessions during which participants will contribute their input on what features and functionality such a system should have. Feedback will be collected and used to develop the early detection warning system which will be operational in 2012.

Feedback on an Early Detection System for the Great Lakes Early Region

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Biomass & Biofuels: 3:15 pm - 4:30 pm

Does Woody Biomass Harvest Open Forests to Increased Exotic Plant Invasion?

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Woody biomass harvest is growing as one potential response to global climate change and energy security, with at least one power plant utilizing this resource already, and more planned. Harvest involves increased mechanical effort, however, and may allow for increased invasion of exotic plants and noxious weeds through its increased disturbance of the soil and litter. Presented here is a multi-year study tracking the impacts of this increased harvest using a Before, After, Control, Impact (BACI) design. Two northern Minnesota forests were divided into three treatments: control (no harvest) clearcut with slash retention, and clearcut with mechanical slash removal (biomass harvest). The plant community was surveyed the year before harvest and one and two years post harvest. Compared to the control treatment and pre-harvest conditions litter depth and litter coverage decreased in both harvested forests, while bare ground increased. This was more significant in the treatments with slash removal. Both harvested forests showed a decrease in native forbs and an increase in exotic and noxious weed plants, with a stronger effect in the slash removal treatments. Plants found to increase in population as a result of woody biomass harvest include white campion (*Silene latifolia*), clover (*Trifolium* spp.), field bindweed (*Convolvulus arvenis*), hemp nettle (*Galeopsis tetrahit*), hawksbeard (*Crepis* spp.), and thistle (*Cirsium* spp.)

Exposure of the Upper Midwest to Invasive Terrestrial Plants from Mandated Cellulosic Biofuel Crop Production

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Conventional crops domesticated for foods and fibers are highly dependent on agronomic inputs (e.g., fertilizer, water) and therefore generally have a low risk of invasion. Demand for new bioenergy feedstock species for the production of biofuels, biopower, and bioproducts is being fueled primarily by renewable energy mandates. The desirable traits of bioenergy feedstock species overlap with those of invasive terrestrial plant species. This has prompted qualitative risk assessments of the most likely bioenergy feedstock species and lead to development of a watch list of species by the Global Invasive Species Program. However, investigations into their economic potential have been largely speculative. Quantitative risk assessments that account for competitiveness of invasive terrestrial plants in and beyond the emerging bioenergy sector can significantly aid current understanding of the risk of exposure. These assessments can determine the magnitude and location of the exposure risk based on the relative profitability of bioenergy feedstock species. This paper 1) assesses establishment risk of bioenergy crops in the environment by examining climate suitability and invasion history 2) develops a crop choice model to aid in estimating the risk of exposure of the Upper Midwest to invasive terrestrial plants from the production of bioenergy 3) outlines the state and federal invasive species and plant pest/weed regulations which may mitigate risk through enforcement.

Buckthorn to Bioenergy: How Minnesota is *Linking Habitat Restoration to Bioenergy and Local Economies*

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Linking Habitat Restoration to Bioenergy and Local Economies is an innovative project providing grants to help landowners restore high quality native plant communities by removing ecologically inappropriate woody vegetation (exotic and/or native species) while stimulating local economies through utilization of the biomass material for bioenergy or other products. Thirteen state funded projects have been completed resulting in nearly 10,400 tons of woody biomass material removed from 157 acres of oak savanna, 61 acres of oak woodland and 55 acres of prairie now under restoration. Non-native, invasive species such as buckthorn (*Rhamnus cathartica*), honeysuckle (*Lonicera sp*.), Amur maple (*Acer ginnala*), Siberian elm (*Ulmus pumila*), black locust (*Robinia pseudoacacia*) and others, as well as native invasive species such as Eastern red cedar (*Juniperus virginiana*) comprised a good portion of the material utilized by District Energy St. Paul in its cogeneration facility. The long-term vision is to support emerging woody biomass

markets state-wide through an ecologically sound approach to achieving long-term ecological restoration goals while utilizing woody invasive species.

Aquatic Invasive Species Regulations and Enforcement: 3:15 pm - 4:30 pm

New "No Transport" Law in Wisconsin

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Transient boaters represent the greatest advantage aquatic invasive species have in moving between waterways. After years of educating boaters of the need to keep boats clean to protect against aquatic invasive species, Wisconsin now has a new law which makes it illegal to transport aquatic invasive species. Plants, animals and water are addressed in the law. Any law enforcement personnel in the state may stop an individual that is seen violating the law and issue a citation which can exceed $2,000. Aquatic invasive species are classified, as either prohibited, or restricted. Control objectives are established based upon the classification.

Law Enforcement Techniques for Aquatic Invasive Species

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Law enforcement is a tool that is used to slow the spread, prevent new introductions, and educate the public on aquatic invasive species. Minnesota DNR has formed a unit devoted to creating new enforcement techniques and to increase enforcement efforts in relation to aquatic invasive species issues. This talk will be presented by Water Resource Enforcement Officers.

Invasive Species Prevention through Minnesota's Prohibited Invasive Species and Infested Waters Permits

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Minnesota has several regulations intended to help prevent the spread of aquatic invasive species and some invasive wild animals. These regulations require permits to import, possess, transport, buy, sell, and propagate prohibited invasive species. There are also permits required to transport or divert water from designated infested waters. This paper will cover the following questions. What are the regulations related to prohibited invasive species and infested waters? What types of situations are permitted? What is the process to obtain permits? And what are the exemptions for permits? Examples of permit situations and actual permitted activities will also be presented.

Management of Invasive Submersed Plants: Funding and Economics: 3:15 pm - 4:30 pm

Tried-and-True Versus Experimental Methods for Eurasian Watermilfoil Control: An Economic Analysis

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Eurasian watermilfoil (*Myriophyllum spicatum*), an invasive aquatic plant, is known to be present in over 200 water bodies in Minnesota and over 400 in Wisconsin. Mechanical and localized chemical treatments are effective in making lakes suitable for recreational boating and swimming, but only temporarily because root systems remain intact. These methods are costly as one-time treatments, and the need for repetition makes them even more costly in present value terms. Experimental treatments such as biocontrol using milfoil weevils (*Euhrychiopsis lecontei*) have the potential to permanently suppress Eurasian watermilfoil populations yet, because of the experimental nature of these treatments, effectiveness is not guaranteed. The cost and success potential of experimental techniques affect the wisdom of trying to achieve control via these methods. We examine the economic trade-offs between proven temporary methods of Eurasian watermilfoil control and experimental methods. Key factors that affect management decisions include the benefits of milfoil removal, the time horizon, the rate of time preference, and the probability that an experimental method will succeed.

Aquatic Invasive Species Control Funding in Wisconsin

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The State of Wisconsin is fortunate to have substantial and diverse financial resources for the prevention and control of aquatic invasive species (AIS). This presentation will describe these resources, how they came about, and how they are used to fund a still evolving comprehensive AIS management effort that includes: Education, Planning and Prevention, Early Detection and Control, Established Population Control, Containment and Maintenance, Research and Demonstration and Technical Assistance.

Minnesota DNR Grants for Control and Prevention of Aquatic Invasive Species

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Since the early 1990's the Minnesota Department of Natural Resources has worked cooperatively with lake associations, park districts, counties, cities and other groups to help prevent the spread of aquatic invasive species and to control infestations of invasives where they occur. In 2010 approximately $100,000 was made available for three types of grants aimed at preventing the spread of aquatic invasive species. These grants were for posting of DNR signs at water accesses, for watercraft inspections, and for public awareness projects. The MN DNR also made approximately $550,000 available for the control of invasive aquatic plants through three grant programs. These grants were for lake-wide control of curly-leaf pondweed *(Potamogeton crispus)* or Eurasian watermilfoil *(Myriophyllum spicatum)* for ecological benefits, for control of Eurasian watermilfoil or flowering rush *(Butomus umbellatus)* on a partial-lake basis to reduce interference with recreation, and for Early Detection and Rapid Response for Eurasian watermilfoil or Flowering rush. This presentation will describe these grant programs and will discuss funding opportunities for 2011.

Cooperative Weed Management Areas 2: 3:15 pm - 4:30 pm

Development and Activities of the Hawkeye Cooperative Weed Management Area in East Central Iowa

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Managing the increasing problem of invasive species can be a formidable task. Federal, State, County, City, and local partners in East Central Iowa are now working together as the Hawkeye CWMA to manage some of these problems, focusing on funding, on the ground control efforts, and public education.

The Indiana Coastal Cooperative Weed Management Area

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The Indiana Coastal Cooperative Weed Management Area (ICCWMA) is comprised of the Lake Michigan Coastal Zone of highly industrialized northwest Indiana. The southern shore of Lake Michigan boasts natural areas which contain the highest biodiversity in the entire state of Indiana. The ICCWMA was formally organized in 2009 because the local natural areas managers realized there was a need to engage adjacent land owners in invasive plant control. Involving these non-traditional partners -- such as right-of-way managers, and land managers of industrial sites -- would be crucial to the successful restoration and management of natural areas in the region. This presentation will convey the unique challenges and opportunities for a CWMA working in a complex landscape, with a diversity of land uses, and land owners. It will also discuss the ICCWMA's formation process, and rationale behind the CWMA's prioritization of high biodiversity natural areas. The presentation will also explain why the ICCWMA chose a small geographic area (the northern half of three counties), while many other CWMAs in Indiana seem to be much larger. Finally, the presentation will talk about the ways in which the ICCWMA intends to use the Great Lakes Restoration Initiative funding that it will soon be receiving.

Aquatic Invasive Species: State, County and Town Coordination in Wisconsin's Northwoods

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Vilas County's economic foundation is rooted in its abundant tourism businesses surrounding its 1,320 lakes. The perceived threat of aquatic invasive species (AIS) ruining lakes, reducing tourism and causing declines in waterfront property valuation prompted the Vilas County Board of Supervisors to take proactive action in 2004. The board authorized the Land and Water Conservation Department to work with the Wisconsin Department of Natural Resources to obtain grant funding which enabled the hiring of an AIS Coordinator to assist with county-wide AIS strategic planning and to provide a link between State AIS programs and local lake residents. Learn how the project has unfolded and how Town Lakes Committees have become the backbone of the county's AIS public awareness, prevention, early detection and management programs and how additional WDNR grant funding has benefitted the Vilas County AIS initiative and has created more AIS County Coordinator positions in other Wisconsin counties.

Emerald Ash Borer Workshop 2: 3:15 pm - 4:30 pm

Wisconsin's EAB Response Plan – Past, Present and Future

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The State of Wisconsin Cooperative Emerald Ash Borer Program developed and approved an official EAB Response Plan in July 2008. The plan was put to the test with the subsequent detection of EAB in the state that same year. Since that time agency staff have worked to refine and improve the plan to best utilize currently available resources as well as taking into consideration future needs of the Cooperative Program.

County-level Forecast of Emerald Ash Borer Presence/Absence in Minnesota and Wisconsin

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Susan J. Crocker and Greg C. Liknes, USDA Forest Service

With the recent introduction of the emerald ash borer (*Agrilus planipennis* Fairmaire, EAB) to Minnesota and Wisconsin, there are many decisions to be made regarding preparedness and resource allocation. It is difficult to know how and where EAB will spread, so information that can be used to predict its presence is useful for mitigation efforts. In this study, we utilize a county-level forecast model to predict the presence or absence of EAB in Minnesota and Wisconsin. The model uses the RandomForests classification algorithm, 19 different county-level metrics describing landscape pattern, forest inventory data, and EAB quarantine information through 2009 for a four-state area: Illinois, Indiana, Ohio, and Kentucky. The model was developed for a highly varied landscape, ranging from sparsely to heavily forested and low to high population densities, similar to that found in Minnesota and Wisconsin. We present a map depicting the county-level predicted presence/absence of EAB as well as information about which metrics were the most critical to model accuracy.

Emerald Ash Borer Community Preparedness in Minnesota

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Rebecca Koetter, University of Minnesota

Emerald ash borer (EAB) (*Agrilus planipennis*) is a devastating wood-boring tree pest that has already killed millions of trees in the United States. In May 2009, EAB was found in Minnesota. In an effort to help Minnesota communities prepare for the impacts EAB will cause to their green infrastructure, the Minnesota Department of Agriculture, Minnesota Department of Natural Resources and the University of Minnesota- Department of Forest Resources worked jointly to provide training and assistance to communities regarding EAB. The training included workshops throughout Minnesota providing the framework communities need in order to write an EAB Community Preparedness Plan. An EAB Community Preparedness Manual was compiled; the manual contains a template preparedness plan and numerous resources from throughout the country on topics related to EAB preparedness. This presentation will provide an overview of why and how a community can prepare for the EAB. Potential funding opportunities available to communities for preparedness and response will also be addressed.

Wednesday November 10, 2010

Restoration: 8:30 am - 10:10 am

Formation of the Southeastern Wisconsin Invasive Species Consortium

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Southeastern Wisconsin is the primary gateway for invasive species into our state due to the high population density, rate of urbanization, roadway travel from Illinois, and maritime traffic into the Port of Milwaukee. The landscape in our region ganges from densely populated urban to rural agricultural with fragmented forests, wetlands, and prairie remnants. An estimated 5 new invasive plant and animal species may be entering the region each year. Small-scale efforts to control invasives in southeastern Wisconsin have been employed for decades, and in June 2007 a Cooperative Weed Management Area (CWMA) was formed to integrate resources for management of invasives across jurisdictional boundaries to benefit the entire region. Functioning as a CWMA< the Southeastern Wisconsin Invasive Specie Consortium, Inc. (SEWISC) is a broad-based coalition that promotes efficient and effective management of invasive species throughout an 8-county region (Sheboygan, Washington, Ozaukee, Waukesha, Milwaukee, Walworth, Racine, and Kenosha). SEWISC provides the opportunity for partners to share and leverage limited resources, raise awareness about invasive species problems, and provide a mechanism for collaborative problem-solving on both public and private lands. To-date more that 200 individuals representing private, government, and corporate interests have partnered through SEWISC, striving to accomplish our mission to educate the public and protect the biodiversity and ecological function of southeastern Wisconsin. SEWISC was incorporated in June 2010, as a non-profit organization under section 501(c)(3) or the Internal Revenue Code.

Effects of Planting Method and Seed Mix Diversity on Tallgrass Prairie Restoration Success

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The goal of this study is to determine if planting method (dormant broadcast, summer broadcast, or summer drill) and seed mix diversity (10, 20, or 34 species) can be optimized to both encourage establishment of native tallgrass prairie species and discourage invasion by nonnative species. Seeding occurred in 2005 and here we summarize results as of the 2007 field season. The dormant broadcast method has consistently produced the greatest perennial forb cover of the three planting methods, but forb cover has not varied with diversity of the seed mix. By 2007, warm-season grasses planted with the summer drill method seemed to have a slight edge over the dormant broadcast, but, as with forbs, diversity of the seed mix had no influence on cover. The summer broadcast had the lowest cover of warm-season grasses. In contrast, cover of cool-season grasses was greatest in plots planted with the high diversity seed mix, but was unaffected by planting method. To discourage invasion, we would like to favor the guild that has the largest negative effect on non-planted cover. We used a structural equation model to partition effects of each guild (warm-season grasses, cool-season grasses and perennial forbs) and seeding method on non-planted cover. In 2007, cool-season grasses had the greatest negative effects on non-planted cover across all three planting methods; warm-season grasses had a smaller and less consistent effect. These results suggest that in the early years of a new restoration, good cover of cool-season grasses may help prevent invasion by undesirable plants.

Restoring Invasive Plant Species Dominated Areas By Means of Assisted Succession

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A thesis project at Camp Ripley Army National Guard Training Site will address the effectiveness of using assisted succession as a means of restoring areas dominated by perennial invasive species: Common tansy (*Tanacetum vulgare*) and spotted knapweed, (*Centaurea maculosa*). Restoring these areas into a native plant community is necessary for this federally maintained study site to be in compliance with Executive Order 13112. This restoration will take place in spring 2010 through fall 2012 and will incorporate site manipulation of four seedbed preparations, two cover crop types, and two seed dispersal methods for each of these invasive species. I hypothesize that by introducing a competitive cover crop immediately upon intentional disturbance of these invaded areas, followed by the seeding of native grasses, an increase in the establishment of native grasses will occur. I hypothesize that drill seeding will be the most effective means of establishing these native grasses in the seedbed. I also hypothesize that the most successful establishment of native grasses will occur on sites that are mowed/burned and then sprayed with an herbicide. If successful, these methods may be applied on a larger scale in other restoration endeavors.

Bird City Wisconsin Addresses Invasives

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Carl Schwartz, Bird City Wisconsin

Bird City Wisconsin, a new coalition of citizens, public officials, and organizations, led by the Milwaukee Audubon Society, the Wisconsin Bird Conservation Initiative, and the Wisconsin Society for Ornithology, wants to ensure that folks living in Wisconsin's communities maintain healthy populations of birds and appreciate them. We have developed a new community recognition program modeled on the successful nationwide program, Tree City USA. Wisconsin communities, whether they are towns, villages, cities, or counties, which come together to help protect birds using a variety of conservation activities, will be designated as a *Bird City Wisconsin* recipient. The program offers public recognition to communities that create/protect bird habitat, foster conservation education, and take steps to protect birds from a range of perils. While this program may seem to be outside the realm of invasive species, in fact, there is a strong component that addresses the problems posed by invasive species. A community must show they meet at least 7 of 22 criteria in order to receive recognition. Included in these criteria are: not restricting "wild" or natural lawns and landscaping, offering the public information on control and removal of invasive plant species, providing easy-to-obtain information to property owners on methods to create and enhance backyard habitat using native species, and participating in programs promoting effective community forest management. See website: http://www.birdcitywisconsin.org for details.

Management of Woody Invasives: 8:30 am -10:10 am

Forestry Mowing: An Economical Solution for Woody Invasive Species Management in Hardwood Forests

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Invasive species such as Buckthorns, Honeysuckles, and Black Locust reduce the ecologic and economic value of native timber stands in numerous ways. Invasive understory growth prevents native tree seedling regeneration and shades out native herbaceous vegetation, leading to a decline in forest health and forest species diversity. Forestry mowing has proven to be an efficient and economic method on some forest sites to mechanically remove invasive species of multiple age classes. Successful woodland restoration depends heavily on the implementation of well-timed and well-executed herbicide regimes following forestry mowing. Without high herbicide efficacy, mechanical removal of woody invasives will rapidly lead to a net increase of invasive species density and biomass. One great benefit to forestry mowing is that slash is light and highly manageable. Even partially cured slash adds fuel structure for subsequent prescribed burns. With the invasive understory removed from a larger area, hardwood leaf litter is allowed to accumulate for one to two seasons. Prescribed fire is re-introduced in the woodlot to ensure depletion of woody invasive seed

bank and to encourage native herbaceous seedling regeneration. EC3 has developed a method of foliar herbicide application via boomless sprayers mounted in modified UTV's. Though multiple herbicide applications may be necessary for complete eradication, foliar based applications are more economical on larger scale (more than five acres) than "cut-stump" treatments due to lower percentage solutions and lower labor inputs, also leading to less negative soil impacts such as soil compaction and herbicide persistence.

