

The Biodiversity Front

The GLBRC Biodiversity Team Newsletter

What is the GLBRC?

In fall 2007, the Department of Energy (DOE) awarded Michigan State University (MSU) and the University of Wisconsin (UW) a five-year \$125 million grant as part of its effort to create practical solutions for producing renewable energy.

The result was the Great Lakes Bioenergy Research Center (GLBRC), one of three DOE-funded bioenergy centers throughout the United States. One unique focus within the GLBRC is the economic and ecological sustainability of biofuels.

Our biodiversity research team is examining the impacts of biofuel cropping systems (ie—corn, switchgrass and prairie) on biodiversity and ecosystem services. Bird, insect, plant and microbial ecologists have been in the field this summer collecting samples and conducting research. Thanks to the many private landowners, foundations and state land managers who allowed us sampling access, we have collected large amounts of ecological data. In



3 potential biofuel sources: corn, switchgrass and prairie

the coming months, we will be analyzing these data to determine the impacts of the three biofuel crop types on biodiversity. We also are looking at the effects of the different crops on ecosystem services, or the benefits that these fields provide to humans.

You might have seen the GLBRC logo on our field vehicles as we've driven around the state to complete our sur-

veys. We have enjoyed talking to many of you about the interesting finds we have made this season, and we look forward to working with you in future years as the GLBRC continues its research.

Meet the MSU Biodiversity Researchers

The GLBRC comprises researchers representing several scientific disciplines.

Dr. Doug Landis, Professor, Entomology, Co-team Leader

Dr. Doug Schemske, Professor, Plant Biology, Co-team Leader

Dr. Thomas Schmidt, Professor, Microbiology & Molecular Genetics

Dr. Kay Gross, Professor, Plant Biology

Dr. Jen Lau, Assistant Professor, Plant Biology, KBS

Dr. Carolyn Malmstrom, Associate Professor, Plant Biology

Dr. Mary Gardiner, Visiting Researcher, Entomology

Dr. Antonio Golubski, Post-Doctoral Fellow, Plant Biology

Dr. Bruce Robertson, Post Doctoral Fellow, Plant Biology

Dana Reznik, PhD student, Genetics Graduate Program

Lauren A. Bailey, Professional Aide, GLBRC



Volume 1, Issue 1
Fall 2008

2008 Collaborators

Public Organizations

Michigan Dept. of Natural Resources
Western Michigan University

Private Organizations

The Edward Lowe Foundation
Kalamazoo Nature Center
Phyllis Haehnle Memorial Sanctuary
Pierce Cedar Creek Institute
Sarrett Nature Center

Private Landowners

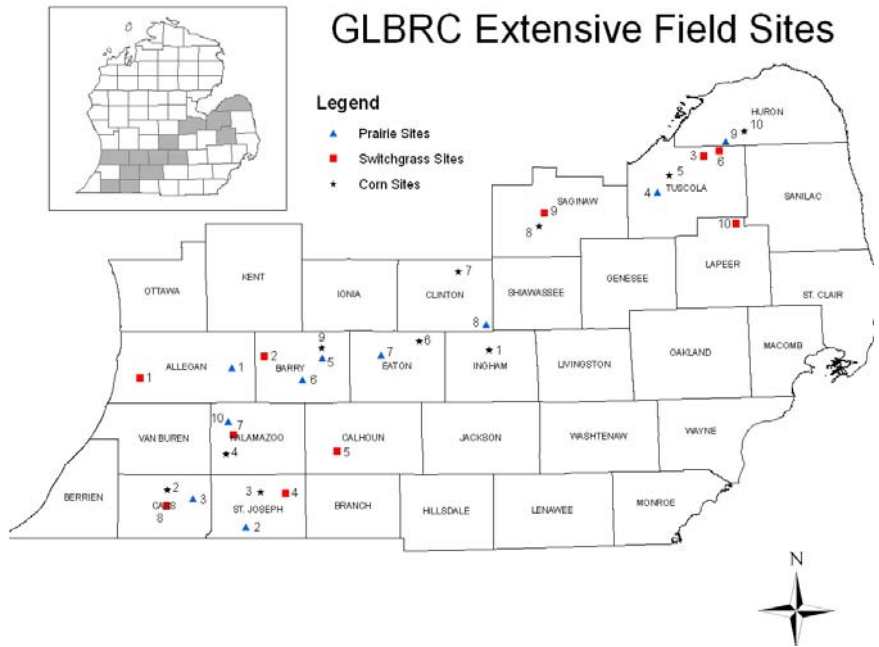
Laverne Eldrid	Al Liedstra
Mark & Lori Sargent	Harlow Bailey
Tom Hess	Pat Sheridan
Jerry Jones	Jim Graham
Jim Bruce	Greg Mahoney
Caroline Buskirk	Fred Marquart
Jim Smith	Gene Heasley
Jack Brinkman	Ann & Karl Zinn
Doug & Joy Landis	Kevin Kardell
Jake Wamhoff	Richard Sattelberg
Bill Westrate	Mike Hatlas
Louis Wierenga	

