

Cowling Arboretum

Carleton College

Northfield, Minnesota

Academic Use in 2011

The Arboretum is used by many classes and students working on independent projects.

Not all classes are offered each year.

Biology

Entomology
Ecosystem Ecology
Population Ecology
Introductory Biology: Genes, Evolution, and Development
Grassland Ecology

Environmental and Technology Studies

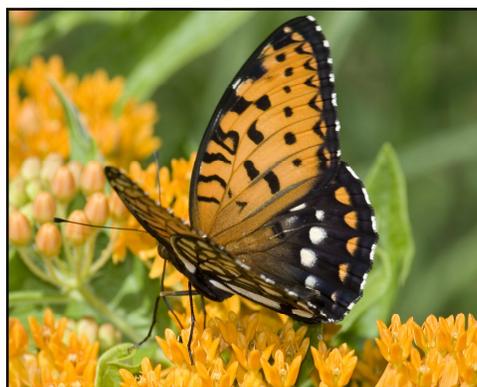
Introduction to Environmental Studies
Environmental Ethics
Introduction to Geospatial Analysis

English

American Nature Writing
Writing the Great Plains

New Finds in the Arboretum!

Three new animal species were confirmed to be living in the Arboretum and at McKnight Prairie this year: the prairie vole, the tiger salamander, and a special butterfly (pictured). Though the prairie vole was once an abundant resident of the region, it is now listed as a Minnesota threatened species because of the destruction of its prairie habitat. The butterfly has a similar story—the destruction of native prairies have made it a threatened species. According to the Minnesota Department of Natural Resources, this butterfly is one of the Minnesota species most in need of critical conservation efforts. A large number of these distinctive red-orange and white spotted butterflies were discovered nectaring on prairie thistles at McKnight Prairie in July, 2011. The third new species is the tiger salamander. Though common throughout much of the area, they are rarely seen. They spend their days in damp underground burrows, coming out to eat and breed only after dark.



Regal fritillary at McKnight Prairie

Math

Sample Survey Design and Analysis

Geology

Geology in the Field
Geology of Soils
Introduction to Geology
Geomorphology
Geochemistry of Natural Waters

Studio Art

Advanced Ceramics
Intro to Digital and Film Photography
Advanced Photography
Woodworking
Field Drawing
Table Making

Physical Education

Nordic Skiing
Outdoor Skills for the Backcountry
Winter Sports Fitness

Cowling Arboretum Mission

- Provide opportunities for education and research
- Preserve and restore native plant and animal communities on College natural lands
- Provide opportunities for outdoor recreation and nature appreciation

Special Funding

In addition to operating support provided by Carleton College, the Arboretum's programs are supported by grants and funds that have been established through generous gifts (listed alphabetically):

Arboretum Endowed Fund

Arboretum Restoration Fund

Richard S. Cole '69 Memorial Fund

Conservation Reserve Program of the U.S. Department of Agriculture

Environmental Quality Incentive Program of the U.S. Department of Agriculture

George W. Megeath Fund for the Cowling Arboretum

Puzak Family Director of the Cowling Arboretum

The Louise '51 and Frank '50 Wright Endowed Arboretum Fund

We wish to thank the Arboretum's many benefactors who help make our work possible.

Classes in the Arboretum: Environmental Ethics

Environmental Ethics is an introduction to central ethical debates in environmental policy and practice and some of the major traditions of environmental thought. It investigates such questions as whether we have moral duties towards animals, ecosystems, or future generations; what is the ethical basis for wilderness preservation; and what is the relationship between environmentalism and social justice. Each year, students in Environmental Ethics analyze one or two Arboretum management issues from an ethical perspective. This year they considered the issue of feral cats and evaluated whether to introduce the dwarf trout lily (an endangered plant) into the Arboretum.



Dwarf Trout Lily

Faculty Scholarship in 2011

Mary Savina, Charles L. Denison Professor of Geology

Professor Savina utilizes the Arboretum and McKnight Prairie extensively in her teaching and with her comps advisees. Because the geology department is field-oriented and its senior comprehensive exercise requires an independent research project, Mary's students likely spend more time out of doors than in the classroom. Much of that time is in the Arboretum: investigating soil, learning how to access and interpret landforms, or observing the impacts of water on the landscape.