New Control Method for Buckthorn and Other Invasive Tree Species

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This presentation describes a new method for controlling buckthorn (Rhamnus) called the "tall stump treatment method." The method is especially suitable for private landowners and can easily be undertaken by one person. Buckthorn is an invasive species that has invaded woodlands throughout much of North America including Minnesota and Wisconsin. It grows fast and birds readily spread its seeds after eating the berries. It thrives in forest understories crowding out desirable native plants. The tall stump method as described here involves these steps: First, use a hand saw or lopper to cut the trunk of the tree to waist or shoulder height, making sure to cut off virtually all branches with leaves or buds. Second, haul the cut tops and branches to a pile for burning or chipping. The tall stumps can then be left alone for as long as eight months. Third, use the cut-and-frill method to treat the stump at its base. Winter is an ideal time for treatment. An herbicide such as glyphosate (20% to 30% concentration) can be used. The tall stump method has a number of advantages. First, the control process can be broken into two distinct phases: cutting and treating. This means fewer tools to carry and keep track of during each phase, making it easier for one person to manage. Second, many months can separate the cutting from treating. With the traditional cut-stump method, stump faces need to be treated within minutes of the cutting. This results in inefficiencies because one must constantly switch tools. Especially in deep snow, this can be very difficult. Third, it is easy to spot the tall stumps for treatment. Short stumps, on the other hand, can easily be lost in leaves or snow. Fourth, the tall stump method can expose more inner bark for treatment than the traditional cut stump treatment method. This increases the chances of a successful treatment. Fifth, if treatment is not effective with the tall stump method, the branches will re-grow just below the cut but well above ground level. A person can generally make another set of frills just below this re-growth and still easily kill the tree. On the other hand, if one fails to kill a tree whose stump is cut at ground level, the stump will have many sprouts forming a bush, and each branch will have to be cut and treated.

DIE Buckthorn Scum!!

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Buckthorn sucks. We will discuss some of our efforts to control it. We don't have the solution but the presentation will include a discussion of successes and failures, costs, and interaction with the audience to see what their experiences have been.

Post-Buckthorn Removal: What Have We Learned?

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The Washington Conservation District (WCD) provides technical assistance to landowners regarding weed management as part of our suite of services offered to local residents. While we don't serve as the weed inspector, we address weed management through information and implementation of targeted grant funds. The WCD has developed innovative ways of coaching management efforts through education programs and coordinating control efforts. *Rhamnus cathartica* (common buckthorn) and *Frangula alnus* (aka *Rhamnus frangula*, glossy buckthorn) are significant problems in our county, and through our outreach efforts and a "buckthorn survey"; we have accumulated information on real-life results of control efforts.
In addition to a summary of our outreach efforts on "weeds," this presentation will describe the feedback we have received from landowners on their buckthorn battle: what has gone right with their management efforts; what benefits have they seen; what would they do differently; what advice would they give others.

Citizen and Business Involvement: 8:30 am - 10:10 am

Minnesota Waters' Aquatic Invasive Species Position and Recommendations – Quelling the Aquademic

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Minnesota Waters developed and adopted a position statement (April 2009) that called the epidemic of aquatic invasive species (AIS) and Aquademic. Minnesota Waters' position is that a) AIS have ecological, economic, recreational, commerce and human health impacts, b) AIS are increasing exponentially, c) there are significant barriers to addressing AIS-related impacts, but d) it is not too late. Minnesota Waters recommends: 1) Minnesota adopts a management system focusing on prevention, 2) 80% of AIS resources be devoted to prevention, 3) the system recognizes regional differences, 4) prevention funding should double, 5) grant funding should increase significantly, 6) invasive plant control should require lake vegetation management plants and 7) a dialog must be started to consider level 3 (including new fees, increased penalties, increased enforcement and perhaps quarantines). A status update will be provided.

Prevent the Spread: Aquatic Invasive Species Training for Lake Service Providers

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Lake Service professionals, such as watercraft rental companies, dock and boat lift installers, fishing outfitters or guides, and lakeshore professionals, routinely travel between AIS infested and un-infested waters as a part of their daily operations. Yet they are an under represented group in AIS prevention efforts. In response to the ever-increasing presence of aquatic invasive species in Crow Wing County, the Brainerd Lakes Aquatic Invasive Species Task Force worked with the Minnesota Department of Natural Resources (MN DNR), Minnesota Waters, and lake associations to host Lake Service Provider AIS seminars. Seminar participants were given an overview of the AIS problem in the region, an up-to-date report of infested lakes, current state regulations that apply to their profession, steps to prevent the spread, how to identify AIS, and steps to report AIS sightings. In light of the push for legislation that would require lake service providers to attend AIS trainings, this presentation will highlight the problems and successes of these trainings that were held from 2008 – 2010, along with suggestions to improve future Lake Service Provider trainings and outreach. We will also discuss the collaboration of Minnesota Waters and MN DNR to streamline the Lake Service Provider trainings for statewide distribution.

Citizen Engagement in Aquatic Invasive Species Prevention

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The Minnesota Department of Natural Resources (DNR) and Minnesota Waters partnered to hold a series of five stakeholder meetings and public open houses across the state to inform citizens of current DNR prevention efforts, to gain citizen input and share new ideas on improving prevention, and to develop new partnerships focused on local and state action. Over 200 citizen leaders, local government officials or staff, and community business representatives participated in the meetings and open houses. The citizens of Minnesota take the threat of aquatic invasive species seriously and feel that not enough is being done to effectively prevent the spread of aquatic invasive species. In particular, those who attended the meetings are most concerned with the spread of zebra mussels, Eurasian watermilfoil, and Asian carp, among others. Stakeholders stated that State agencies need to take bold action or aquatic invasive species will continue to spread in the state. Many also stated that not enough resources are available to meet the invasive species prevention needs. Much discussion during the stakeholder meetings was around potential actions that could be implemented to help prevent the spread of aquatic invasive species. Additional stakeholder meetings are planned to work through the potential actions in detail and determine what support and resources are needed to put them in to practice.

Empowering Citizens to Address the Sale and Use of Invasive Species

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Invasive plants and animals, both aquatic and terrestrial, continue to be sold throughout the Midwest. Both traditional and non-traditional sales outlets have been found selling species that are legally prohibited and restricted in Wisconsin as recently as the summer of 2010. Continued education will be the key to preventing the spread of more invasive species. This education must be more than simply handing the business operator a list of invasive species and making a request. It can be significantly more complicated than that. This presentation will address some of the difficulties the business owners have in complying with regulations regarding invasive species. It will also address how to approach the issue of sales of invasive plants and animals in a manner that encourages voluntary compliance with any state's regulations.

Management and Ecology of Eurasian Watermilfoil: 8:30 am - 10:10 am

Shoreline Habitat Requirements of the Native Milfoil Weevil, *Euhrychiopsis lecontei*, in Portage County, Wisconsin

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Eurasian watermilfoil (*Myriophyllum spicatum, L.*) (EWM) is a non-native, aggressively invasive aquatic plant that can easily be spread across lakes by anthropogenic activities. Management of EWM has traditionally relied heavily on chemicals, which offer quick, but often temporary relief. Research shows that the native milfoil weevil, *Euhrychiopsis lecontei* (Dietz), can be an effective biological control agent for EWM, but more research concerning factors that limit milfoil weevil populations is needed to develop protocols and understand the potential for success in a specific lake. To better define habitat requirements for overwintering success of the milfoil weevil, univariate and multivariate statistical methods were used to assess weevil hibernation habitat on the shorelines of two lakes in Portage County, Wisconsin. Thomas Lake is a 13-ha glacial seepage lake, and Springville Pond is a 7-ha impoundment of the Little Plover River and McDeill Pong is a 109-ha impoundment of the Plover River. Depth of duff material was found to be positively correlated with weevil presence and quantity on Springville Pond, and percent cover of leaves was found to be positively correlated with weevil presence and quantity on Thomas Lake; both of which suggest that management activities that remove duff material, such as mowing and raking, would degrade weevil habitat. Analyses from both Thomas and Springville found distance from shore to be negatively correlated with weevil presence and weevil quantity, suggesting that weevils occur more often in near shore habitats. Discriminant (canonical) function on Thomas Lake also identified height above water as a significant variable with positive correlation with weevil presence, suggesting that weevils occur more often at higher (and thereby drier) sites. The combined results suggest that higher sites nearer to shore, with more duff material, correlate positively with weevil presence.

Contrasting Effects of Early-Season Harvesting and Chemical Treatment in Lake Monona

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Eurasian watermilfoil (*Myriophyllum spicatum*, EWM) is a conspicuous member of the Lake Monona (Madison, WI) macrophyte community that often forms nuisance-level monocultures which interfere with recreation and may affect biodiversity. For the past four years, we have studied the effects of early-season mechanical harvesting as well as early-season herbicide treatment with granular 2,4-D on both EWM and non-target native macrophyte species. We will present results that contrast these management options relative to untreated controls. The results of this study present an opportunity to compare the relative costs and benefits of several EWM management alternatives.

Water Level Fluctuation as a Tool for Eurasian Watermilfoil (*Myriophyllum spicatum*) Control and Lake Restoration

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Fluctuation of water levels on lakes and rivers is a natural event to which thousands of aquatic organisms have evolved around. Low periods of water levels can transform aquatic plant communities and restore beneficial plants. Aquatic organisms depend on these fluctuations to repopulate, reclaim, and essentially restore lake ecosystems. Thus, fluctuating water levels is a viable tool to lake restoration on impoundments where the aquatic plant community has been altered by artificially high water levels. Water level fluctuations and also has shown to be an effective tool to manage Eurasian Watermilfoil. Using drawdown techniques in combination with low dosage herbicide treatments, (0.5-1.0 mg/l 2,4-D), has shown considerable promise to control Eurasian Watermilfoil and restore high value native plants on McDill Pond, Marion Millpond, Montello Lake and Lake Alpine in Central Wisconsin. These lakes all showed significant decline in Eurasian Watermilfoil frequency (100%, 92%, 93%, 87% respectively) and an increase in Floristic Quality Index when calculated the first year following the drawdown and herbicide treatment. However, long-term controls are not well defined and are currently being evaluated to determine efficacy over time.

Eurasian Watermilfoil Impacts to Native Plants in Christmas Lake

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Eurasian watermilfoil (*Myriophyllum spicatum*) was confirmed in Christmas Lake (Hennepin County, MN) in 1992, but had not become prevalent until about 2000. Aquatic plant inventories were conducted in 2001, 2003, 2006 and 2007 using the line-intercept method (2001) and the point-intercept method in other years. Eurasian watermilfoil increased from 23% frequency to 60% frequency over that time span and native plant richness decreased correspondingly ($r = 0.94$). No comprehensive plant controls had been implemented prior to or during this time interval. The conclusion – that Eurasian watermilfoil, left unchecked, is highly correlated with serious ecological and habitat impacts.

Common Carp Management: 8:30 am - 10:10 am

Population Estimates of Common Carp Demonstrate that Nursery Habitat May be Limiting

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Recent research has indicated that recruitment of common carp (*Cyprinus carpio)* in Midwestern lakes is driven by recruitment events in shallow basins prone to winterkill (Bajer & Sorensen 2010). However, the abundance of year-0 carp has yet to be determined in any North American lake. We used trap-nets and minnow traps to conduct a mark-recapture study in three lakes in the Phalen Chain of Lakes in St. Paul, MN to determine these values. Preliminary data suggest that the number of age-0 carp varies greatly and that large lakes, which do not winterkill typically have none. We estimated 12,000 in a 6 ha pond (Markham) that winterkills and 2114 in another (Casey); no young carp were caught in the main lake (Keller), which does not winterkill. Age-0 carp in Casey and Markham had equivalent condition factors, suggesting that food availability does not explain variation in their abundance. Notably, Lake Keller catches were dominated by bluegill sunfish (*Lepomis macrochirus),* which eat carp eggs, while no bluegill were found in the two nursery lakes. Instead, these nurseries had large numbers of other fishes, with carp dominating (69% of fish caught) in Markham Pond. Ongoing research is refining these measures and examining other techniques eDNA to determine if they might provide easier measures of fish abundance as trap nets are laborious. Once perfected these techniques should permit control of carp using IPM schemes. (Funded by the Minnesota Environment and Natural Resources Trust Fund).

Hormone Implants Induce Potent Pheromonal Attractant Release from Common Carp (*Cyprinus carpio*)

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The common carp (*Cyprinus carpio*) is one of the most damaging invasive fish species in North American lakes, wetlands and shallow rivers. To date, carp control has focused on rotenone poisoning but it is expensive and kills all fish. Pheromones that mediate behavioral interactions between conspecifics, show promise for use in targeted removal of the carp. Recent lab studies have shown that ovulated female carp release a mixture of F prostaglandins and unknown bodily metabolites which attract males at picomolar concentrations. Because we do not know the identity of the bodily metabolites we have devised a way of continuously inducing high levels of sex pheromone release by implanting carp with F prostaglandin. Laboratory tests show they release extremely high levels of the entire pheromone for up to two weeks. Field tests show that they can attract males from a distance of 50m. Future studies are planned in Australia. We hope that this technique can serve as tool in integrated control strategies to remove small numbers of adults from lakes after netting or treatment with rotenone. (Funded by the Invasive Animals Cooperative Research Centre, Australia).

Egg Predation by Native Sunfish Control Recruitment of Invasive Common Carp

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The common carp (*Cyprinus carpio*) was introduced to North America a century ago and now dominates many shallow lakes where it wrecks great ecological damage. Control methods currently rely on poisoning and draw-downs, and are damaging and difficult to sustain. Recent studies (Bajer & Sorensen 2010) suggest that carp recruitment (survival of young) is sporadic and may be triggered by winter hypoxia that kills native fishes which otherwise might eat young carp. This study examined the fate of carp eggs in lakes that experienced hypoxia and normoxic lakes that did not. Carp spawning activity was monitored daily in the spring of 2009, and spawning areas were sampled using electro-fishing to ascertain if carp eggs were being consumed. While carp eggs disappeared within three days in the normoxic lake (which had many native fishes), they survived five days in a hypoxic lake. Sampling demonstrated that bluegill sunfish (*Lepomis macrochirus*) were the primary consumers of carp eggs in the normoxic lake (94% of 49 fish found feeding on eggs were sunfish). Autumnal sampling found young carp in the hypoxic lake but none in the normoxic lake. This pattern of recruitment was observed again in the summer of 2010, and laboratory studies have since shown that bluegill sunfish actively consume both carp eggs and larvae. We conclude that if populations of bluegill sunfish can be maintained in lakes, they might control carp. (Ramsey Washington Metro Watershed District and Minnesota Environment and Natural Resources Trust Fund).

Integrated Pest Management of the Common Carp

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The common carp (*Cyprinus carpio*) is one of the most abundant and destructive invasive fish in both North America and Australia where it has severely damaged shallow water ecosystems. Control presently focuses on nonspecific poisons and water-drawdowns and has not had sustainable success. Recently, we discovered that carp population abundance in the Midwest has little density dependence because recruitment is driven by seasonal environmental fluctuations that control native fish predation on young carp (Bajer & Sorensen 2010). This insight has permitted us to initiate an experimental integrated pest management (IPM) scheme which focuses on targeted adult removal using radiotagged Judas fish and pheromones while suppressing recruitment by limiting access to unstable nurseries and balancing native fish populations. A statistical model describes and guides this process. Using this targeted approach we have been able to suppress carp populations to about 10% of their initial levels in three local lakes for several years. During this time improvements in water quality have been noted. We believe that the lessons we have learned with common carp will be applicable to other invasive fishes (Funded by The Minnesota Environment and Natural Resources Trust Fund, Riley Purgatory Bluff Creek Watershed District, Ramsey-Washington Metro Watershed District).

Emerald Ash Borer Workshop 3: 8:30 am - 10:10 am

Cold Hardiness of Emerald Ash Borer and Its Implications for the Upper Midwest

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Emerald ash borer (EAB) was first detected in Wisconsin in 2008 and in Minnesota in 2009. The potential movement of this insect across both states is a serious concern. Portions of Minnesota and Wisconsin frequently have low winter temperatures that are colder than areas where EAB has been a serious problem. The purpose of this study was to measure the cold hardiness of emerald ash borer larvae, the overwintering stage of the insect. Supercooling point, the temperatures at which an insect freezes, is a widely used indicator of cold hardiness. Winter-ready larvae from infested trees in St. Paul, MN had an average supercooling point of -25°C (-13°F). Laboratory assessments of cold hardiness were confirmed during field tests. Naturally infested logs were held outdoors in St. Paul, MN (low winter air temp=-28°C) and near Grand Rapids, MN (-34°C) for ca. 5.5 weeks. Approximately 40% of larvae from logs in St. Paul were inactive or brown, both evidence of death; approximately 90% of larvae from logs near Grand Rapids were inactive or brown, compared with the approximately 10% that showed evidence of death prior to exposure or after being held under cool, non-lethal conditions. Overwintering mortality may help to minimize the damage caused by emerald ash borer in areas with extremely cold winter climates.

The Influence of Satellite Populations on Emerald Ash Borer (*Agrilus planipennis* Fairmaire) Damage in U.S. Communities, 2010-2020

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As of January 2010, satellite infestations of the emerald ash borer have been detected in thirteen states and two Canadian provinces. We simulate the effect of satellite populations that formed by human transport from 2005-2010 on projected emerald ash borer (EAB) damage over the next decade (2010 to 2020). Damage is measured by the projected discounted cost of treatment, removal, and replacement of native ash trees (*Fraxinus* sp.) growing within U.S. communities. The reduced damages from scenarios of fewer satellites range from one to seven billion US$. The most damaging satellites are far from the core infestation and close to large cities highlighting the need for policies to reduce long-distance human transport of EAB and improve the detection of EAB near cities. Scenarios also include the effectiveness of tactics to slow the spread of ash mortality (SLAM) applied to satellites detected during 2009. SLAM tactics that are one hundred percent effective reduce damages by roughly one billion US$, and SLAM tactics must be at least fifty percent effective to reduce damages more than 250 million US$.

Identification and Removal of Emerald Ash Borer (*Agrilus planipennis*) Infested Trees

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One of the main components of emerald ash borer (EAB) suppression is identifying, removing and processing infested trees before adults emerge and infest new trees. However, few details are available on how to identify which trees are about to produce adult beetles so that they can be prioritized for removal. We worked in two EAB infested areas (St Paul and Minneapolis) to visually assess trees and rate them using woodpecker feeding as a primary indicator of their likelihood to produce adult beetles. As trees were removed we sampled them to estimate EAB abundance and condition in those trees. In addition to evaluating our ability to identify trees likely to produce beetles, we also estimated the impact the removals had on EAB population growth in each area. We found that within an EAB-infested area, it may be possible to identify which trees will produce the most adult EAB in a given summer by inspecting them for woodpecker feeding during the preceding winter / spring. However, characteristics of the area such as tree size

and density may influence the degree to which this procedure is successful. Trees with smaller EAB larvae will not be identified by this process until the larvae become large enough for woodpeckers to prey on them. The impact of tree removal on EAB population size is dependent on accurate identification of trees with beetles near emergence – i.e., a higher degree of accuracy in identifying and removing trees will result in a larger impact on EAB population size.

SLAM – A Strategy to SL.ow A.sh M.ortality in Emerald Ash Borer Outlier Sites

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SLAM is an integrated strategy designed to suppress EAB population growth and delay the onset and progression of widespread ash mortality in isolated EAB outlier sites. Basically, SLAM projects are intended to be implemented in newer EAB sites where the goal is to buy time for land managers to take proactive steps in dealing with the impending loss of the ash resource. SLAM projects attempt to integrate EAB survey efforts, ash surveys for tree distribution and amount of ash phloem, population suppression tools and tactics, regulatory activities, data management and evaluation, and outreach and communications. EAB population suppression tools can include the use of insecticide treatments, girdled ash trees (sinks), sanitation of infested trees, and ash utilization (phloem reduction). SLAM Pilot projects are being implemented and evaluated at sites in the Upper Peninsula (U.P.) of Michigan. This presentation will provide a description and update of the U.P. SLAM pilot projects.