Inside this issue:

Summer 2008 Study Area	2
Bird Diversity Research	2
Insect Diversity Research	2
Plant Diversity Research	3
Microbial Studies	3
2008 GLBRC Research Fellows	3
On The Horizon	4

Summer 2008 Study Areas

In Spring 2008, we contacted landowners throughout southern lower Michigan to find cornfields, switchgrass fields and prairies for sampling. We were fortunate to work with a diverse group of state biologists, conservation groups, foundations and private landowners from southwest Michigan northeast into the thumb.



Bird Diversity Research



Dr. Bruce Robertson examines insects he collected with a sweep net; insects are an important part of many birds' diets. Not pictured: Elizabeth Loomis

Dr. Bruce Robertson and Elizabeth Loomis comprised the crew for the bird component of the GLBRC biodiversity study. Working under Dr. Doug Schemske, they were interested in the differences in bird species diversity between the three bio-fuel crop systems. In addition, they sampled insect communities to determine the availability of food resources for nesting birds during the summer breeding season. Bruce and Liz spent the early dawn hours looking and listening for birds flying over or nesting in the fields.

They found that birds used prairies more than switchgrass or corn for feeding; how-

ever, both prairies and switchgrass fields were used for nesting activity. Their study results also show that most bird species prefer larger fields over smaller ones, possibly due to many bird species' vulnerability to predators in smaller areas.

Bruce and Liz found the Dickcissel and Henslow's sparrow (threatened species) and the Northern Harrier and Grasshopper sparrow (species of special concern) in several switchgrass and prairie sites.

This fall, Bruce and Liz will be back in the field, determining how biofuel crop fields serve as habitat to autumn migrating birds.

Insect Diversity Team

The insect diversity crew traversed the southern lower part of the state, making weekly visits to sample insects at all 30 prairie, switchgrass and corn sites.

The insect crew, working under Dr. Doug Landis, was particularly interested in collecting beneficial insects, including predators and pollinators. They found several types of ladybugs (7 in corn, 9 in switchgrass and 11 in prairie), which are beneficial to agriculture because they eat many pest insects like aphids. The pink lady

beetle, in particular, was most abundant in corn fields. The team also found a large diversity of native pollinators, the abundance of which was higher in switchgrass and prairie than in corn. A large number of insects has been collected; the crew is currently working to identify them. Given the importance of pollinators to crop production, it is encouraging to have found so many different types in these sites. The crew had some unexpected encounters, including the endangered Massasauga rattlesnake and the Blue racer snake.



The Insect Diversity Field Crew: Michael Bigsby, Lauren Bailey, Mary Gardiner, Denae Baker and Nick Longbucco

Plant Diversity Study

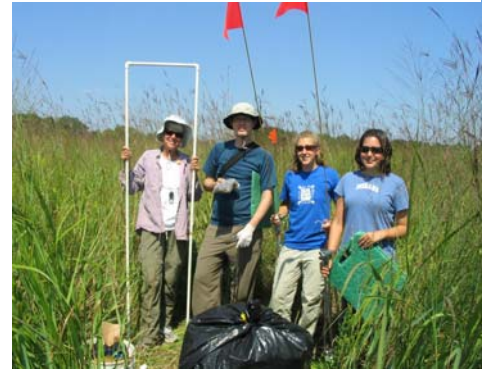
Under the direction of Dr. Kay Gross, the plant sampling crew started work in late-summer, traversing through tall-grass switchgrass and prairie, albeit with some difficulty. Crewmember Pam Mosely said, "Finding our way to the plots in a field was our biggest challenge at some sites!" With a crew of seven technicians, sampling equipment in hand and lots of enthusiasm, the team hit all 20 switchgrass and prairie sites distributed across the state.