Mary Savina with class at
McKnight Prairie

Mary also involves her students in research that helps guide Arboretum management decisions. For example, students investigated stream bank erosion on Spring Creek and evaluated response options. Another class helped site a new trail, determined land use history of an area and assessed the potential to restore wet prairie based on soil type. "Geology students and faculty are incredibly lucky to have a resource like the Arboretum on campus," says Mary. "Not only is it a natural laboratory of surface processes and landforms, but students can also apply their skills to problems that can help the Arboretum staff."

Collaboration with the Cannon River Watershed Partnership (CRWP)

CRWP, a citizen driven non-profit organization, has been working to protect water quality and habitat in the watershed for the past twenty years. Carleton has been part of that work from the beginning, focusing on reducing soil erosion and restoring habitat in the Arboretum. More recently, Arboretum staff have worked on joint field trips and other programming, and have served on the organization's board of directors. Partnering with groups like CRWP is one way to extend the reach of the Arboretum beyond its borders and have a positive influence on the broader community.



Inventory and Monitoring

For the past 3 summers, Carleton senior Owen McMurtrey '11 has ventured out once a week at the break of dawn to the Lower Arboretum prairie to look and listen for birds. His work contributes to the Grassland Breeding Bird Survey, initiated by Mark Luttera '07 in 2005, and supports the Arboretum's conservation mission. The survey helps inform management actions by documenting the species of birds that breed here and how they respond to management techniques and changes over time. Though Owen can differentiate around 500 bird species, his survey focuses on just eighteen, including the Eastern Kingbird, the Sedge Wren, and the American Goldfinch.



American Goldfinch

Forest Tree Inventory

The forests of the Lower Arboretum were inventoried this summer to prepare for the development of response strategies for pests and diseases such as the emerald ash borer and gypsy moth. While we have long known what species of trees grow in the Arboretum forests, we have not had good information about density, composition, recruitment and the importance of each species. Staff and volunteers took to the woods with diameter tape and tree guides and collected data from both floodplain and upland forests. Over the next year, data will be analyzed and recommendations for specific management actions will be developed.



Environmental Education and Community Outreach

Field trips are an important way to share the work of the Arboretum with others. Arboretum staff facilitate these experiences for prospective students, visiting alumni or other guests, reunion groups, faculty, staff, current students, and members of the general public.

Last year, Arboretum staff also collaborated with the Minnesota Department of Natural Resources to host a workshop for private landowners on identifying and controlling invasive, non-native shrubs. A problem for natural areas and private landowners, invasive shrubs are one of the most time consuming land management tasks for the Arboretum staff.

Volunteer opportunities are offered on a regular basis to both the Carleton and Northfield communities. Thirty volunteer opportunities were offered in 2011 involving current students, retired staff and faculty, scout groups, K-12 classes, adults from the Northfield community and alumni year-round and during reunion weekend.

| Type of Group | Number of Field Trips, Talks or Workshops | Total Number of Attendees |
|-------------------------|---|---------------------------|
| College-Related | 10 | 237 |
| Youth (K-12 or Other) | 10 | 455 |
| Adult (Local Community) | 6 | 147 |



Cole Student Naturalist Program

The Cole Student Naturalist Program is funded through an endowment created in memory of Richard S. Cole '69. The program trains students in natural history and nature interpretation and provides opportunities to lead field trips and participate in other educational events for Carleton and the broader Northfield community. Student Naturalists meet each week during the academic year to share experiences and knowledge and learn from experienced naturalists. Field trip leaders are requested by various campus offices, including admissions and alumni affairs, scouting groups, schools and garden clubs. The student naturalists also write a weekly column for the *Carletonian*, the student newspaper. Meet two of our 2011 Cole Student Naturalists:

Rae Wood '12

English Major, Excelsior, MN

Between growing up playing in the woods in her backyard, downhill skiing with her Dad, and using the outdoors as creative inspiration for her favorite hobbies (writing, photography), nature has become an integral part of Rae's life.