Outreach and Prevention 2: 10:40 am - 11:55 am

Right Plant, Right Place, Right Time, Right Now

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Nursery and landscape organizations refer to their members as the “green industry.” But how “green” are they on the invasive plants issue? Are the days over when the prevailing attitude was that of the obstinate nurseryman who didn’t believe there was any such thing as a bad plant? Has a new generation of nursery and landscape professionals seen the light and is the new generation ready to play it safe on new plant introductions? We will discuss the transition era we are now in within nursery and landscape circles; and how even the most stubborn plant sellers are recognizing the need for more environmental responsibility. On the other hand, nursery and landscape associations and plant breeders are hoping the ecological community is ready to recognize the potential positives offered by new cultivars of old problem plants.

Development of Non-invasive Plant Alternatives for Use in the Landscape

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The distribution of plants has been very beneficial and has provided nutritional and aesthetic improvements throughout the world. However, a minority of these displaced plants possess traits that allow them to escape their intended area of cultivation and spread to other regions. These plants have become invasive weeds. Examples from the upper Midwest include Norway maple *(Acer platanoides)*, Amur maple *(A. ginnala)*, Japanese barberry (*Berberis thunbergii*), common tansy *(Tanacetum vulgare)* and many other species. These plants are sold for use in the landscape, but have the potential to escape from their controlled cultivation and thrive as invasive species. Many of these invasive species have been or may be regulated. Regulation results in loss of sales to the green industry, restricts consumer choice and imposes on government agencies to enforce new laws. The goal of our research is to test strategies to produce sterile cultivars of valuable, but invasive landscape plants through biotechnology and mutagenesis breeding. Sterile varieties would allow continued sales and provide consumers with non-invasive alternatives for use in the landscape.

Weed Feed: Edible Invasive Species & Community Activism

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Garlic mustard escaped into the United States from Europe, introduced originally as a culinary herb. Many invasive species are edible and can be utilized as nutritious ingredients in food preparation. Local communities increasingly rely on neighborhood organizations and their volunteers to eradicate invasive species on public land. Educating, motivating and recruiting volunteers can be a serious challenge to these efforts. A unique local approach to restoration & volunteerism success puts the party into work party with a culinary event which showcases edible invasive species, live music and theatrical entertainment focused on ecological education.

Distribution and Detection: 10:40 am - 11:55 am

Buckthorn Detection Using Small Format Aerial Photography

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The invasive plant, common buckthorn (*Rhamnus carthartica)*, has been in Minnesota for over one-hundred and fifty years. During that time it has spread into many of the state's forests, pushing out native species, reducing forest regeneration by competing for space and nutrients, contributing to soil erosion and helping spread certain pests and pathogens. Aerial detection of buckthorn is possible because it generally loses its leaves after the over-story trees have lost theirs and because buckthorn leaves remain a dark green until a few days before they drop. In cooperation with area foresters and Sue Burks – MN DNR Invasive Species Program Coordinator, the Resource Assessment Program of MN DNR Forestry has taken small format stereo aerial photos of several forested areas just after canopy leaf fall; testing both color and color infrared images and both large and small scales for their interpretability and efficiency in detecting and mapping buckthorn. Field checks of the interpreted photos indicate that buckthorn can be detected and used in an integrated program of detection and eradication. Lessons learned and suggested improvements will be presented.

Using Forest Inventory and Analysis Data to Detect the Invasion Stage of Non-Native Invasive Plants and Quantify the Invasibility of Forested Lands in the Upper Midwest

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Non-native invasive plant (NNIP) species are spreading rapidly from managed ecosystems into natural ecosystems (e.g., forests, grasslands) in the Midwest. Using the strategic inventory data from the 2005-2006 U.S. Department of Agriculture, Forest Service's Forest Inventory and Analysis (FIA) program, we mapped the spatial distribution patterns of major NNIPs by using kernel density smoothing. Based on the smoothed presence probability and cover percentage, the Midwest counties were classified into different invasion stages for each NNIP by using the classification and regression tree method. Meanwhile, based on the weighted mean of all NNIPs presence probability and cover percentage, the invasibility of forested lands in the Midwest counties was quantified and classified into high, medium, low and hint risk levels. This information is helpful for NNIP surveillance, control and mitigation.
Keywords: invasive stage, non-native invasive plant, kernel density, classification and regression tree.

Extent and Spread of Selected Non-Native Invasive Plants in Upper Midwest Forests

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Non-native invasive plants (NNIP) represent a serious threat to the composition and structure of native forest ecosystems. Possessing life history strategies that convey competitive advantage, NNIP can capture growing space and impact normal regeneration and growth of co-occurring native plant species. Once established, NNIPs can be extremely difficult to eradicate. Identifying presence and potential for spread is critical to developing a strategy for minimizing or mitigating the influence of NNIPs in the forests of the northern United States. The USDA Forest Service's Northern Research Station Forest Inventory and Analysis Program (NRSFIA) has been sampling for selected NNIP species on plots in the Upper Midwest and Northeastern states since 2005. The different species evidenced varying levels of intensity and direction of spread. Multiflora rose (*Rosa multiflora*) had a strongly demarcated northern limit, likely reflecting its sensitivity to severe winter cold. Common buckthorn (*Rhamnus cathartica*) appears to have no northern limit in the contiguous United States, whereas Japanese honeysuckle (*Lonicera japonica*) was more concentrated in the southern tier of the region. Non-native bush honeysuckles (*Lonicera* spp.) were more generalists, exhibiting no apparent latitudinal limits. Garlic mustard (*Alliaria petiolata*) presence probability was strongly concentrated in the center of the region, likely reflecting disturbance and forest fragmentation, rather than climatic influences. NRSFIA is coordinating an effort to produce estimates of extent and composition of northern states forests 60 years into the future under varying climate scenarios. Such estimates will provide a framework to take these modeled relationships of NNIP extent and see how future climate affects potential invasions.
Keywords: non-native invasive plant, forest inventory and analysis, climatic influences.

Aquatic Early Detection and Rapid Response: 10:40 am - 11:55 am

Citizen Scientists Monitor Wisconsin's Rivers for Invasive Species

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Over 150 Project RED (riverine early detectors) monitors have been trained in Wisconsin to monitor rivers and streams for 15 invasive species of concern including early detection species hydrilla *(Hydrilla verticillata)* and Brazilian waterweed *(Egeria densa)*. In 2009 they monitored over 170 miles of riverbank finding over 100 new records of invasive species including Japanese knotweed (*Polygonum cuspidatum)* and Japanese hops *(Humulus japonicas).*

Aquatic Invasive Species Monitoring Through the Citizen Lake Monitoring Network

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Wisconsin Department of Natural Resources' staff have recruited lake volunteers to watch for Aquatic Invasive Species (AIS) since 1991. This effort was non-standardized, but successful. In 2006, UW Extension - Lakes staff drafted standardized volunteer AIS monitoring protocols that mesh with the Department's protocols. The Citizen Lake Monitoring Network (CLMN) hosts Train the Trainer workshops for County and local AIS staff. Then CLMN staff and Trainers host AIS monitoring workshops to teach the volunteers how to identify, collect and document suspect invasives. Based upon participant comments, it was determined that some of the protocols were too technical for all volunteers. The Network thus added a "casual observer" monitoring level while maintaining the more technical standardized monitoring level. The Wisconsin Department of Natural Resources set up a website so lake residents and volunteers can initiate the verification process if a suspect AIS is found. The suspect invasives are delivered to local Department staff. The staff then completes the verification and vouchering process. Trained volunteers can enter on-line incident reports which include questions on where the invasive was collected. Staff can go to the location to verify the location and densities of the AIS in the lake. Once the AIS is verified and vouchered, the data is entered into the statewide Surface Water Integrated Monitoring System (SWIMS) database. Having volunteers monitor for invasives is both a time and cost savings to the Department plus the volunteers become advocates when the State is considering AIS monitoring and control funding.

Early Detection Monitoring for Vulnerable Great Lakes Coastal Ecosystems

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Great Lakes harbors/embayments are vulnerable to introduction of aquatic invasive species. Monitoring is needed to inform on new introductions, as well as to track success of prevention programs intended to limit spread. We have completed a pilot field case study in the Duluth-Superior Harbor, an at-risk shipping port on Lake Superior. Our "oversampling" strategy used spatially-comprehensive, high-density sampling strategies. We found >35 fish species and >162 benthic invertebrate taxa, including all known non-native and invasive species and another 8 new non-native benthic invertebrates we have now reported for the first time. "Oversampling" provided an empirical basis to perform analyses/modeling and illustrate the prime dilemma with detection of potentially-invasive species while they are still rare in their abundance and distribution: we can improve detection probability through increased sampling effort, but this comes at increased cost. A related technical issue is to how to develop cost-efficiency yet maintain a high statistical confidence in ability to detect species in very low abundance, when rapid responses could be most effective. We have used the extensive information base from our case study to evaluate effectiveness of sample allocation strategies, in an effort to develop a model approach. Other Great Lakes case studies are being planned for 2010-2011; together these will help define an early detection monitoring design for a broad network to be established across the Great Lakes by 2014.

Restoration of Emergent and Submersed Plants: 10:40 am - 11:55 am

Initial Attempts to Restore Native Plants After Carp Removal in Lake Susan

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Removal and control of common carp (*Cyprinus carpio*) to enhance water quality should promote aquatic macrophyte growth. We are studying a Twin Cities Metro lake to determine if we can promote establishment of native plants and prevent dominance by invasive curlyleaf pondweed (*Potamogeton crispus*) and Eurasian watermilfoil (*Myriophyllum spicatum*) following carp removal. After winter carp removal, spring water clarity improved compared to previous years and macrophytes expanded their distribution. By June 2009, 56% of the littoral area (depth ≤ 4.6 m) was vegetated. Coontail (*Ceratophyllum demersum*) was the most frequent taxon (43%) followed by Eurasian watermilfoil (35%), curlyleaf pondweed (17%) and narrow leaf pondweeds (15%). By August, curlyleaf decreased and coontail became dominant. Eurasian watermilfoil decreased, likely from herbivory by the milfoil weevil, *Euhrychiopsis lecontei*. In 2010, curlyleaf increased in spring to 30% of the littoral area but narrow leaf pondweeds were found at 40% of sites and persisted through the summer. Eurasian watermilfoil remained controlled. Five native plant species were transplanted from a nearby lake into Lake Susan in 0.5m water depth: muskgrass (*Chara sp.*), water celery (*Vallisneria americana*), northern watermilfoil (*M. sibiricum*), water stargrass (*Zosterella dubia*) and bushy pondweed (*Najas sp.*). All plants initially established, but after 6 weeks bushy pondweed and water stargrass performed best. However, in the following spring and summer water celery and water stargrass grew and expanded whereas muskgrass and northern watermilfoil were not found.

Water Quality Issues Associated with Native Macrophyte Re-establishment

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Direct biomass control programs (i.e., herbicide, biocontrol, mechanical) that target non-native macrophyte species may not always produce the desired goal of restoring native macrophyte community dominance in shallow aquatic systems. Native re-establishment is often complicated by eutrophic conditions, enhanced nutrient recycling, and frequent nuisance algal blooms that result in poor light penetration and limited colonizable macrophyte habitat. Thus, plans for re-establishing native submersed macrophyte growth also need to consider lake management strategies that reduce nutrient inputs (primarily phosphorus) and limit algal productivity in

order to improve underwater light habitat. This research examines the role of algae in attenuating light in eutrophic shallow lakes and projected changes in light penetration as a result of managing the lake to control algal growth.

Avoiding Reinvasion: Theory, Practice, and Policy

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The ecological mechanisms responsible for reinvasion are well-documented and include unfavorable propagule pressure, altered disturbance regimes and environmental conditions, and differential establishment and growth of native vs introduced species. Reinvasion risk varies among ecosystems and situations; depending primarily on the importance of landscape-scale factors. Based on observations from wet meadows and riparian forests, reinvasion risk is often over-estimated. Reinvasion is increasingly seen as a universal, intractable problem for restoration projects that must overcome initial dominance by invasive species. Yet, practice-related factors that are controllable explain reinvasions on many restorations; these can be categorized into decisions that lead to high post-treatment populations and those that delay the re-establishment of replacement vegetation. High-post-treatment population abundance is very common due to poor timing of control, incomplete spatial coverage of control or lack of attention to seedbanks. Lags in restablishment of replacement vegetation stem from inadequate seed quantities, ill-suited species composition of seed mixes, and a lack of seed priming. Minimizing problems associated with these practice-related factors requires increased accountability of weed-control contractors, integration of weed control and revegetation, and longer project durations to reduce post-control weed populations and to acquire needed seed supplies. Widespread adoption of best-practices is limited less by a lack of available information than by designs of policies and programs that reinforce ineffective practices and increase the incidence of reinvasion. Many of the needed changes to policy design would increase cost-effectiveness because of reduced incidence of restoration failure.

Carp and Invasive Fish Management: 10:40 am - 11:55 am

Asian Carp and the Great Lakes - What Can We Expect?

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For nearly eight years we've watched Asian carp advance towards the Great Lakes. Our focus on preventing their expansion into Lake Michigan has been an electric barrier located in Romeoville, IL about 35 miles from Chicago. New genetic detection methods suggest the electric barrier may not be effective and that the fish are very near or already in Lake Michigan. This presentation will discuss the movement of Asian carp towards the Great Lakes from the Mississippi River, the new detection techniques, potential failures of the electric barrier, habitat requirements of these non-native species and efforts to stop these potentially harmful fish from establishing a population in the Great Lakes basin. Finally the presentation will discuss possible long-term approaches to Asian carp management in the Great Lakes and Mississippi River drainage basins.

Control of Invasive Carp Movements Using Non-Physical Behavioural Barrier Techniques

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Fish deterrents utilizes years of research followed by a number of successful and proven installations of "guiding" or "deterring" fish via the proper combination of stimuli. The use of sound, air and light has been successfully employed to deter populations of fish from a particular area. The use of a Sound Projection Array (SPA), which utilizes an alternating frequency of sound, repels or deters fish to steer away from designated areas. Other methods include a BioAcoustic Fish Fence (BAFF), which utilizes a SPA combined with an air bubble curtain that captures the sound, and thus increases the to read dispersion intensity of the generate sound signal and its dispersion to the surface. In addition, high intensity specially designed light bars can provide a visual queue or warning to deter or guide fish. Certain species require the use of all three. Levels as high 73-95% deflection have been attained in many installations. Common carp (*Cyprinus carpio*) are a highly mobile species that spread invasively through interconnecting watercourses, often with disastrous results for the aquatic ecosystems. Among the possible techniques for controlling carp invasions,

use of non-physical behavioural barriers is one that appears promising. Carp have a highly sensitive auditory system which makes them especially amenable to behavioural guidance using BAFF (sound & air bubble curtain) stimuli. They also have the ability to learn quickly and associate combinations of aversive stimuli, suggesting those multi-stimulus barriers, using e.g. combinations of acoustic, air bubble, high intensity light bars, electric, offer considerable potential for controlling invasions. This paper will discuss the biological basis of developing carp barriers, review data on responses of cyprinids to barriers and discuss the scope and limitations of using barriers in different types of watercourse.

Round gobies in the Duluth Superior Harbor

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The round goby, *Apollina melanostomus,* is an aggressive invasive fish which has become a major component of the Laurentian Great Lakes ecosystem since its introduction in 1990. We currently are assessing its movement, site fidelity, growth and bioacoustics in the Duluth-Superior Harbor. Our initial studies indicated a maximal movement of less than 1 km per year. A current tag and recapture study confirms high site fidelity with minimal seasonal or yearly movement. Fish were captured biweekly using 16" minnow traps located every 25 meters along a 550 meter stretch of the Duluth-Superior Harbor shoreline. A total of 1,328 tagged gobies, representing 419 individuals were recaptured during the ice-free months from July 2009 to August 2010. Net movement between captures exhibited a leptokurtic distribution centered at the site of original capture with 88% of the recaptured gobies showing no net movement and a maximum recorded movement of 475 meters. Instantaneous growth rates varied significantly between seasons, gender, and initial length with the greatest growth exhibited by small males in midsummer. We are also monitoring round goby nesting sites with hydrophones to develop a bioacoustic library of round goby calls. Preliminary results indicate that males will produce trains of short grunts. Concurrent phonotaxis experiments are examining whether female round gobies can be acoustically attracted to traps. The goal is to integrate the natural history and sensory biology of the fish to produce a bioacoustical trap for management or early detection of the fish.

Emerald Ash Borer Workshop 4: 10:40 am - 11:55 am

The Risks and Benefits of Biological Control: A Case Study of the Emerald Ash Borer

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The emerald ash borer (EAB) (*Agrilus planipennis*) was first discovered in the U.S. in 2002 and has since spread to 15 states and is causing considerable mortality to ash trees in urban and forest environments. Mechanical, chemical, and cultural control methods, including quarantine implementation, have proved unable to stop the spread of this insidious pest. Classical biological control of EAB was initiated as an alternative control strategy and the steps followed are presented. The benefits of classical biological control include economic benefits (reduction in loss of timber, reduction in cost of control measures) and environmental benefits (reduction in damage to natural systems, reduction in pesticide contamination). The successful biological control projects against the cottony cushion scale and the cassava mealybug are presented in terms of the benefits of biocontrol. The unintended consequences of biocontrol, most specifically impacts on non-target organisms, are discussed and the evidence for the host specificity of EAB parasitoids is presented. After an in depth review process, the benefits of EAB biocontrol were considered to outweigh the risks, and permits were issued for the release of three parasitoids from China. All three parasitoids have successfully reproduced and overwintered in MI and OH.

Effects of Emerald Ash Borer on Ash Populations and Forest Plant Communities

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Emerald ash borer (EAB) (*Agrilus planipennis*), an introduced insect pest, has killed millions of ash trees in the Midwest and is spreading rapidly. The effects of EAB on forest ecosystems are being studied through a collaborative research program between the US Forest Service and the Ohio State University. We are monitoring EAB populations, decline and mortality of >4500 ash trees and saplings, changes in understory light availability, responses of both native and invasive plant species, changes in species composition and forest structure, and effects on other organisms and ecosystem processes in over 250 monitoring plots in forests in Ohio and Michigan, representing a gradient of EAB infestation duration. Although there is some variation due to habitat type, ash species, light exposure, and initial health, survival analysis shows healthy ash stands experience nearly complete mortality within approximately 6 years. EAB will kill ash saplings as small as 2.5 cm DBH. In many sites that have reached nearly complete mortality of larger ash, there are many established ash seedlings and small saplings, and few newly germinated seedlings. It is too early to tell whether this final cohort of ash will be killed by EAB when it reaches susceptible size. EAB populations begin small, rapidly increase and peak, and then crash but persist at low densities after eliminating their food source. Forest canopy gaps, formed by dying ash trees, allow increased light to the understory in ecosystems without a well-developed midstory. The increased light affects both native and invasive plants in these ecosystems. We have identified 14 species of invasive plants in the monitoring plots, with at least one invasive plant species present in most plots. Initial cover of invasive species was low in most plots, which may indicate an opportunity to control invasive plants in these ecosystems before they respond to gaps. We have begun research on the restoration of EAB-impacted ecosystems through control of invasive plants and planting of Dutch elm disease-tolerant elm seedlings.