Preliminary results suggest that many of the prairies are quite different from each other; some are considerably more diverse in the number of grass and flower species that are present. Additionally, the team found that in both the prairie and the

switchgrass sites, many "old field" weeds were present; these are weedy plant species that might have been present before the area was inhabited. Pam says, "It has been a pleasure to get a glimpse of the pre-settlement days."

The team had other interesting finds: Side-oats grama grass and Rosinweed, both threatened species, were found in two of the prairie sites. They also encountered a Black rat snake, which is listed as a species of special concern in Michigan.

The sampling crew will be back in the lab this fall calculating the biomass (total amount of vegetation) provided by each of the prairie and switchgrass sites.



The Plant Diversity Team: Carol Baker, Rob Morrison, Liana Nichols, and Madoka McAllister out sampling . Not pictured: Pam Mosely, Codi Sharp, and Dylan Rapp

Microbial Studies



Dana Reznik is a PhD student who loves bacteria! A student in the genetics program working with Dr. Tom Schmidt, she has been working this summer alongside the insect crew to obtain soil samples from the corn, switchgrass and prairie fields. Dana collected five soil cores from each site; she then sieved, combined and froze the samples to conduct DNA analyses.

She is hoping to learn more about how a particular biofuel crop influences its soil's

microbial community. Dana is particularly interested in bacteria that consume methane and convert excess nitrates (from sources such as fertilizers) back into nitrogen gas. These are important ecosystem processes because they prevent consumed methane from contributing to greenhouse gases, as well as prevent nitrates from contaminating ground and surface water.

2008 GLBRC Undergraduate Research Fellows Program

This summer, MSU's Kellogg Biological Station (KBS) played host to a group of Undergraduate Research Fellows, funded by the GLBRC. The program was coordinated by Dr. Kay Gross and Dr. Tony Golubski, and was designed to give undergraduates and recent graduates the opportunity to gain research experience by conducting scientific studies, both in laboratory and field settings.

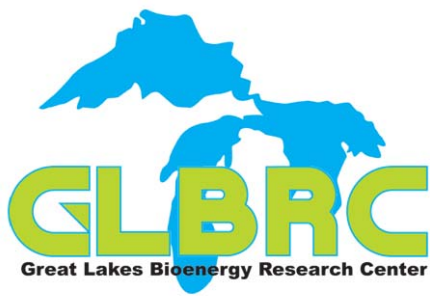
Research projects ranged from measuring plant richness and diversity, to sampling for ant abundance and diversity, to calculating available insect biomass for local bird com-

munities. Fieldwork was conducted in corn, switchgrass and prairies near KBS, thanks to the generous support of local landowner, Woody Boudemann. Students concluded their summer research experience with a poster session that was open to KBS faculty, staff, students and the public.

Congratulations on a great summer to all of the 2008 GLBRC fellows!



The 2008 GLBRC Undergraduate Research Fellows: Megan Sebasky, Robert Snyder, Elizabeth Olenzek, Marya Johnston-McIntosh, Drew Ballantyne, and Caitlin Kempfski



204 Center for Integrated Plant Systems
Michigan State University
East Lansing, MI 48824

Contact: Lauren A. Bailey
Phone: 517-432-5282
E-mail: bailey65@msu.edu



On The Horizon



Now that our 2008 sampling season has nearly come to a close, we are currently in the process of analyzing the data that was collected this summer. In the coming months, every landowner who participated in the study will receive a report detailing results for the surveys that were conducted on their property.

As we move into the fall and winter months, we will start planning for our 2009 sampling season—working out kinks, considering new sites, and hiring our new field crew. Rest assured that employees of the GLBRC will maintain the high level of professionalism and integrity that you have come to expect when we are working on your property.

For those landowners who worked with us in summer 2008, we hope that you will consider working with us again next year. Repeated sampling on the same fields contributes to a stronger body of data. If you have any questions or concerns, you can always call or e-mail us at our contact information. We are also happy to hear of additional landowners who would be interested in

working with us. If you or someone you know has a cornfield, switchgrass field, or prairie (CRP and CREP fields are fine) and might be interested in participating, please send them our way! We are happy to expand the GLBRC landowner community.

Best wishes for a happy and safe autumn, and we look forward to working with you again in Summer 2009!