Potential Impact of EAB in Riparian Forests in Wisconsin and Minnesota

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Since its North American discovery in 2002, the emerald ash borer (*Agrilus planipennis* Fairmaire, Coleoptera: Buprestidae, EAB) has shown a considerable ability to adapt to native ash trees and cause extensive tree mortality regardless of species, size or vigor. While these factors have not shown to have tremendous weight in driving spread, there is some evidence that the position of ash trees on the landscape may play a role in guiding EAB dispersal patterns. Patterns of dispersal will, in turn, shape changes in forest structure and composition. In this study, the potential impact of EAB on riparian forests is examined. Forest inventory and geospatial data from Michigan were used to compare ash mortality and the abundance of standing dead trees across different physiographic classes (e.g. upland vs. riparian), as well as the relative change in species composition over time. We then discuss the potential impact of EAB on the composition of riparian forest ecosystems in Wisconsin and Minnesota, USA.

Poster Presentations

Invasive Species Biology, Ecology, Impacts, and Distribution

Naturalized Yellow-flowered Alfalfa (*Medicago sativa* ssp. *falcata*): Is It Invasive?

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The occurrence of naturalized yellow-flowered alfalfa (YFA) on private and adjacent public rangeland in northwestern South Dakota presents a dilemma. The capacity for natural reseeding demonstrates value for rehabilitating severely depleted rangelands by increasing soil organic C and N and augmenting forage production. Ironically, the same plant characteristics that make it suitable for rangeland improvement also increase its invasive potential. In fact, there has been great concern expressed by the USFS regarding the impact of YFA on the native plant communities where YFA has invaded. A study was initiated on the Grand River National Grassland in 2003 to describe spatial distribution patterns of YFA, to determine associations between YFA occurrence and species richness and biomass production of native plant communities, and to examine density and viability of the seed bank of YFA along environmental gradients. Although YFA plants were occasionally found on upper and mid-slopes, highest densities occurred on the lower slopes in fine-textured soil. Areas dominated by YFA had low richness and biomass production from native species, but high total biomass. Density of the YFA soil seed bank was positively correlated with YFA cover and biomass and was > 39,000 seed m-2 in the lower slopes. Ninety-nine percent of YFA seeds were viable but < 4% germinated under standard laboratory conditions. The distribution of YFA was clumped, and periodic seed production and high frequency of hard seeds presumably provided population maintenance on the lower slopes. However, its potential for dominance on less favorable landscape positions appeared to be low.

An Invasive Species May Limit Diet Expansion in a Native Lady Beetle

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Invasive predators may exclude native predators from available resources either by preying on them or by causing them to avoid certain habitats. We used a series of manipulated and observational studies to assess the impact of the invasive multicolored Asian lady beetle (*Harmonia axyridis*) on resource use of the native twelve-spotted lady beetle (*Coleomegilla maculata*). Our hypothesis is that the risk of predation by the invasive, intra-guild predator, H. axyridis limits the expansion of diet breadth by C. maculata to include soybean aphid. In 2008 and 2009 visual counts of coccinellids on maize and soybean plants revealed that although all stages of H. axyridis were common in both habitats, in soybean, C. maculata sightings were almost exclusively adults. Egg mass identification confirmed that C. maculata eggs were very rarely found in soybean. Studies on caged maize and soybean plants and outplants of sentinel eggs in 2009 and 2010 will determine the effect of H. axyridis on fitness of the native predator in maize and soybean habitats.

Evaluating the Invasive Potential of Norway Maple (*Acer platanoides* L.) and Amur Maple (*Acer tataricum* L. ssp. *ginnala* (Maxim.) in Central Minnesota - Initial Results

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Amur maple and Norway maple have long been popular landscape plants in the United States, valued for their ornamental attributes and tolerance of harsh environments. However, both are often cited as being invasive and are currently on the invasive species lists

of many states. While documented research concerning invasiveness exists only for Norway maple, none of the work was conducted in the upper Midwest. A multi-year investigation of characteristics potentially contributing to invasiveness of these species in Minnesota was initiated at the University of Minnesota Landscape Arboretum in 2007. Four native species, boxelder, (Acer negundo L.), red maple (*Acer rubrum* L), silver maple (*Acer saccharinum*) , and sugar maple (Acer saccharum Marshall) were also evaluated to provide a reference for comparison. Cultivars of Amur and Norway maple differed in seed quantity per gram dry weight of stem tissue indicating it may be possible to breed and select for less invasive genotypes of these species. Seed persistence ranged from 1-3 weeks for Norway, Red, Silver, and Sugar maples to six months or more for Box Elder and Amur maple. Sown seed of all species established more readily in wood chips or tilled soil than in grass or forest understory plots. Seed predation appeared to be a factor limiting establishment in the grass and forest plots. Initial hybridization trials suggest that neither Amur nor Norway maple readily outcrosses with any of the four native maple species. Ongoing trials will quantify growth rates and length of juvenile periods of these species.

Phenology of Flowering Rush and Hardstem Bulrush in the Detroit Lakes Chain

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Flowering rush, *Butomus umbellatus*, is an invasive plant species that has been present in the Detroit Lakes system (Becker County, Minnesota) since the 1960's. It is an emergent plant present in the littoral zone that reproduces primarily by asexual budding of the rhizome. Past control efforts, which began in the 1980's, mainly consisted of digging up flowering rush beds and in the 1990's, application of herbicides. We measured above- and below- ground biomass of flowering rush relative to growth of the native emergent hardstem bulrush, *Schoenoplectus acutus* in order to understand the phenological differences between the two species. This experiment consisted of four plots, corresponding to Big and Little Detroit Lake, Lake Sallie, and Curfman Lake (Becker County). The site selection was made in conjunction with the Minnesota DNR Fisheries and Invasive Species programs to prevent damage to sensitive habitats, such as fish spawning sites. Every three weeks throughout the summer, samples were taken from each site using a 6" diameter corer. Samples were washed, and separated into: emergent leaves, submersed leaves, flowers and rhizomes. Both wet and dry biomass was recorded as well as the plant height and number of ramets, bulbils, and rhizome buds present in each sample. Understanding the timing of flowering rush plant emergence and carbohydrate allocation relative to water temperature and the growth of hardstem bulrush will be important to identifying effective treatment methods.

Inter Simple Sequence Repeat (ISSR) Variation in Reed Canarygrass (*Phalaris arundinacea* L.)

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Reed Canarygrass (*Phalaris arundinacea L.*), a perennial grass native to temperate Europe, Asia, and North America, has become invasive in many wetland and disturbed habitats in the US. This project aims to use Inter Simple Sequence Repeat (ISSR) molecular markers to analyze the genetic diversity and relatedness between individuals and populations from European and North America. DNA from 500 Reed Canarygrass genotypes comprising wild populations in four US states and six commercial forage cultivars has been isolated. Additional DNA samples of genotypes from eight European countries have been provided by Dr. Michael Casler's lab at the University of Wisconsin. To date, data from three ISSR primers with a total of 24 polymorphic loci have been analyzed. While a preliminary cluster analysis of pair wise genetic similarity did not indicate a high level of geographic differentiation, several intriguing patterns emerged. Of the ornamental and forage cultivars, only one variety formed a distinct group while the other cultivars were widely distributed throughout the dendrogram. Additionally, there were many indistinguishable or highly similar pairs consisting of either one European and one wild North American or one cultivar and one wild North American genotype. These results are consistent with the small number of selection cycles of most of the commercial cultivars, and suggest a relatively high level of genetic similarity between cultivars and wild populations from both continents surveyed. Ongoing work will augment the dataset with markers from additional primers. Further analyses will focus on population-level differences at regional, state, and continental geographic scales.

Site and Climate Effects on Midwest Forest Invasibility by Non-Native Plants

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The relationship between invasive species presence, site characteristics (e.g. disturbance, live tree volume, city distance, edge distance, physiography, and type of water [e.g. streams] present on plot), and climate (annual average number of days the temperature is ≥ 90˚F and annual average number of days the temperature is ≤ 32˚F) was modeled for five non-native invasive plants (multiflora rose [*Rosa multiflora*], common buckthorn [*Rhamnus cathartica*], non-native bush honeysuckles [Lonicera spp.], garlic mustard [Alliaria petiolata], and reed canary grass [*Phalaris arundinacea*]) sampled by the USDA Forest Service's Forest Inventory and Analysis program in seven Midwestern states for 2005-2006. Species' response to site and temperature predictors varied due to trait differences such as shade tolerance and moisture affinity. Most species presence was positively related to biotic disturbance (disease(s)/animal(s)) and mesic physiography and negatively related to distance from a city or nonforest edge. The best predictor for the presence of non-native invasive plants was annual average number of days the temperature is ≤ 32˚F, with all five species correlated. Understanding the effect of site and climate on NNIP distribution provides insights into important drivers of species presence at a regional scale and allows concerned citizens to predict invasion risk and future ecosystem response.

Population Biology of Garlic Mustard (*Alliaria petiolata*) in Minnesota Hardwood Forests

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Invasive garlic mustard (*Alliaria petiolata*) has become abundant in many forested regions of the United States. This study examined the fluctuations of garlic mustard populations over time and their relationship with native species, levels of leaf litter, photosynthetic radiation, and insect herbivores. At half of the 12 monitoring sites, garlic mustard populations showed strong two-point cycling with alternating dominance of the first- and second-year life stages. Increased garlic mustard cover was negatively correlated with native species richness and cover. All sites had litter layers that had been significantly impacted by earthworms. Light was a key factor in understanding garlic mustard populations. Adult plant cover is higher where light is more abundant, but high cover of adult plants produces shade and can cause low cover of seedling plants. We found that less than 2% of garlic mustard leaf area is currently being damaged by herbivores in Minnesota. These results have implications for both the release of potential biological control agents and restoration of garlic mustard invaded sites. When working to restore a site that has been heavily invaded by garlic mustard, the level of earthworm impact, the number and abundance of native species that remain, and any changes to the light available from the canopy should all be considered as factors that could influence the recovery of the site, in addition to the potential decrease in garlic mustard.

Light Brown Apple Moth Cold Hardiness: Potential for Overwintering in the Midwest

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The Light Brown Apple Moth, *Epiphyas postvittana*, is an invasive pest and was recently confirmed to be established in California. The Midwest region has several host plants (e.g., apples, alfalfa) but may be too cold for the insect to survive. The aim of this study was to measure the capability of this species to survive low temperatures and to estimate the potential of this pest to overwinter in northern states. Two indices of cold hardiness, supercooling point (SCP) and lower lethal temperature (LLT), are reported here for instars and pupae reared at 15 or 22°C. SCP is the lowest temperature recorded before detection of the exotherm. We measured SCP

and LLT following established protocols in a biosecurity level-2 quarantine facility. SCPs for larvae ranged from -13 to -24˚C, depending on instar and rearing temperature; pupae ranged from -15 to -17˚C. In LLT studies, larvae that gave an exotherm (i.e., froze) typically died. Larvae cooled to temperatures below 0°C but above the exotherm range often continued to develop to adults. Although *E. postvittana* was more cold hardy than we anticipated, it does not seem likely to survive winters in upper Midwestern states.

Competitive Responses of Tansy and Goldenrod Differ According to Ploidy and Genotype

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Establishment and persistence of invasive species depends on the genetics of the invasive and native populations. Populations may differ in their ability to invade or tolerate invasion depending upon their genetic structure. This research examines the genetics of a competitive interaction between the widespread invasive perennial, common tansy (Tanacetum vulgare), and the native polyploid perennial, late goldenrod (Solidago altissima). Clones of five diploid and tetraploid genotypes of goldenrod were grown in competitive arrays with three tansy clones. Thirty tansy genotypes were cloned such that each experienced competition from diploid and tetraploid goldenrod. From the native species perspective, tetraploids were generally larger than diploids, but there was no difference among ploidy levels in the extent to which competition reduced traits. However, diploids benefited more from the presence of tansy in having fewer aphids than tetraploids. Significant differences were also found among goldenrod genotypes within ploidy levels in their competitive ability suggesting that the presence of tansy may alter goldenrod genetic structure. From the invasive species perspective, significant variation in plant size among tansy genotypes were found depending on their competitive pairing with diploid or tetraploid goldenrod suggesting that the ploidy composition of the invaded population may exert selection on tansy. Overall, this research does not demonstrate a competitive advantage of polyploidy. However, the greater genetic variability among tetraploids suggests they may evolve competitive traits more readily than diploids. This work also indicates tansy invasion in native goldenrod populations may be influenced by the ploidy distribution.

Spatial Distribution of Nonnative Invasive Plants Inventoried in the North by Forest Inventory and Analysis

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The threat of nonnative invasive plant species in the nation's forests is an ever-growing concern. Their aggressive nature allows many of them to out-compete native species, causing ecological and economic harm. The Forest Inventory and Analysis (FIA) program of the USDA Forest Service is taking an active role in the inventory and monitoring of these species in order to provide statistically valid estimates of their distribution and abundance. While a national protocol has been established to describe the process of collecting invasive vascular plant data, each FIA region is responsible for identifying the most important invasive plants to monitor on its forestlands. The list developed by the Northern Research Station currently includes 43 species. From 2007 to 2009, the presence and abundance of these species were documented on more than 2,400 forested locations across the northern region, stretching from the Great Plains to Maine. Each of the forested sites will be re-visited on a 5-year cycle in order to monitor change. We present maps depicting the distribution of 5 of these invasive plants based on FIA data. A field guide that can be used to identify all 43 invasive plant species is now available at http://nrs.fs.fed.us/pubs/34183.

Invasive Reed Canarygrass (*Phalaris arundinacea*) in Wisconsin Trout Stream Restorations

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Invasive plant species such as reed canarygrass (*Phalaris arundinacea*) are a concern in trout stream restorations throughout the state of Wisconsin, due to interest in restoring native prairie. We investigated 1) the effects of reed canarygrass on stream macroinvertebrates, and 2) the spatial pattern and degree of reed canarygrass invasion in trout stream restorations in west-central Wisconsin. We found a negative correlation between reed canarygrass and macroinvertebrate quality and diversity in established stream reaches, but a positive correlation in newly restored reaches. This pattern suggested that reed canarygrass provided vegetative

cover in new restoration sites, but in older sites with abundant vegetation it had negative effects on the macroinvertebrates. Reed canarygrass was a definite impediment to riparian prairie restoration in some restoration sites. The degree of invasion was highest along stream banks and wet meanders. Trout stream restoration provides a unique opportunity to restore high-quality native riparian vegetation, and methods to prevent invasive species colonization are needed.

Celastrus orbiculatus (Oriental bittersweet) at the University of Wisconsin Arboretum, Madison, WI

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Celastrus orbiculatus (Oriental bittersweet) is widely recognized as a noxious plant species in much of the eastern U.S., but it is only beginning to show its invasive potential in the Upper Midwest. However, rapidly growing populations such as the one observed in this study in Madison, Wisconsin suggest that there is substantial reason for concern. Recently, the vine has become invasive in the Grady Tract of the UW Arboretum. The goals of this study were two-fold: to determine the extent of C. orbiculatus in the Grady Tract and to determine how topography, distance to edge, and tree community composition affect its presence and abundance. We sampled 100-m2 circular plots spaced every 100 m throughout the Grady Tract. In each plot, we tallied C. orbiculatus climbing stems, measuring the diameter of those larger than 1 cm. We measured slope, aspect, and terrain shape at each plot. We determined tree community composition by identifying all canopy trees in a plot and measuring the basal area using a 2M basal area prism. The data showed no significant correlation between local topography or distance to edge and C. orbiculatus abundance. However, there was a weak positive correlation between tree basal area and C. orbiculatus abundance. Areas dominated by red pine (*Pinus resinosa*) and white pine (*Pinus strobus*) also had higher abundance of C. orbiculatus than areas dominated by other tree species such as oaks (Quercus spp). Understanding the factors that determine the distribution of C. orbiculatus in the Upper Midwest is important for designing effective management strategies to minimize its spread.

Invasive Species Prevention, Containment, and Preparedness

Wisconsin DNR Monitor Effort for Aquatic Invasive Species: A Partnership Approach

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Wisconsin Department of Natural Resources' staff have recruited lake volunteers to watch for Aquatic Invasive Species (AIS) since 1991 and provided training in collecting and entering data independently. Once the AIS is verified and vouchered, the data is entered into the statewide Surface Water Integrated Monitoring System (SWIMS) database. The benefits to the Department include greater coverage than staff alone would achieve which can lead to earlier detection of priority species. Following detection, local communities can apply for funding to conduct a response or depending on the species identified, DNR staff may initiate a rapid response. The distribution data is also used to quantify spread of priority aquatic invasive species in the state and determine efficacy of longer term outreach efforts designed to slow the spread of these species. Trained volunteers are a valuable point of contact in their communities and help distribute messages about aquatic invasive species. In addition to tracking the distribution of aquatic invasive species some of the volunteers may monitor for water quality as well. These volunteers are the first line in observing the conditions in the lake and taking steps to protect a healthy and diverse aquatic community.

Current Regulatory Policy for Invasive Earthworms in Minnesota

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To prevent the spread of environmentally damaging invasive species a regulatory policy needs to be in place and enforced. Under current legislation in Minnesota, earthworms, a non-native terrestrial species from Europe and Asia, are not regulated and are being spread throughout the state, damaging the northern hardwood forest ecosystem. Here we review the present regulatory policy in Minnesota for invasive earthworms. We have identified seven Federal and seven State agencies that may have authority to regulate invasive earthworms in northern Minnesota. Relevant personnel at each agency were interviewed by telephone to determine authority, plans and actions for regulating invasive earthworms. We found that nearly all agencies asserted some regulatory authority over invasive earthworms; however this authority was typically narrowly constrained or indirect. In addition, we found that few agencies had plans for regulating invasive earthworms and fewer still were taking action to do so. After an analysis of the current action of agencies we expect to find that there are no state-wide comprehensive authoritative measures being taken to prevent the spread of earthworms in the northern Minnesota hardwood forests. These findings suggest a need to coordinate and strengthen statewide authority for invasive species, and perhaps even introduce new legislation that would cover the earthworm issue specifically.

Demand for Earthworm Bait

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Earthworms otherwise known as Angle Worms (*Aporrectodea caliginosa*) or Night Crawlers (*Lumbricus terrestris*) are present in the northern hardwood forests of Minnesota, likely due to human activity. Researchers suspect that the use of earthworms for fishing bait, and the activity of anglers have transported the earthworms to these northern forests. Earthworms are considered an invasive species in these forests because they are not naturally occurring and they consume leaf litter that native woodland wildflowers and other native species rely on for survival. Educating anglers about the invasiveness of earthworms in northern hardwood forests is thought to have great potential for reducing future introductions. The purpose of this study was to identify when anglers are most likely to use earthworms as bait. By knowing when earthworms are likely to be used, educational efforts can be targeted so they have the greatest effect. The objective of this study was accomplished by interviewing fishing guides to determine what factors influence when earthworms are typically used as bait. The results of these interviews indicated that lake temperature is a key factor because earthworms are most effective in lakes that have a temperature of 65 degrees Fahrenheit or greater. To corroborated these findings, weekly live bait sales for bait shops in the Cass Lake region will be related to weekly average temperatures to determine if the use of earthworms increases relative to other live baits as air temperatures (which are correlated with lake temperatures) rise.

Genetic Conservation of Minnesota's Ash Resource

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The Emerald ash borer (EAB, *Agrilus planipennis*) is an exotic, invasive insect that threatens all ash (*Fraxinus*) species in North America. It was first detected in Detroit, Michigan and Windsor, Ontario in 2002 and has since killed tens of millions of ash trees in 14 states and two provinces. It was identified in Minnesota in 2009. Our native ash species have no known resistance to EAB and thus mortality rates could reach 100% in an undetected outbreak in four to six years. These localized extinctions result in the loss of genetic diversity and adaptation to local climate conditions. The goals of our project are to conserve the genetic variation found in Minnesota's ash species through seed collection and long-term storage and to evaluate three seed collection strategies to determine which is the most efficient at capturing genetic variation. We have collected seed from 299 green ash (*F. pennsylvanica*) and 205 black ash (*F. nigra*) using three different collection strategies: population collections (groups of 20-30 trees from small geographic areas), ecoregion collections (11-15 trees across Omernik Level III ecoregions), and volunteer collections (individual trees scattered across the state). Microsatellite markers from European ash (*F. excelsior*) will be used to characterize the genetic variation in a subset of the seeds and to determine the efficacy of the three collection strategies.

Semi-Automated Identification of Municipal Ash Trees Using High Resolution Aerial Imagery

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While ash is a significant component of forests, it has also been widely planted in municipal areas as a replacement for elm lost to Dutch elm disease during the latter half of the 20th century in the Midwestern United States. Now, however, ash is in peril as the emerald ash borer (*Agrilus planipennis*) continues to spread after killing millions of ash trees in Michigan and the surrounding areas. In 2008 and 2009, EAB was discovered in Wisconsin and Minnesota, respectively, and a number of cities in each state have taken action to respond to this threat. For example, the city of Milwaukee has undertaken a huge endeavor to map all of its tree cover and classify the ash crowns. Their undertaking includes acquiring and incorporating hyperspectral imagery and associated LiDAR data to produce an accurate tree canopy dataset over a large area (95 sq. miles) (Souci et al. 2009). While Milwaukee's approach will provide a data-rich inventory, not all municipal areas can carry out a project of this magnitude. We present a viable alternative for identifying and mapping ash tree canopies using eCognition Developer 8 image segmentation software and freely-available four-band high-resolution imagery from the USDA's National Agriculture Imagery Program. A fine-scale map of ash trees is presented for a study area in the Twin Cities metropolitan area. Souci, J.S., I. Hanou, and D. Puchalski, 2009. High-resolution remote sensing image analysis for early detection and response planning for emerald ash borer. Photogrammetric Engineering & Remote Sensing, 75(8):905-909.

Clean Boats, Clean Waters: Citizens and Staff Work Together to Protect Wisconsin's Lakes

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Educating boaters and anglers at boat landings through watercraft inspection is a vital part of Wisconsin's aquatic invasive species (AIS) prevention efforts. With so many waterbodies and so few state resources, the success and continuation of our watercraft inspection program has been very reliant upon our enthusiastic, highly motivated citizens. Since the creation of the Clean Boats, Clean Waters program in 2004, thousands of citizens have been trained at inspection workshops on how to initiate boater education efforts at their local boat landings. These volunteers, as well as paid staff, collect data about the actions of boaters and anglers and share information about how to help prevent the spread of aquatic invasive species. The data that has been gathered over the past six plus years has revealed some fascinating, and exciting, trends in the AIS preventative behaviors and AIS awareness of people using our boat landings. Even though an all-time-high of 50,034 boats were inspected in 2008, inspectors exceeded that number by more than 13,000 in 2009. More people were contacted during watercraft inspections in 2009 than ever before, as well. These exciting data finds wouldn't exist if it weren't for all of the volunteers and staff who collect and report inspection data. Thanks to all of you who have worked so hard to prevent the spread of AIS! It is clear were making a difference for Wisconsin's waterbodies.

Youth Protecting Wisconsin Waters: The Department of Workforce Development Boat Inspection Program

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In the summer of 2009, an increase in watercraft inspectors was made possible by a new project and partnership with the Wisconsin Department of Workforce Development. Forty-nine young adults who were unfamiliar with aquatic invasive species (AIS) or outreach efforts were given the opportunity to become educators and help protect Wisconsin's lakes by working as inspectors. With the support of numerous partner organizations and outstanding supervisors, these young adults, known as the Water Force, conducted boat inspections in 23 counties. Many of them gained valuable work experience and insight into their career interests, while lakes with an AIS presence gained some much needed boat inspections. Our partnerships were key in the evolution of the Water Force project, and the lessons learned will benefit future inspection efforts.

Preventing Saltcedar (*Tamarix* spp.) Invasion in the Northern Great Plains

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Although the seasonally wet conditions associated with the prairie pothole region (PPR) in the Northern Great Plains (NGP) appear uniquely suited for saltcedar (*Tamarix* spp.) invasion, this area has few infestations of this pervasive non-native. Saltcedar typically colonizes freshly exposed moist soils following disturbances including overgrazing, fire, or flooding. Controlled burns are being tested to manage other invasive species in NGP rangelands, which may inadvertently promote saltcedar invasion by opening the vegetative canopy. Saltcedar establishment was investigated in fire, clipped (simulated grazing), and control (nonburned/nonclipped) treatments in NGP PPR soils. Three soil cores per treatment were collected in spring immediately after fire treatment from three sites (one containing paired footslope and summit positions) in eastern South Dakota. Cores were seeded with saltcedar seeds in the greenhouse and subirrigated to maintain high soil water conditions typical near potholes during late spring/early summer. Seedlings were counted during the first three weeks and, in order to calculate growth rates, heights of five seedlings per core were measured weekly from weeks 3 to 7. More saltcedar seedlings established and had higher growth rates in fire treatments compared with controls from footslope positions. Fire did not influence these parameters at the summit. Clipping increased seedling establishment and growth rates in the absence of fire. These results suggest that opening the canopy with fire or grazing increases the potential for saltcedar invasion in lower-elevation areas of the NGP. Areas adjacent to viable saltcedar seed sources should be managed to maintain canopy cover to limit further establishment.

Firewood Use and Movement: Before and After Regulation and an Education Campaign

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Surveys were conducted in 2008 and 2006 following regulation of firewood allowed onto state lands and an associated education campaign. In both surveys, we measured camper attitudes, behaviors related to camping and firewood transport, and features of firewood supplies at/near state forests and parks. We also asked why campers brought firewood from home. For the 2008 survey, we included questions to help determine if various education efforts, regulations, and notices have influenced camper transport of firewood, and which of these efforts campers thought were most informative and/or persuasive. We also asked how firewood quality could be improved inside the parks and whether campers transported firewood when they visited private or county campgrounds. Over this period, awareness of emerald ash borer (EAB) increased, awareness of the role of firewood in spread of EAB increased, support for stopping long distance movement of firewood increased, and movement of firewood by respondents decreased. The most common source of information was parks staff and it was also the most trusted.

What Does “Local” Firewood Buy You? Managing the Risk of Invasive Species Introduction

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Firewood can serve as a vector in the transport of non-native species, including wood-boring insects that feed within the wood and thus can be transported accidentally. Governments have enacted limitations on the movement of firewood in an effort to limit the anthropogenic movement of non-native species through, for example, recreational camping. Although the movement of invasive species through firewood is a documented invasion pathway, it is not trivial for governments to determine a “safe” allowable distance for moving firewood. We were motivated by this challenge and developed a theoretical simulation to determine the campgrounds that could be potentially exposed to infested firewood based upon the hypothetical distribution of an invasive species and the allowable distance for moving firewood. We extend this concept to the known distributions of emerald ash borer (*Agrilus planipennis Fairmaire*) and Asian longhorned beetle (*Anoplophora glabripennis Motschulsky*). We illustrate, based upon theoretical and empirical

observations, that as the distribution of an invasive species increases, more rigid constraints on the movement of firewood would be required relative to those species that are distributed over a smaller scale. Also, on the level of management within a state, smaller states have far less margin for error than larger ones, as even extremely rigid restrictions on the movement of firewood could have little management effect unless the infested area is spatially limited. These results collectively suggest the potential for a dynamic management strategy that adjusts allowable distances for firewood movement based upon the distribution of the non-native species.

NR 40 - Wisconsin's New Comprehensive Invasive Species Rule

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After five years and the active involvement of hundreds of people, Wisconsin now has a comprehensive invasive species classification rule. Plants, animals and pathogens – aquatic and terrestrial – are all covered in one rule, although there are parts of the rule that relate to only one group of organisms. This new rule uses science-based assessments to classify and regulate exotic invasive plants, animals, and disease-causing microorganisms, as well as the various pathways by which invasives can be transported across the landscape. In 2001 the state legislature authorized the development of an advisory Council and required DNR to create an invasive species classification rule. The Wisconsin Council on Invasive Species created several subcommittees to provide a wide range of input into the rule-making process. The Research Committee developed a science-based set of criteria upon which to assess each species for classification. The following criteria are used: 1) current status and distribution, 2) establishment potential and life history traits, 3) damage potential, 4) socio-economic effects , and 5) control and prevention potential. Species Assessment Groups, comprised of experts and stakeholders, were formed for each group of species to review the literature and recommend a legal classification for each species. Extensive public review of the rule allowed diverse stakeholders to provide valuable input and lent credibility to the process, leading to wide-ranging acceptance and support of the final rule. Due to the large number of species listed, the need for staff training and public outreach is extensive.

Forest Resource Information to Support Decision-makers and Land Managers

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Since the discovery of emerald ash borer in Minnesota and Wisconsin, numerous news reports have cited statistics on the number and volume of ash trees in these states. Have you ever wondered how those numbers were derived? Would you like to generate similar statistics for your area of interest? The Forest Inventory and Analysis (FIA) program of the USDA Forest Service has been collecting information on forest resources since the 1930's. FIA gathers data across all 50 states on both public and private lands. Statistically precise estimates for a suite of forest attributes can be generated from data collected on a network of thousands of plots across Minnesota and Wisconsin. Highlighting ash as an example, we present a variety of resources, including maps, geospatial datasets, on-line tools, and published reports, that decision-makers and land managers can use to help assess what's at risk.

Freshwater Ballast Treatment - Moving Toward Prevention in the Great Lakes

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While ballast water treatment regulation and technology for saltwater vessels advances steadily, progress on freshwater applications has been slow. This is due largely to the relatively small number of freshwater vessels and differences in their operation and construction. Isle Royal National Park has partnered with industry, government, academia and non-profits to advance permanent, interim, and emergency freshwater ballast treatment for vessels in the Great Lakes. This poster presentation provides an update of our current efforts at developing ballast water treatment technology and emergency response procedures.

Invasive Species Early Detection and Rapid Response

Early Detection System for the Great Lakes Early Region

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The National Park Service (NPS), National Institute of Invasive Species Science (NIISS), Midwest Invasive Species Network, and University of Wisconsin-Madison are collaborating in the development, implementation, and maintenance of an online database and early detection warning system for invasive species. This database will provide new users with the ability to store and access data online and allow users with existing databases to contribute their data to a larger database by automatically sharing data across the region. We will also create an alert system from this database to inform users when new invasive species are reported. Alerts will be sent to users via email and can be tailored by the user using criteria such as species, area within the region, and/or habitat This poster will feature a short description of the proposed system and feature a large blank space for participants in the conference to contribute their input on what features and functionality such a system should have in written form.

New Invaders to Wisconsin

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Yellow-floating heart (*Nymphoides peltata*), Brazilian Elodea (*Egeria densa*) and Red swamp crayfish (*Procambarus clarkii*) were recently discovered in Wisconsin. The ability to order these organisms over the internet and through mail order gives them the ability to travel to all parts of the world. Yellow-floating heart, a popular water garden plant, is very difficult to control due to its ability to form a new plant from rhizomes, stolons, separated leaves, plant fragments, or seeds. Attempts to mechanically harvest only serve as means of creating and introducing more plant fragments aiding in dispersal to new locations. Yellow-floating heart has the potential to colonize large areas within one growing season by means of vegetative propagation and a single plant can produce over 100 new plants in only 12 weeks. Periods of drawdown facilitate germination of the seeds, which stay viable for 3-5 years, and chemicals normally used in aquatic plant control seem ineffective. Brazilian waterweed, a top selling aquarium and pond plant, is native to South America. It grows in still and flowing waters such as lakes, ponds, pools, ditches, quiet streams and seems to grow best in mildly acidic, nutrient-rich lakes. During winter, it survives along the bottom and resumes growing when waters reach 50 degrees Fahrenheit. It forms mats dense enough to restrict water movement, trap sediment and cause fluctuations in water quality. Reproducing via fragmentation allows it to spread from a single plant and tends to choke out slower-growing native plants. It can out compete Eurasian water-milfoil. This species is the most widely introduced crayfish in the world. Red swamp crayfish are farmed extensively in the Southeastern United States and make up the vast majority of crayfish consumed worldwide. Biological supply companies commonly sell this species as pets or for educational purposes and they prefer marshes, swamps, ponds and slow moving rivers and streams, but have also become established in lakes.

Early Detection of Invasive Cereal Cyst Nematodes Using PCR-Restriction Fragment Length Polymorphism

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During the field season of 2009, Minnesota Department of Agriculture (MDA) field staff collected soil samples from small grain and corn fields across the state as part of a three year survey for invasive cereal cyst nematodes (CCN). The invasive cereal cyst nematodes surveyed for are *Heterodera filipjevi*, *H. latipons* and *Punctodera chalcoensis*. Also included in the survey are *H. avenae* and *H. zeae*. Each year a third of the grain producing counties in the state are sampled. The soil samples are extracted using either a centrifugation and sugar flotation method or a Fenwick can extraction. Initial morphological screening separated any cysts in the genus Punctodera. The CCN cysts are in the same genus as the soybean cyst nematodes (SCN) found in Minnesota and are morphologically

similar. Molecular diagnostics are needed to differentiate the species. Cysts from the extracted samples are stored in a nematode extraction buffer followed by a DNA extraction. Initial polymerase chain reaction (PCR) screening for soybean cyst nematode (*Heterodera glycines*) is done and any positive finds eliminates those samples as suspect CCN. The remaining DNA samples are differentiated using a PCR-restriction fragment length polymorphism (RFLP) amplifying regions of the internal transcribed spacer, ITS1 and ITS2 and the 5.8S gene. Amplification was followed by RFLP digestions using up to three restriction endonucleases, HinfI, TaqI and PstI. The first year of sample screening done in 2009 resulted in no positive finds for CCN.

Invasive Species Control and Management

Yellow Floating Heart Eradication Experiences in Wisconsin

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Wisconsin has had two cases of ponds infested with yellow floating heart (*Nymphoides peltata*). Manual removal either did not work, or was not an option, chemical control was ineffective, so both ponds were removed with care taken to remove and contain all seeds in water and mud. The ponds were rebuilt, and control efforts appear to have been effective. This poster provides photos, highlights problems/resolutions from both examples, and presents take home messages, along with contact info for both ponds.

Biological Control of Garlic Mustard (*Alliaria petiolata*): an Update

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Use of biocontrol agents to control garlic mustard would provide long-term control and management of this invasive biennial weed. Extensive host specificity testing on a potential biocontrol agent, the stem and crown-boring weevil, *Ceutorhynchus scrobicollis*, has been completed at CABI Bioscience in Switzerland and at the University of Minnesota. Results of these tests indicate that *C. scrobicollis* is a highly specific herbivore. At the University of Minnesota, the Level 2 High Security Containment Facility is currently the only location in the country where work on *C. scrobicollis* is being conducted. At this facility, we have been rearing and conducting host specificity testing with *C. scrobicollis* for the past five years. After completion of a series of vigorous host range tests, we have applied to the Technical Advisory Group (TAG) for Biocontrol of Weeds for approval for field release of *C. scrobicollis* and are now testing some additional native mustards at reviewers' request. We will discuss the current status of our garlic mustard biocontrol project with *C. scrobicollis* as well as our work with *Ceutorhynchus alliariae*, another potential biocontrol insect.

Impact of Mowing Timing on Japanese Hedge Parsley (*Torilis japonica*) Seed Production

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Although a relatively new invader in Wisconsin, many believe that Japanese hedge parsley (*Torilis japonica*) will present a formidable challenge, and it is widely heralded as the next garlic mustard. As a prohibited/restricted species under new Wisconsin state legislation, management is required by law, and spreading Japanese hedge parsley seed, even accidentally during mowing, is illegal. This study investigated the impact of mowing timing on the quantity of Japanese hedge parsley seeds produced. Randomly sampled plants at three sites in south central Wisconsin (Black Earth, Madison, and Spring Green) were cut at different phenological stages throughout the summer. Data on phenology, height, aboveground biomass, and vegetation cover of Japanese hedge parsley were collected at each mowing interval. At every interval, cut plants were removed from the site and allowed to dry at room temperature.

The seeds initially produced from cut plants were counted. Individual plants were revisited in the fall, and the seeds produced from resprouting tissue were also collected and counted. Results will provide important basic information on the phenology and ecology of this new invader, as well as specific information on how to manage Japanese hedge parsley with mowing to prevent seed production.

Cool Season Grass Management in Riparian Zones and Resulting Impact on Stream Characteristics

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Riparian zones present challenges for the management of invasive species. Cool season grasses, particularly reed canary grass (*Phalaris arundinacea*), are known to invade these systems and form dense monocultures. To determine the best method for establishing higher biodiversity in these riparian zones and assessing ecosystem impact of methods, experiments were initiated at three sites in southwestern Wisconsin. A split plot design was implemented at each site with revegetation treatments as the main plot and control method as sub-plots. Control methods included at late fall + spring glyphosate application at 0.84 kg ae/ha, spring glyphosate application at 0.84 kg ae/ha, mowing, and no treatment. Revegetation treatments included planting grasses and forbs with a no-till drill in spring, planting grasses with a no-till drill in spring and frost seeding forbs the following winter, and an unplanted control. An additional glyphosate application was made after several frosts, but prior to seeding forbs to provide additional weed suppression. Experiments were repeated at each site in an upstream location. Preliminary results indicate late fall + spring applications of glyphosate show the best control of cool season grasses, while increasing cover of biennial weeds. Treatment comparisons in terms of biodiversity and invasive control will be presented, as well as the establishment success of the different revegetation techniques. The impacts of both the treatments and the revegetation techniques on the stream ecosystem will also be presented. These findings provide valuable information on invasive cool season grasses and the best revegetation methods in disturbance sensitive riparian zones.

Developing Biological Control for Common and Glossy Buckthorn

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Rhamnus cathartica (common buckthorn) and *Frangula alnus* (glossy buckthorn) (Rhamnaceae) are both shrubs and small trees of Eurasian origin which have become invasive in North America. In 2001, a new research program to develop biological control for buckthorns was initiated. Candidate biological control agents would be monospecific to *R. cathartica* or *F. alnus* or their host ranges restricted to a few non-native species in either the *Rhamnus* or *Frangula* genera. Initial surveys and research found that there were no species or genus-specific potential biocontrol agents for *F. alnus*. By 2008, several potential biocontrol agents had been identified for *R. cathartica*. Host-specifity testing focused on the leaf-feeding moth *Phileremevetulata*, the leaf-margin gall psyllid *Trichochermes walkeri*, and the seed-feeding midge *Wachtiella krumbholzi*. *P. vetulata* was determined not to show enough host-specificity and will be eliminated from future testing. Future work will include continuing to assess the feasibility of using *T. walkeri, Cacopsylla rhamnicolla* (psyllid), and *W. krumbholzi* as biological control agents for *R. cathartica*. However, the phytoplasma '*Candidatus Phytoplasma rhamni*' (buckthorn witches' broom) has been detected in two populations of *T. walkeri* in Switzerland. *T. walkeri* is the first insect host record for this phytoplasma. Additional study of the phytoplasma is necessary to determine if *T. walkeri* could be used as a biological control agent. Research will also be conducted to determine the causes of the high levels of seed and seedling mortality of *R. cathartica* observed in Europe as a step toward identifying additional potential biological control agents including pathogens.

Biological Control of Invasive Plants in Minnesota

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Biological control, the use of natural enemies to control non-native pests, can be an effective tool in managing invasive plants. Non-native plants can become invasive because they lack the insects and diseases that control them in their native environments. Biological control reunites natural enemies, such as herbivores and pathogens, with their host (invasive plant) to reduce impacts caused by the pest. Frequently, this involves the use of specialized insects that were tested extensively for host specificity (safety) and efficacy. The goal of biological control is not to eradicate the invasive plant, but to reduce its impact to an acceptable level. The Minnesota Departments of Agriculture and Natural Resources have implemented successful biological control programs for leafy spurge (*Euphorbia esula*), spotted knapweed (*Centaurea biebersteinii*), and purple loosestrife (*Lythrum salicaria*, *L. virgatum*, hybrids, and cultivars) statewide. Development of new biological control efforts for garlic mustard (*Alliaria petiolata*), buckthorn (*Rhamnus cathartica* and *Frangula alnus*), and common tansy (*Tanacetum vulgare*) are underway.

Southeast Ohio Non-Native Invasive Species Interest Group: Building Collaboration for Landscape-Level Impacts

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In 2007 a group of interested stakeholders, including private landowners, land managers, researchers and non-profit organizations began meeting to explore opportunities to share knowledge and experience and coordinate efforts across the landscape. This group identified three watersheds in Southeastern Ohio where the presence of public lands and private non-profit lands intermixed with private holdings could create the right conditions for successful Cooperative Weed Management Areas (CWMAs). Groups and individuals within these three areas began working together to: remove the most vigorous of invasive species: prevent new infestations through early detection and rapid response; and educate and engage landowners, citizens and youth about non-native invasive species (NNIS) in order to have positive landscape-level impacts. Future direction for the group includes participation in the Central Hardwoods Invasive Plant Network (CHIP-N), which inventoried and mapped aquatic and terrestrial NNIS along portions of the Ohio River, its tributaries and nearby inland lakes in 2010.

Preliminary Characterization of Digestive Enzymes in Native Mussels and Zebra Mussels: a Step Toward Developing a Species-Specific Control for Aquatic Invasive Species

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Resource managers consistently list the lack of chemical tools to control aquatic invasive species, like zebra mussels (*Dreissena polymorpha*), as a top resource concern. Zebra mussels have been reported to clog water intakes for hydroelectric companies; displace native mussel species; and are believed to be a source of avian botulism. A molluscicide that can be delivered to zebra mussels while limiting impacts on non-target native species is highly desirable. One possible delivery method is to exploit enzymatic differences used for digestion. Unfortunately, little is known about the digestive physiology of zebra mussels and native mussels. Therefore, we characterized the enzymatic profile of the digestive glands of zebra mussels and two native mussels: threeridge (*Amblema plicata*) and pocketbook (*Lampsilis cardium*). A commercial enzyme kit, api®ZYM (bioMérieux, Inc. Durham, NC), was used to qualitatively assess enzymatic profiles among the three species. Preliminary results suggest further study of N-acetyl--glucosaminidase (NAGase), an enzyme responsible for the degradation of mucopolysaccharides and glycoproteins. This enzyme appears to be present at a higher concentration in zebra mussels than either of the two native mussel species. Differences in either the presence or activity levels of enzymes may be incorporated into a zebra mussel specific molluscicide delivery system.

Efforts to Develop Potential Selective Agents for the Control of Common Carp (*Cyprinus carpio*) Through Large-Scale Synthesis of GD-174 and Analog Design

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Controlling the population of non-native carp in upper Midwestern waterways has been a problem for several decades. In the 1970's GD-174 was discovered by Marking et al. as a fish toxicant that exhibited selectivity towards common carp. This selectivity, coupled with its fairly short half-life in aqueous solutions, made it a compound of great interest. Unfortunately, pond trials conducted in 1983 by Gilderhus and Burress demonstrated that GD-174 was did not induce a complete carp kill in 19 of 23 ponds. Further studies to understand this drop in activity have not been pursued, and it is possible that with new technology and understanding, GD-174 may be a potential solution to the carp problem. A scalable synthesis of GD-174 has been developed in two steps from geraniol. Through implementation of the synthesis, 18 grams of GD-174 have been made that will be used to more fully study its activity in whole fish assays. Additionally, the synthesis provides a route for analogs that have been chosen to alter its ability to bind to aquatic plant life, which may increase bioavailability of the compound in fish habitats.

The Effects of Burning and Herbicide Treatments on Spotted Knapweed (*Centaurea maculosa*)

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Previous research has shown biological controls for invasive species are effective, but it takes several years to see results. Herbicides and mechanical controls have been studied and shown to work, but they can be costly and labor intensive. The best approach for controlling invasives has been an integrated approach. The purpose of this study is to test a combination of herbicide and burning treatments to help reduce the spread and control spotted knapweed (*Centaurea maculosa*). The burning treatments will use a catalyst of invasive free hay. The herbicide treatments will use Milestone, a chemical produced by DowAgro®. I expect that the combination of the burning and herbicide treatment will have the greatest reduction in post treatment percent cover when compared to the control. The burning only treatments will have higher post treatment percent cover when compared to the control. Once this study is complete, it will demonstrate a new integrated management strategy for spotted knapweed.

Identification and Management of Weedy Umbels

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White umbelliferous plant species have been invading various habitats in Wisconsin ranging from dry prairies and roadsides to riparian corridors for several years and still they are hard to distinguish from one another. This poster will compare similarities and differences between these species and provide some control information. Species included will be: Giant hogweed (*Heracleum mantegazzianum*), Japanese and spreading hedge-parsley (*Torilis japonica*; *T. arvensis*), Queen Anne's lace (*Daucus carota*), poison hemlock (*Conium maculatum*), wild chervil (*Anthriscus sylvestris*), and burnett-saxifrage (*Pimpinella saxifrage*).

Post-Invasion Restoration

Prairie Restoration: Increasing Warm-Season Native Grasses with Fire, Herbicide, and Nitrogen Application

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Only 3% of the original 260 million acres of native tallgrass prairie exists in the United States today. Reduction of native prairie acreage has been influenced by farming, loss of historic interactions with buffalo and fire, and the introduction of exotic plants. Introduced plant species often outcompete native species for resources including nutrients, light, and water causing reductions in overall diversity of the remaining prairie. This study examines the use of prescribed burns, glyphosate , and nitrogen application at specific stages of plant growth to reinvigorate native species and suppress invasive species at two South Dakota locations that contain a mix of native and exotic, non-native species. Native species include big bluestem (*Andropogon gerardii*), sideoats and blue grama (*Bouteloua curtipendula* and *B. gracilis*) and accounted for 35-60% of the starting vegetation. Invasive species of interest consists of smooth brome (*Bromus inermis*) and Kentucky bluegrass (*Poa pratensis*). First year field results of the herbicide treatment applied after native grass senescence the previous fall indicates a visual decrease in non-native grass species cover and an observed increase in forb production, such as sweet clover (*Melilotus officinalis*). Plots that received a prescribed burn in spring and evaluated six weeks later had stunted non-native grass growth and an increase in native grass species in both biomass and visual presentation. Continued field work includes further evaluation of first year treatments (fall sampling) and a second year of repeated treatments and evaluations.Organisms: big bluestem (*Andropogon gerardii*), sideoats (*Bouteloua curtipendula*)and blue grama (*Bouteloua gracilis*) Herbicides: glyphosate (32 oz./acre fall treatment, 8 oz./acre spring rate)

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Appendix D

MNWIISC 2010

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James Truax	Truax Company Inc.	4300 Quebec Ave. N. New Hope, MN 55428	763-537-6639	truax3@qwestoffice.net
Ada Tse	University of Minnesota Duluth	2124 E 1st St Duluth, MN 55812	218-728-1538	tsexx015@d.umn.edu
Scott Van Egeren	Wisconsin Department of Natural Resources	2801 S. Progress Rd. Madison, WI 53716	608-221-6338	Scott.VanEgeren@wisconsin.gov
Laura Van Riper	Minnesota Department of Natural Resources	500 Lafayette Road Box 25 St. Paul, MN 55155-4025	651-259-5090	laura.vanriper@state.mn.us
Janet Van Sloun Larson	City of Minnetonka	11522 Minnetonka Blvd Minnetonka, MN 55305	952-988-8423	
Jim Vaughan	City of St. Louis Park	3700 Monterey Drive St. Louis Park, MN 55416	952-924-2699	jvaughan@stlouispark.org
Robert Venette	United States Department of Agriculture- Forest Service	1561 Lindig St St. Paul, MN 55108		rvenette@fs.fed.us
Brad Vierkant	Prairie Restorations, Inc.	PO Box 327 Princeton, MN 55371	763-631-9427	bvierkant@prairieresto.com
Gary Wagenbac	Carleton College	10400 Jenkins Trl Nerstrand, MN 55053	507-645-8549	gwagenba@gmail.com
Lisa Wagner	Minnesota Department of Natural Resources Forestry	800 Oak Savanna Ln SW Cambridge, MN 55008		lisa.wagner@state.mn.us
Bruce Wahlstrom	Lake Weeders Digest.com	12175 48th Circle N. Ply, MN 55442	763-551-1441	theweedersdigest@gmail.com
Robert Wakeman	Wisconsin Department of Natural Resources	141 NW Barstow St. Rm 180 Waukesha, WI 53188	262-574-2149	robert.wakeman@wisconsin.gov
Danielle Waldschmidt	Rice Soil and Water Conservation District	1810 30th St NW Faribault, MN 55021	507-332-5408	danielle.waldschmidt@mn.nacdnet.net
Jake Walsh	University of Wisconsin - Madison Center For Limnology	2290 High Ridge Trail Fitchburg, WI 53713	651-717-5883	jrwalsh2@wisc.edu
Barbara Walthber	United States Army Corps of Engineers	180 E 5th St. St. Paul, MN 55701	651-290-5469	barbara.l.waltber@usace.army.mil
Joseph Walton	Refugia	2938 Duluth Street Maplewood, MN 55109	651-271-9450	j_walton514@yahoo.com
Teagan Ward	City of Bellingham, WA	210 Lottie Street Bellingham, WA 98225	360-778-7972	teward@cob.org
Carol Warden	University of Wisconsin	10810 County Rd. N Boulder Junction, WI 54512	715-356-9494	warden@wisc.edu
Marsha Watland	Becker Soil & Water Conservation District	809 8th St. SE Detroit Lakes, MN 56501	218-846-7360	mjwatla@co.becker.mn.us
Shauna Waughtel	South Dakota State University	PO Box 2140 C Brookings, SD 57007	320-510-3460	shauna.waughtel@sdstate.edu
Walker Wearner	Minnesota Department of Natural Resources Forestry	16543 Haven Rd Little Falls, MN 56345	320-616-2450	Walker.wearne@state.mn.us
Andrew Weflen		1200 Warner Rd. St. Paul, MN 55106		
Ralph Weible	Wisconsin Department of Natural Resources	910 Hwy 54 E Black River Falls, WI 54615	715-284-1474	ralph.weible@wi.gov
Chris Weir-Koetter	Minnesota Department of Natural Resources	2115 Birchmont Beach Rd. NE Bemidji, MN 56601	218-308-2679	christine.weir-koetter@state.mn.us
Jacqueline Welch	University of Minnesota-Duluth	4419 Cooke St Duluth, MN 55804	218-726-8901	welc0212@d.umn.edu
Troy Weldy	The Nature Conservancy -Eastern New York	195 New Karner Road, Suite 201 Albany, NY 12205	518-690-7841	tweldy@tnc.org
Chip Welling	Minnesota Department of Natural Resources	500 Lafayette Road, Box 25 St. Paul, MN 55155-4025	651-259-5149	chip.welling@state.mn.us
Tom Wesolowski	City of Shoreview	4600 Victoria St. N Shoreview, MN 55119	651-490-4652	twesolowski@shoreviewmn.gov

Paula West	Mission Lake Association	27199 County Road 19 Merrifield, MN 56465	218-838-5010	westcom@brainerd.net
Julie Westerlund	Minnehaha Creek Watershed District	18202 Minnetonka Boulevard Deephaven, MN 55391	952-471-0590 x209	jwesterlund@minnehahacreek.org
Norm Wetzel	Lac du Flambeau Town Lakes Committee	1478 Silver Beach Rd Lac du Flambeau, WI 54538	717-356-5550	norman.wetzel@gmail.com
Marc White	Southeastern Wisconsin Invasive Species Consortium	3976 Highway NN West Bend, WI 53095	262-338-0539	
Mindy Wilkinson	University of Wisconsin Extension	445 Henry Mall, Room 202 Madison, WI 53706	805-704-7906	melinda.wilkinson@wisconsin.gov
Jim Wilson	Minnesota Department of Natural Resources Forestry	1810 NW 30th St. Faribault, MN 55021		jim.wilson@state.mn.us
Teresa Wolfe	National Park Service-St. Croix National Scenic Riverway	401 Hamilton Street St. Croix Falls, WI 54024	715-483-5827	teresa_wolfe@nps.gov
Brock Woods	Wisconsin Department of Natural Resources	2801 Progress Rd. Madison, WI 53716	608-221-6349	brock.woods@wisconsin.gov
Stan Worm	Kandiyohi County Lakes Association	12549 County Road 9 NE Spicer, MN 56288	320-894-6484	orthoworm1@charter.net
John Zinn	NRCS	330 Elton Hills Dr. Rochester, MN 55901	507-289-7454	john.zinn@mn.usda.gov
Maureen Ziskovsky	Minnesota Department of Natural Resources	500 Lafayette Road, Box 25 St. Paul, MN 55155-4025	651-259-5146	maureen.ziskovsky@state.mn.us

Appendix E

Minnesota-Wisconsin Invasive Species Conference
November 8-10, 2010, St. Paul, Minnesota

Conference Participant Survey

1. Overall, how would you rate your experience at this conference?

- ○ Excellent
- ○ Good
- ○ Fair
- ○ Poor

2. Overall, do you think this conference achieved its goals, which were to:

- Exchange information on invasive species including invasive aquatic and terrestrial plants, animals, and pathogens
- Strengthen awareness of invasive species issues, prevention, and management

○ Yes ○ Somewhat ○ No

If NO, please describe: _____

_____

3. To what extent did you gain an understanding of invasive species in Minnesota and Wisconsin?

- ○ I have a very much improved understanding
- ○ I have a much improved understanding
- ○ I have a somewhat improved understanding
- ○ My understanding is unchanged

4. How useful was the conference in addressing your organization's invasive species-related mission or goals?

- ○ Very useful
- ○ Somewhat useful
- ○ Not very useful
- ○ Not at all useful

5. As a result of the conference, how likely is it that you will implement some aspect of knowledge gained to improve invasive species management, research or education efforts?

- ○ Very likely
- ○ Somewhat likely
- ○ Somewhat unlikely
- ○ Very unlikely

If likely, what are one or two ways you might use the information in the future? _____

_____

6. How important to you were opportunities for networking with others at this conference?

- ○ Very important
- ○ Somewhat important
- ○ Somewhat unimportant
- ○ Unimportant

(*over*)

7. How useful were each of the following conference sessions, workshops and events to you?

Sessions, Workshops, and Events	Very Useful	Somewhat Useful	Not Very Useful	Not at All Useful	I Did Not Attend
Monday: Opening Plenary	○	○	○	○	○
Terrestrial and Overview	○	○	○	○	○
Terrestrial	○	○	○	○	○
Aquatic Prevention	○	○	○	○	○
Aquatic Biology & Management of Plants	○	○	○	○	○
Aquatic	○	○	○	○	○
Terrestrial Workshop: EE & RR Species	○	○	○	○	○
Terrestrial Workshop: Prairie Weeds	○	○	○	○	○
Poster Exhibit and Expo Reception	○	○	○	○	○
Tuesday: Lunch Plenary	○	○	○	○	○
Terrestrial (I)	○	○	○	○	○
Terrestrial (II)	○	○	○	○	○
Aquatic Prevention	○	○	○	○	○
Aquatic Biology & Management of Plants	○	○	○	○	○
Aquatic & Cooperative Weed Management Areas	○	○	○	○	○
Workshop: Prairie Wetlands	○	○	○	○	○
Workshop: Forest Management	○	○	○	○	○
Workshop: Emerald Ash Borer (I/II)	○	○	○	○	○
Wednesday: Terrestrial (I)	○	○	○	○	○
Terrestrial (II)	○	○	○	○	○
Aquatic Prevention	○	○	○	○	○
Aquatic Biology & Management of Plants	○	○	○	○	○
Aquatic	○	○	○	○	○
Workshop: Emerald Ash Borer (I/II)	○	○	○	○	○

8. Which best describes you as a conference participant?

Researcher	Resource Manager	Policy Maker	Educator	Student	Non-Government Org Rep	Citizen
○	○	○	○	○	○	○

9. Which way(s) did you learn about the conference? (*check all that apply*)

- ○ Email Symposium Announcement
- ○ Word of Mouth
- ○ Print Newsletter
- ○ Electronic Newsletter
- ○ Web Sites
- ○ Other: _____

10. Comments: _____

Please leave this survey at registration or fax to 218.726.6556. Thank You!

Appendix F

Minnesota-Wisconsin Invasive Species Conference
November 8-10, 2010, St. Paul, Minnesota

Exhibitor Participant Survey

1. **As an exhibitor, please rate your expectations as a marketing or educational venue to garner sales leads or educational networking.**
   - ○ Excellent
   - ○ Good
   - ○ Fair
   - ○ Poor

   Comments: _____

2. **Please list any problems you had as an exhibitor:** _____

   _____

3. **Please list any examples of superior service you received as an exhibitor:** _____

   _____

4. **What did you like or dislike as an exhibitor?** _____

   _____

5. **How satisfied were you with the level of pre-conference communication to you as an exhibitor?**
   - ○ Very satisfied
   - ○ Somewhat satisfied
   - ○ Somewhat unsatisfied
   - ○ Dissatisfied

6. **What suggestions do you have to improve communication to you as an exhibitor?**

   _____

   _____

7. **Do you have ideas to promote and increase the number of exhibitors?**

   _____

8. **Would you consider exhibiting at a similar conference in the future?**
   - ○ Yes
   - ○ No

   If not, why not? _____

Please leave this survey at registration or fax to 218.726.6556. Your comments are appreciated!

Appendix G

Pre-Conference Resources

Minnesota-Wisconsin Invasive Species Conference 2010

Working together to Control Invasive Species

We are pleased to announce the first Minnesota-Wisconsin Invasive Species Conference, building upon efforts to manage terrestrial and aquatic invasive species.

This conference will highlight exhibitors and speakers from all over the Midwest region.

Come exchange information and learn about the latest tools and strategies to address the invasive species challenge in your area.

Approximately 600 researchers, students, land managers, natural resource professionals, university personnel, landscapers, nursery, agricultural and forestry employees, environmental specialists, lake association members, private woodland owners, as well as agency and non-governmental organizations will be in attendance.

Save the Date!

November 8-10, 2010
Crowne Plaza
St. Paul Riverfront Hotel
St. Paul, MN

MNWIASC
Minnesota-Wisconsin Invasive Species Conference
2010

The conference is co-hosted by the:
Minnesota Invasive Species Advisory Council
Invasive Plants Association of Wisconsin
Midwest Invasive Plants Network
Soil and Water Conservation Society – Minnesota Chapter

Session topics will include:
Invasive Species Biology, Ecology, Impacts, and Distribution
Invasive Species Prevention, Containment, and Preparedness
Invasive Species Early Detection and Rapid Response
Invasive Species Control and Management
Post Invasion Restoration

For more information visit:
www.minnesotaswcs.org

Registration is now Open!
The abstract deadline has been extended to August 18th!
Exhibitor and Sponsorship Opportunities Still Available!

CALL FOR ABSTRACTS

MINNESOTA-WISCONSIN INVASIVE SPECIES CONFERENCE 2010:

Working Together to Control Invasive Species

http://www.minnesotaswcs.org/

November 8-10, 2010; St. Paul, Minnesota

The first collaborative Minnesota-Wisconsin conference on invasive species will be held for the purpose of exchanging information on invasive species topics. **This is an all-taxa conference covering invasive aquatic and terrestrial plants, animals, pests, and pathogens.** The focus is to strengthen awareness of invasive species issues, prevention, and management. Expected audiences include researchers, land managers, natural resource professionals, university personnel, landscapers, nursery, agricultural or forestry employees, environmental specialists, lake association members, and agency and non-governmental organizations.

The hosting organizations are the Minnesota Invasive Species Council (www.mda.state.mn.us/misac/), the Invasive Plants Association of Wisconsin (www.ipaw.org), the Midwest Invasive Plant Network (www.mipn.org), and the Soil and Water Conservation Society – Minnesota Chapter (www.minnesotaswcs.org). The hosts are announcing a CALL FOR ABSTRACTS for this invasive species conference.

You are invited to share your projects or research as oral presentations or posters.
Presenters may be affiliated with universities, municipal, state or federal agencies, tribes, local governmental units, non-governmental organizations, industry, or other organizations involved with management and protection of natural resources. The conference will include concurrent sessions with topics on both aquatic and terrestrial invasive species. Sessions will be organized under five themes: 1) Invasive species; 2) prevention, containment, and preparedness; 3) early detection and rapid response; 4) control and management; and 5) restoration. *Please review the themes and consider where your presentation would be most relevant when submitting an abstract. If you don't feel your presentation fits into one of these categories, we still welcome your submission.*

1. **Invasive Species Biology, Ecology, Impacts, and Distribution**

   Biology, Ecology, Impacts and Distribution of Invasive Species (terrestrial and aquatic animals, plants, and pathogens).

2. **Invasive Species Prevention, Containment, and Preparedness**

   Pest Risk Assessment (process, results, use), Outreach and Education (methods, effectiveness, examples), Regulation (efforts, types, successes), Technology (examples, evaluation, use); Containment of Established Invasive Species (methods, effectiveness, examples); Proactive Industry and Agency Procedures (applications of HACCP); Proactive Land Management Practices (forest, prairie, or managed landscape examples, Emerald Ash Borer preparedness, silvicultural research).

3. **Invasive Species Early Detection and Rapid Response**

   Early Detection Survey (design, results, modeling, outreach), Response Planning (plans, exercises, lessons learned), Responses (examples), Eradication (examples).

4. **Invasive Species Control and Management**

   Integrated Pest Management (research, outreach, successes), Biocontrol (research, releases, results), Management Tactics: chemical and non-chemical (forest, prairie, aquatic, or managed landscape examples), Cooperative control efforts (Cooperative Weed Management Areas).

5. **Post-Invasion Restoration**

   Vegetation Replacement (need, funding opportunities, policy), Monitoring (design, plans, successes), Limitations (examples, research).

Presentations should be relevant in some way to the Minnesota-Wisconsin-Midwest region. Members of the program committee will review abstracts. Acceptance will be based on relevance to the conference's session topics and the receipt of the abstract by the deadline. The number of oral presentations may be limited and some submissions may be requested as poster presentations instead.

Guidelines

Abstracts may be submitted for oral presentations, posters, topical seminars or as case studies. Abstracts for both papers and posters should not exceed 250 words. Abstracts should be typed in 12-point Arial font, no indents or tabs, with a one inch margin. We will not retype or make typographical corrections on submitted abstracts, so please submit the abstracts ready for publication following the guidelines below.

1. **Title:** Submit the title exactly as you would like it to be in the program (maximum 12 words, bold). Leave one line blank after the title and list all authors, including affiliation. If there are multiple authors, please place an asterisk (*) after the name of the presenter of the paper or poster. Full contact information (affiliation, address, phone number, email address in this order) should be included for the author who will be presenting.

2. **Body of abstract:** Leave a blank line after the authors' names and affiliations and begin with the text. Type the text single-spaced, justifying only the left margin.
The abstract should be written as a single paragraph and provide a brief description of the project, methods, results and conclusions as appropriate to the topic.

3. **Names of organism:** All organisms must be listed first by their common name with scientific names in parenthesis. Subsequent references to the organism may be by common name.

4. **Names and application rates of pesticides:** When referring to pesticides, initial reference should be to their common names (e.g., in *Herbicide Handbook*, Weed Science Society of America). Trade names can be used subsequently. Rates and units of measurement should be clear.

5. **Numbers and units:** Use either English or metric units, but do not mix them.

Those wishing to make an oral presentation or display a poster must e-mail the title and abstract to laura.vanriper@state.mn.us no later than **August 1, 2010**.

Guidelines for Presentations
Oral presentations will be 20 or 30 minutes in length depending upon the number of abstracts accepted. Authors will be notified of the desired length of their presentation.
All oral presentations will use LCD projectors. Neither slide projectors nor overhead projectors will be available. All presentations must be in PowerPoint (any version).
The presentation must be saved as a PowerPoint show file. Presenters must submit their presentation files and audio clips at the time of conference check-in. This will allow the session chairs to load the files onto their laptop computers prior to the sessions to ensure that the files will run properly before your session. Presentation files will be deleted from all computers immediately after the meeting and will not be shared without author permission. Posters may not exceed a maximum size of 48 x 48 inches.
Authors are strongly encouraged to discuss and interpret how their work benefits invasive species management at local, state, or regional levels.
Questions: Contact Laura Van Riper at 651-259-5090 or laura.vanriper@state.mn.us.

Example abstract submission:
Presentation
Invasive Species Biology, Ecology, Impacts, and Distribution

Population Biology of Garlic Mustard (*Alliaria petiolata*) in Minnesota Forests

Laura Van Riper*, MN Department of Natural Resources
100 Main Street
St. Paul MN 55555
651-259-5090
laura.vanriper@state.mn.us
Roger Becker, University of Minnesota – Twin Cities

Garlic mustard, a biennial forb native to Europe, has invaded native ecosystems in forested regions in the United States. In anticipation of a biological control program being implemented in the United States for this plant, a garlic mustard monitoring program was initiated.

Preliminary Program

Working Together to Control Invasive Species

November 8-10, 2010
Crowne Plaza St. Paul Riverfront
St. Paul, Minnesota

2010 Minnesota-Wisconsin Invasive Species Conference

Working Together to Control Invasive Species

Crowne Plaza St. Paul Riverfront
St. Paul, Minnesota
November 8-10, 2010

About the Conference

This is the first collaborative Minnesota-Wisconsin conference on invasive species (MNWIISC). The Conference is being held for the purpose of exchanging information on invasive species topics in the interest of minimizing the impacts of terrestrial and aquatic invasive species. Presentations by experts in their respective fields will cover new and innovative research, outreach programs, technological developments related to ecology and impacts, prevention, containment, early detection, rapid response, control and management, as well as eradication and restoration.

The conference is being hosted by the Minnesota Invasive Species Advisory Council, the Invasive Plants Association of Wisconsin, the Midwest Invasive Plant Network, and the Soil and Water Conservation Society – Minnesota Chapter. Topics will cover both aquatic and terrestrial invasive species.

Conference Location and Accommodations

Our conference venue is the **Crowne Plaza St. Paul Riverfront Hotel** in downtown St. Paul, MN. Exhibits and posters showcasing the latest in invasive species research and restoration work will be displayed in Governor's Hall throughout the conference. Receptions and breaks are also planned for this area, which will give registrants many opportunities to visit with the exhibitors and poster authors.

The Crowne Plaza St. Paul Riverfront provides a beautiful setting for the Minnesota-Wisconsin Invasive Species Conference, with spectacular views of the Mississippi River and a central location in downtown St. Paul. Accommodations include free wifi in rooms and common areas, a complimentary newspaper in the morning, swimming pool and exercise facilities, and on site parking. St. Paul's finest dining and entertainment venues such as museums, theaters, and the Xcel Energy Center, St. Paul's largest multi function event space, are within a few block of the Crowne Plaza.

On Tuesday evening a reception will be held in the stunning "Windows On The River" on the 22nd floor of the hotel. Complimentary refreshments will be served as attendees network and socialize while taking in a breathtaking panorama of St. Paul and the Mississippi River Valley.

A block of rooms have been set aside at the Crowne Plaza St. Paul Riverfront (11 E. Kellogg Boulevard, St. Paul, MN 55101) at a discounted rate of $89 per night. Call 1(800) 593-5708, and mention the conference name to receive a discounted reservation.

Blocks of rooms have also been set aside at three hotels in Hudson, Wisconsin for Wisconsin government staff who must stay in state. Hudson is a considerable distance from St. Paul and attendees are encouraged to stay on site at the Crowne Plaza.

- **Holiday Inn Express (1200 Gateway Boulevard, Hudson, WI 54016)**
  The room rate is $85 per night. Call 1 (800) 821-2228, and use the group name "MNWIISC". This reduced rate is only guaranteed until October 8.
- **Best Western Hudson House Inn (1616 Crest View Drive, Hudson, WI 54016)**
  The room rate is $70 per night. Call (715) 386-4562, and use the group code "MNWIISC"
- **Fairmount Inn (2400 Center Drive, Hudson, WI 54016)**
  The room rate is $70 per night. Call (715) 386-6688, and use the group name "MNWIISC"

Exhibitor and Sponsorship Opportunities

Take advantage of the tremendous advertising and outreach opportunity for your company or organization provided by the first ever joint-state Invasive Species Conference. This is a great opportunity to inform our hundreds of attendees about your company, products, and services. Be one of the sponsor and/or exhibitors at this ground breaking event by visiting www.minnesotaswcs.org and clicking the MNWIISC 2010 logo or contact the Conference Administrator at (414) 967-5678. Exhibit space is limited and will be granted on a first come, first served basis.

Special branding and recognition opportunities are offered to exhibitors and sponsors who submit their payment by September 1.

Conference Information

Approximately 600 researchers, students, land managers, natural resource professionals, university personnel, landscapers, nursery, agricultural and forestry employees, environmental specialists, lake association members, private woodland owners, as well as agency and non-governmental organizations are expected to attend. We are expecting participants to come from the entire Midwest Region. Exhibitors will include associations, organizations, and businesses involved in work with invasive species and preserving the ecologies they threaten. Presentations and Posters will focus on the following topics:

- Invasive Species Biology, Ecology, Impacts, and Distribution
- Invasive Species Prevention, Containment, and Preparedness
- Invasive Species Early Detection and Rapid Response
- Invasive Species Control and Management
- Post-Invasion Restoration

Schedule of Events

Monday, November 8: 10:00 AM - 6:00 PM

10:00 AM – 12:00 PM: Opening Plenary
The plenary session will cover the key terrestrial and aquatic invasive species that affect Minnesota and Wisconsin, how they spread and establish themselves, the extent of the damage they can cause to the states' natural resources, and the role of the public in preventing the spread and future infestations of invasive species.
12:00 PM – 1:00 PM: Lunch in Governor's Hall and an opportunity to visit exhibit and poster displays.
1:00 PM – 2:30 PM: Concurrent sessions
2:30 PM – 2:50 PM: Break
2:50 PM – 4:30 PM: Concurrent sessions
4:30 PM – 6:00 PM: Poster reception in exhibit area

Tuesday, November 9 : 8:00 AM – 6:30 PM

8:30 AM – 10:00 AM: Concurrent Sessions
10:00 AM – 10:10 AM: Break
10:20 AM – 11:50 AM: Concurrent Sessions
12:00 PM – 1:30 PM: Lunch Plenary and Awards Ceremony in Grand Ballroom
1:30 PM – 2:50 PM: Concurrent sessions
2:50 PM – 3:10 PM: Break
3:10 PM – 4:30 PM: Concurrent Sessions
4:30 PM – 6:30 PM: Reception at "Windows on the River". Visitors to the 22nd floor ballroom of Crowne Plaza St. Paul Riverfront's "Windows on the River" will be greeted by expansive panoramic views St. Paul and Mississippi River Valley. Refreshments will be served and there will be a cash bar for beverages.

Wednesday, November 10: 8:00 AM – 12:00 PM

8:30 AM – 10:00 AM: Concurrent Sessions
10:00 AM – 10:20 AM: Break
10:20 AM – 12:00 PM: Concurrent Sessions

Note: Session and plenary topics will be posted at a later date. All attendees will be notified.

Conference Hosting Organizations

Minnesota Wisconsin Invasive Species Conference is being hosted by the following organizations dedicated to the control of invasive species in the Midwest.

Soil and Water Conservation Society – Minnesota Chapter
The SWCS is a nonprofit scientific and educational organization –founded in 1943- that serves as an advocate for conservation professionals and for science-based conservation practice, programs, and policy. SWCS chapters throughout the United States and Canada conduct a variety of activities at local, state, and provincial levels and on university campuses. These 75 chapters represent the grass roots element of the organization. Our mission is to foster the science and art of natural resource conservation. Our work targets conservation of soil, water, and related natural resources on working land- the land used to produce food, fiber, fuel, and other services that improve the quality of life people experience in rural and urban communities. We work to discover, develop, implement, and constantly improve ways to use land that sustains its productive capacity and enhances the environment at the same time.

Invasive Plants Association of Wisconsin
The mission of the Invasive Plant Association of Wisconsin is to promote better stewardship of the natural resources of Wisconsin by advancing the understanding of invasive plants and encouraging the control of their spread. IPAW sponsors several committees and groups that work to educate and organize people to defend against the spread of invasive plants. The membership of IPAW is made up of concerned citizens, agronomists, horticulturists, professors, and businesses to name a few. All have one thing in common: the desire to make a difference in the spread of invasive plants, and ultimately preserve the the state's natural heritage.

Midwest Invasive Plant Network
MIPN includes a diverse group of participants and partners who dedicate themselves to reducing the impact of invasive plant species in the Midwest. MIPN is dedicated to developing consistent, objective and transparent criteria to be used to assess invasiveness and determine appropriate control methods for invasive plants. Another goal is to encourage and assist the development of effective prevention measures for invasive plant species across the Midwest. The entire network aims to promote active early detection and rapid response programs for invasive plant species across the Midwest.

Minnesota Invasive Species Advisory Council
The Minnesota Invasive Species Advisory Council is a diverse group with a common interest in battling non-native invasive species in Minnesota that was initiated in May 2001. The Council was formed in response to Presidential Executive Order 13112 on invasive species, the National Invasive Species Management Plan, and Minnesota Legislation that encouraged the state to plan and take action on invasive species. The purpose of MISAC is to review information concerning the current status and management of terrestrial and aquatic invasive species including animals, insects, plants, and diseases in Minnesota. The group is working cooperatively to identify and locate invasive species and share strategies in order to maximize resources for managing invasive species.

Want more information? Check the conference website at www.minnesotaswcs.org (click the MNWIISC 2010 logo), find the Minnesota-Wisconsin Invasive Species Conference 2010 on Facebook, or follow us on Twitter @MNWIISC2010. We will be posting updates to plenary and session speakers, poster topics, and other conference information.

For any other information or questions contact the Conference Administrator at: info@mnwiisc.org or call 414.967.5678.

Preliminary List of Posters

Poster topics cover a broad range of topics from criteria of invasiveness to control and management strategies . There are still opportunities for additional submissions, so this list is subject to change. The submission deadline has been extended to August 18th, so get your abstracts in soon!

Invasive Species Biology, Ecology, Impacts, and Distribution

Site and climate effects on Midwest forest invasibility by non-native plants
Cassandra Kurtz*, USDA Forest Service
Rebecca Montgomery and Neil Anderson, University of Minnesota – Twin Cities
W. Keith Moser, USDA Forest Service

Evaluating the Invasive Potential of Norway Maple (Acer platanoides L.) and Amur Maple (Acer tataricum L. ssp. ginnala (Maxim.) in Central Minnesota - Initial Results
Steve McNamara, Mary Gervais, and Stan C. Hokanson
Department of Horticultural Science, University of Minnesota

Phenology of flowering rush and hardstem bulrush in the Detroit Lakes Chain
Casey Olson*, Samantha Dusek*, and Michelle Marko, Concordia College
John Madsen and Joshua Cheshier, Mississippi State University
Tera Guetter, Pelican River Watershed District

Population Biology of Garlic Mustard (Alliaria petiolata) in Minnesota Hardwood Forests
Laura Van Riper*, MN Department of Natural Resources
Roger Becker, University of Minnesota – Twin Cities
Luke Skinner, MN Department of Natural Resources

Naturalized Yellow-flowered Alfalfa (Medicago sativa ssp. falcata): Is It Invasive?
Lan Xu, South Dakota State University – Brookings
Arvid A. Boe, South Dakota State University – Brookings
Roger N. Gates*, South Dakota State University
Patricia S. Johnson, South Dakota State University – Rapid City

An invasive species may limit diet expansion in a native lady beetle
Kristina Prescott*, University of Minnesota
David A. Andow, University of Minnesota

Inter Simple Sequence Repeat (ISSR) Variation in Reed Canarygrass (Phalaris arundinacea L.)
Michael Nelson* and Neil Anderson
Dept. of Horticultural Science, University of Minnesota

Light Brown Apple Moth cold hardiness: potential for overwintering in the Midwest.
Lindsey D.E. Christianson*, University of Minnesota, Department of Entomology
R.C. Venette, USDA Forest Service, St. Paul, MN, rvenette@fs.fed.us
R.L. Koch, Minnesota Dept. of Agriculture, St. Paul, MN
W.D. Hutchison, University of Minnesota, Department of Entomology

Competitive responses of tansy and goldenrod differ according to ploidy and genotype
Ada Tse*, University of Minnesota Duluth
Julie Etterson, University of Minnesota Duluth

Spatial Distribution of Nonnative Invasive Plants Inventoried in the North by Forest Inventory and Analysis
Cassandra Olson*, USDA Forest Service
Greg Liknes*, USDA Forest Service

Invasive Species Prevention, Containment, and Preparedness

Wisconsin DNR Monitor effort for Aquatic Invasive Species: A Partnership Approach
Laura Herman, UWEX-Lakes*
Mindy Wilkinson, UWEX-ERC and DNR

Clean Boats, Clean Waters: Citizens and Staff Work Together to Protect Wisconsin's Lakes
Erin McFarlane, University of Wisconsin – Extension Lakes

Youth Protecting Wisconsin Waters: The Department of Workforce Development Boat Inspection Program
Erin McFarlane*, University of Wisconsin – Extension Lakes
Jeff Bode, Wisconsin Department of Natural Resources

Current Regulatory Policy for Invasive Earthworms in Minnesota
Jenna Kallestad*, Hamline University
David A. Andow, University of Minnesota

Demand for Earthworm Bait
David Northbird, University of Minnesota Duluth.

Genetic Conservation of Minnesota's Ash Resource
Julie Hendrickson*, University of Minnesota
Andrew David, University of Minnesota—North Central Research and Outreach Center, Grand Rapids

Semi-automated identification of municipal ash trees using high resolution aerial imagery
Dacia M. Meneguzzo*, USDA Forest Service
Greg C. Liknes, USDA Forest Service

Susan J. Crocker, USDA Forest Service

Preventing saltcedar (Tamarix spp.) invasion in the Northern Great Plains
Michelle Ohrtman*, South Dakota State University, Department of Plant Science

Firewood use and movement: before and after regulation and an education campaign.
Andrea Diss-Torrance*, Wisconsin Department of Natural Resources
Kim Peterson, Wisconsin Department of Natural Resources
Ed Nelson, Wisconsin Department of Natural Resources

What does "local" firewood buy you? Managing the risk of invasive species introduction
Andrea Diss-Torrance*, Wisconsin Department of Natural Resources
Patrick C. Tobin, USDA Forest Service
Laura M. Blackburn, USDA Forest Service
Brian D. Brown, Wisconsin Department of Natural Resources

Invasive Species Early Detection and Rapid Response

Early detection system for the Great Lakes Early Region
Brendon Panke*, University of Wisconsin – Madison Agronomy Department
Mark Renz, University of Wisconsin – Madison Agronomy Department
Carmen Chapin, National Park Service

New Invaders to Wisconsin
Laura Herman*, UWEX-Lakes
Heidi Bunk, Wisconsin Dept. of Natural Resources
Scott VanEgeren, Wisconsin Dept. of Natural Resources
Scott Provost, Wisconsin Dept. of Natural Resources

Early Detection of Invasive Cereal Cyst Nematodes using PCR-Restriction Fragment Length Polymorphism
Tina Seeland, Minnesota Department of Agriculture

Invasive Species Control and Management

Biological Control of Garlic Mustard (Alliaria petiolata): an Update
Elizabeth Katovich*, University of Minnesota
Roger Becker, University of Minnesota
David Ragsdale, University of Minnesota
Hariet Hinz, CABI Biosciences, Delemont, Switzerland
Esther Gerber, CABI Biosciences, Delemont, Switzerland
Luke Skinner, Minnesota Department of Natural Resources, St. Paul, MN
Bernd Blossey, Cornell University, Ithaca, NY

Impact of mowing timing on Japanese hedge parsley (Torilis japonica) seed production
Rose Menyon Heflin*, University of Wisconsin-Madison Department of Agronomy
Mark J. Renz, University of Wisconsin-Madison Department of Agronomy

Cool season grass management in riparian zones and resulting impact on stream characteristics.
Ryan deRegnier*, University of Wisconsin
Mark Renz. University of Wisconsin, Madison Wisconsin
Kris Wright University of Wisconsin, Platteville Wisconsin

Developing Biological Control for Common and Glossy Buckthorn
Andre Gassmann, CABI-Europe Switzerland
Laura Van Riper*, MN Department of Natural Resources
Luke Skinner, MN Department of Natural Resources

Biological Control of Invasive Plants in Minnesota
Monika A. Chandler*
Luke Skinner, Minnesota Department of Natural Resources
Laura Van Riper, Minnesota Department of Natural Resources

* = Corresponding Author

Registration is now open!

Click Here to Register Online! To receive a printable registration form send an email request to: info@mnwiisc.org or call 414.967.5678

Exhibitor and Sponsor Opportunities: Download the Exhibitor/Sponsor Registration form at www.minnesotaswcs.org (click the MNWIISC 2010 logo) or email: info@mnwiisc.org.

See you in November!

Minnesota Wisconsin Invasive Species Conference 2010

Working Together to Control Invasive Species
http://www.minnesotaswcs.org/
November 8-10, 2010
Crowne Plaza St. Paul Riverfront
St. Paul, Minnesota

Exhibitor and Sponsor Prospectus

About the Conference

The first collaborative Minnesota-Wisconsin conference on invasive species will be held for the purpose of exchanging information on invasive species topics. **This is an all-taxa conference covering invasive aquatic and terrestrial plants, animals, pests, and pathogens.** The focus is to strengthen awareness of invasive species issues, prevention, and management. The expected audience of **600** includes researchers, land managers, natural resource professionals, university personnel, landscapers, nursery, agricultural or forestry employees, environmental specialists, lake association members, as well as agency and non-governmental organizations.

The hosting organizations are the Minnesota Invasive Species Advisory Council, the Invasive Plants Association of Wisconsin, the Midwest Invasive Plant Network, and the Soil and Water Conservation Society – Minnesota Chapter. We expect participants to come from the entire Midwest region.

All continental breakfasts, breaks and some receptions will be in the Exhibit area where attendees will have ample time to view your company's professional services and discuss their invasive species management concerns with your representatives.

General questions and questions regarding exhibit opportunities may be directed to Andrew Czachowski at 414.967.5678 or andrewc@mnwiisc.org. For questions regarding sponsorship opportunities contact Belle Bergner at 414.967.5678 or bbergner@mnwiisc.org

Six Concurrent Sessions will focus on:

1. Invasive Species Biology, Ecology, Impacts, and Distribution

2. Invasive Species Prevention, Containment, and Preparedness
Pest Risk Assessment (process, results, use), Outreach and Education, Regulation, Technology (examples, evaluation, use); Containment of Established Invasive Species; Proactive Industry and Agency Procedures (applications of HACCP); Proactive Land Management Practices (forest, prairie, or managed landscape examples, Emerald Ash Borer preparedness, silvicultural research).

3. Invasive Species Early Detection and Rapid Response
Early Detection Survey (design, results, modelling, outreach), Response Planning (plans, exercises, lessons learned), Responses (examples), Eradication (examples).

4. Invasive Species Control and Management
Integrated Pest Management (research, outreach, successes), Biocontrol (research, releases, results), Management Tactics: chemical and non-chemical (forest, prairie, aquatic, or managed landscape examples), Cooperative control efforts (Cooperative Weed Management Areas).

5. Post-Invasion Restoration
Vegetation Replacement (need, funding opportunities, policy), Monitoring (design, plans, successes), Limitations (examples, research).

Exhibitor and Sponsorship Opportunities

The Conference organizing committee asks for your support. We need sponsorship funds to subsidize conference costs so that our target audience will be able to afford to attend. Not only will your sponsorship and generosity provide assistance with conference costs, but it will also be providing your company with a tremendous advertising opportunity.

Sponsorship opportunities include the following benefits in addition to package specific benefits:

- Name and logo highlighted on conference announcements, publications, and ad website. The conference ad site will also feature a link to your company web site
- Name and logo displayed in the conference program
- Logo displayed on prominent signage at the event
- Exhibit booth space
- Receipt of contact information for all attendees

Every exhibitor will receive the following benefits:

- Name and logo displayed in the conference program and at plenary luncheon
- Exhibit booth or display table space

Package details for exhibitors and sponsors are listed on the following page.

Exhibitor Opportunities

Exhibitor's have several different options depending on their needs. The details of each specific package are listed below.

Booth Exhibitor **$750**
A draped, 10' x 20' exhibit area
Two full conference registrations

Table Exhibitor **$500**
One clothed and draped 6' table
Two full conference registrations

Nonprofit Exhibitor **$250**
One full conference registration

Additional staff in attendance will need to purchase an additional registration. Contact us for more information.

Sponsorship Opportunities

In addition to the previously mentioned benefits all sponsors receive benefits specific to their chosen level of sponsorship. Benefits specific to each level are listed below.

Prevention Sponsor **$1,000**
Two full conference registrations
Sponsor ribbons for all company attendees
Half-page company ad in attendee material

Identification Sponsor **$2,500**
Three full conference registrations
One-page company brochure in attendee material
Sponsor ribbons for all company attendees

Plan of Attack Sponsor **$5,000**
Five full conference registrations
One-page company brochure in attendee material
Sponsor ribbons for all company attendees

Rapid Response Sponsor **$7,500**
Seven full conference registrations
One-page company brochure in attendee material
Sponsor ribbons for all company attendees
1/2 page, full-color ad in official meeting program

Control Sponsor **$10,000**
Ten full conference registrations
1/2 page, full-color ad in official meeting program
Host of breakout session with a speaking opportunity
One-page company brochure in attendee material
Sponsor ribbons for all company attendees

Eradication Sponsor **$15,000**
Fifteen full conference registrations
Full page, full-color ad in the official meeting program
Host of meal function, general session or social function with a speaking opportunity
One-page company brochure in attendee material
Sponsor ribbons for all company attendees

Special Event Sponsorship Opportunities

Sponsors may also choose to support a specific conference activity, item, or event. Examples in addition to the opportunities below include travel support for invited speakers, registration, and more. Contact us for more information.

Each special event sponsor receives:

- Exhibit booth space
- Event-specific signage with your company logo prominently displayed for attendees to see in multiple locations around the event.
- One full conference registration provided per $1,000 in sponsorship.

One Breakout Session of Your Choosing **$1,000**
One morning or afternoon session will have your company logo displayed at the breakout session, verbal recognition, and a sign outside the session room.

One AM or PM Break **$1,500**
Your company name printed on two, 24" x 36" signs at your sponsored break. Starbucks coffee, Tazo Tea and select refreshments will be provided.

Two AM or PM Breaks **$2,000**
Your company name printed on two, 24" x 36" signs at your sponsored breaks. Starbucks coffee, Tazo Tea and select refreshments will be provided.

Monday Box Lunch **$5,000**
All attendees will see your company name in several locations around the lunch area as they pick up a delicious box lunch after the opening plenary.

Monday Evening Reception **$6,000**
As attendees mix and mingle with a beer, wine, or cocktail and an hors d'oerves, they will be thankful that you sponsored this fun event! Verbal recognition and logo display with company advertisement on a projector screen!

Tuesday Plenary Lunch **$10,000**
Attendees will associate a delicious gourmet buffet lunch with your company name. Verbal recognition, event signage, and an advertisement for your company on a projector screen will provide recognition for your generous sponsorship

Early Detection Deadline: September 1, 2010!

Your Company Name and logo will be featured on the conference web site, in a September Press Release, and a registration reminder announcement. Sponsors of $2,500 and above will receive Logo placement on all confirmation emails to registrants after September 1. Sponsors of $3,000 and above receive logo placement on the conference Facebook page.

Final Registration Deadline for Sponsors and Exhibitors: September 24, 2010

Contact Information
Belle Bergner
Conference Administrator
MNWIISC 2010
2651 N. Downer Ave #6
Milwaukee, WI 53211
T: (414) 967-1350
E: bbergner@mnwiisc.org

PRESS RELEASE

First Joint Minnesota and Wisconsin State Conference Addressing Invasive Species Is Announced

Working Together To Control Invasive Species

Thursday, October 7, 2010 (St. Paul, Minnesota and Milwaukee, Wisconsin) – The Minnesota-Wisconsin Invasive Species Conference (MNWIISC) will take place November 8-10 in St. Paul, MN, at the Crowne Plaza St. Paul Riverfront Hotel. This is the first ever, joint state conference bringing together researchers, land and water area managers, private property owners, consultants, and others to work together and learn from each other to improve invasive species research and management.

MNWIISC will address both aquatic and terrestrial invasive species. Over 180 oral and poster presentations in six concurrent session tracks will provide nearly 50 distinct sessions on invasive species management issues for attendees to choose from.

Expected attendance is 500-600 people. Over 300 people have already registered.

"If your lake has Eurasian watermilfoil and purple loosestrife, or your local woodland has buckthorn or honeysuckle, or you are concerned about losing your ash trees to emerald ash borer, we have several presentations and exhibitors tailored to your information needs. We want to give citizens, land or water managers, lake associations, and other organizations the tools to be effective stewards," says Steve Chaplin, Senior Conservation Scientist with The Nature Conservancy and MNWIISC Co-Chair.

The conference is being co-hosted by the Minnesota Invasive Species Advisory Council, the Invasive Plants Association of Wisconsin, the Midwest Invasive Plant Network, and the Soil and Water Conservation Society – Minnesota Chapter.

News headlines increasingly document the threat of invasive plants and animals to the ecological heritage of the upper Midwest. From quagga mussels to Japanese hedge parsley, there may be up to five new invading species entering the region every year.

"Whether you work, live or play in or near forests, rivers, prairies, or lakes, everyone can do something to stop the spread of invasive species," says Laura Van Riper, Terrestrial Invasive Species Coordinator with the Minnesota DNR and MNWIISC Co-Chair.

New laws are in place in both Minnesota and Wisconsin regarding the possession and management of invasive species. Special sessions will teach attendees how the laws affect them.

Plenary presentations will discuss regional approaches, new techniques, and the politics of invasive species research and management. A Welcome Plenary will take place on Monday, November 8 from 10am – 12pm and a Luncheon Plenary on Tuesday, November 9 from 12-1:15pm will also feature the Carol Mortensen Award from the Minnesota Invasive Species Advisory Council.

Plenary speaker highlights include:

- Lindsay Chatterton from The Nature Conservancy Great Lakes Project will discuss the use of DNA testing to detect Asian Carp and other aquatic invasive species.

- Janet Clark, Owner of Sweetgrass Consulting will discuss opportunities for partnerships, publicity, and funding.

- Troy Weldy from The Nature Conservancy – New York Chapter will talk about how New York created a state-wide invasive species program; and

- Lee Frelich, Director of the Center for Hardwood Ecology at the University of Minnesota will discuss how the interaction of invasive species and climate change may greatly affect forests.

Over 32 of the Midwest's and the Nation's leading invasive management and restoration companies, agencies, and organizations will exhibit their products and services.

# # #

Download Conference Program information and more at the conference website:
http://www.minnesotaswcs.org/2010_mn_wi_invasive_species_conference.htm

For Immediate Release:
November 2, 2010

Contact:
Belle Bergner
Conference Administrator
MNWIISC 2010
2651 N. Downer Ave #6
Milwaukee, WI 53211
Office: (414) 967-1350
Cell: (414) 339-2405
E: bbergner@mnwiisc.org

MEDIA ADVISORY

Joint Minnesota and Wisconsin Conference
Addressing Invasive Species Starts In Less Than One Week

- The Minnesota-Wisconsin Invasive Species Conference 2010 (MNWIISC 2010) will take place in less than one week from November 8-10 at the Crowne Plaza St. Paul Riverfront Hotel, 11 E. Kellogg Blvd., St. Paul, Minnesota
- Final Conference Program and Abstracts Now Released: www.minnesotaswcs.org
- Minnesota State Representative Jean Wagenius Welcomes Attendees on Monday, November 8 at 10:00am
- The Latest on Asian Carp, Emerald Ash Borer, And Other Invasive Species Threats
- Interviews with Plenary Speakers, Concurrent Session Presenters, or Conference Leaders Available Upon Request
- Media Room off of Garden Court Available Throughout The Conference
- Blog of Conference Highlights will begin on Monday at http://mnwiisc.blogspot.com

This first ever, joint state conference will bring together researchers, land and water area managers, private property owners, consultants, students, and concerned citizens to work together and learn from each other to improve invasive species research and management.

MNWIISC 2010 will address both aquatic and terrestrial invasive species. Over 180 oral and poster presentations in six concurrent session tracks will provide nearly 50 distinct sessions on invasive species management issues for attendees to choose from.

Expected attendance is 550-600 people. Nearly 500 people are registered.

The conference is being co-hosted by the Minnesota Invasive Species Advisory Council, the Invasive Plants Association of Wisconsin, and the Midwest Invasive Plant Network, with the Soil and Water Conservation Society – Minnesota Chapter serving as the fiscal agent and website host.

New laws are in place in both Minnesota and Wisconsin regarding the possession and management of invasive species. Special sessions will teach attendees how the laws affect them.

Plenary presentations in the Great River Ballroom will discuss regional approaches, new techniques, and the politics of invasive species research and management. A Welcome Plenary will take place on Monday, November 8 from 10 am – 12 pm and a Luncheon Plenary on Tuesday, November 9 from 12:15 pm - 1:20 pm will feature the Carol Mortensen Award from the Minnesota Invasive Species Advisory Council.
Plenary speaker highlights include:

- Troy Weldy from The Nature Conservancy – New York Chapter will talk about how New York created a state-wide invasive species program (Monday 10:30am).
- Lindsay Chadderton from The Nature Conservancy's Great Lakes Project will discuss the use of DNA testing to detect Asian Carp and other aquatic invasive species (Monday 11:00am).
- Janet Clark, owner of Sweetgrass Consulting, will discuss the politics of invasive species, and opportunities for partnerships, publicity, and funding (Monday 11:30am).
- Lee Frelich, Director of the Center for Hardwood Ecology at the University of Minnesota, will discuss how the interaction of invasive species and climate change may greatly affect forests (Tuesday 12:40PM).

Thirty-seven (37) of the Midwest's and the Nation's leading invasive management and restoration companies, agencies, and organizations will exhibit their products and services throughout the conference in Governors Hall.

Lead sponsors include: Minnesota DNR, Wisconsin DNR, Dow AgroSciences, National Park Service, Minnesota Sea Grant, Wisconsin Sea Grant, Star Hill Jawz, The Nature Conservancy, Minnesota Nursery and Landscape Association, University of Minnesota Extension and University of Wisconsin Extension.

# # #

Download the final Conference Program, Abstracts, and more at the conference website:
http://www.minnesotaswcs.org/2010_mn_wi_invasive_species_conference.htm

(Newsletter Release for Non-Profits)

First Minnesota-Wisconsin Invasive Species Conference in November

By Belle Bergner, MNWIISC Conference Administrator

The first collaborative Minnesota-Wisconsin Invasive Species Conference will be held in St. Paul, Minnesota on November 8-10 at the Crowne Plaza St. Paul Riverfront Hotel. The purpose of the conference is to exchange information on all invasive species topics, especially strengthening awareness of invasive species issues, prevention, and management. This is an all-taxa conference covering invasive aquatic and terrestrial plants, animals, pests, and pathogens.

Conference organizers expect a broad audience including researchers, land managers, natural resource professionals, university personnel, landscapers, nursery, agriculture and forestry employees, environmental specialists, lake association members, woodland association owners and agency and non-governmental organizations. Posters and presentations will be given from all of these sectors.

Exhibitors will showcase the latest products and services to control and manage the spread of terrestrial and aquatic species across the Upper Midwest. Invasive species management companies, ecological restoration firms and nonprofit organization exhibits will provide attendees the opportunity to talk with professionals who have solutions for all invasive species management needs.

The conference host organizations are the Minnesota Invasive Species Advisory Council, the Invasive Plants Association of Wisconsin, the Midwest Invasive Plant Network, and the Soil and Water Conservation Society – Minnesota Chapter.

"Registrations have been coming in at a swift pace since registration opened in early August. Due to recent invasive species regulations in both states, more people are looking for guidance on invasive species management than ever before. We are expecting 500-600 people to attend this first joint state conference," says Kate Howe, Coordinator, Midwest Invasive Plant Network and MNWIISC Program Committee Chair.

"Invasive species are a growing threat to the health of natural systems in the Upper Midwest. This conference will offer the chance for managers and researchers from Minnesota and Wisconsin to share ideas about their common invasive species challenges and how we might do a better job at cost-effective control and management," says Steve Chaplin, Senior Conservation Scientist with The Nature Conservancy and MNWIISC Co-Chair.

With six concurrent sessions throughout the conference and two plenary sessions, there will be over 170 oral and poster presentations to choose from.

MNWIISC Co-Chair Laura Van Riper, Terrestrial Invasive Species Coordinator with Minnesota DNR also added:
"This conference will be an amazing opportunity to learn from others working with invasive species. There will be talks and posters from people throughout Minnesota and Wisconsin as well as presenters from 10 other states. From management techniques to the newest research and technology, there will be topics of interest to everyone."

Conference information including links to registration and lodging is at www.minnesotaswcs.org. Click on the conference logo on the right side of the home page.