At Carleton, she finds cross-country skiing and taking long walks in the Arb as the best breaks from her long hours in the library. As a student naturalist, she likes to learn more about the environment around her and to pass on her knowledge and love for nature to others.

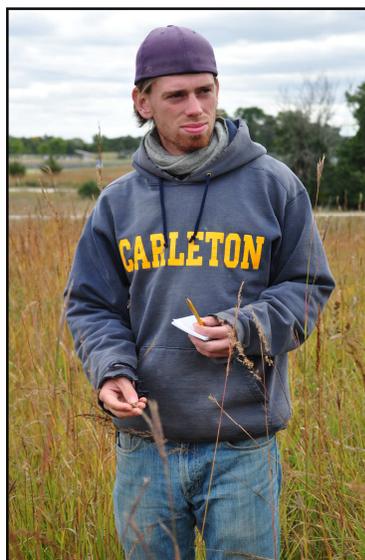


Owen McMurtrey '12

Environmental Studies Major, Chicago, IL

Owen developed an interest in birds at a young age. He has now seen over 425 species of birds in North America. Of late, Owen has focused on butterflies, dragonflies and other insects because they give him something new to look for when he's out in the field.

Owen is thrilled to be attending Carleton because the opportunity to enjoy nature in the Arb is within a minute's walk. Whether birding, looking for bugs, or just hiking, Owen is consistently amazed by the beauty and size of the Arb.



Land Management and Restoration

Restoration efforts continued with several new prairie plantings this year. Prairie seeds are collected by student workers and volunteers from the Arboretum, McKnight Prairie, and other nearby prairie remnants. This year seeds were collected from over 90 plant species! Before being planted, seeds are sorted, cleaned and weighed before they go into the ground. The goal of these efforts is to create large blocks of highly diverse prairie habitat. Prairie restoration provides secure areas for birds and mammals and fosters the exchange of seeds, microbes, and important pollinating insects between areas.

Soil Inoculation Project

This year, a new research project investigated the impact of inoculating restoration plantings with soil from original, never plowed, prairie remnants. Prairie restorations typically occur in fields that have been cultivated for many years. The original soil organisms—bacteria, mold, fungus, invertebrate animals—



are lost during this period of cultivation. Our research, which is ongoing, focuses on assessing the impact of returning such organisms to the soil, and predicts that such action will reduce the ability of the largest prairie grasses to dominate restoration plantings, which is more reflective of true prairies. Soil inoculation may hold the key to creating healthier, more diverse restorations.

Citizen Science Monarch Butterfly Project

A new collaboration between the Arboretum, Carleton's Academic and Civic Engagement program and the Northfield Middle School was established this summer. This partnership integrated the Driven to Discover (D2D) Citizen Science Monarch Butterfly project, developed by the University of Minnesota Extension Service, into the curriculum of a class of nine middle school students. Students learned how to use scientific methods to ask and answer questions about their environment and explored the Arboretum as they observed monarch butterflies, learned about ecology, and asked questions about monarchs and their host plants. Three Carleton students were involved in the program, working directly with the middle school students and developing the daily activities. The participants' ability to ask ecologically-oriented questions flourished during the program, as did their confidence in interacting with their environment.

Arboretum Staff

During the 2010-2011 academic year, 37 students worked more than 2,800 hours in the Arboretum, assisting with restoration and habitat-management programs. Six summer student workers assisted with the restoration and management programs of the Arboretum and McKnight Prairie. These students provided 2,400 hours of work. Students also provided critical support in the Arboretum office through data entry, outreach programs, and general support of the day to day work of the office.



The Arboretum crew prepares for a prescribed burn.

Around the Arboretum



Aya Myint (5) lends a hand and a smile in the fall planting.



Arboretum crew members step away from the flames of a prairie burn.



Newly discovered Tiger Salamander

For additional information, contact our director or visit our Web site or Facebook page:

www.carleton.edu/campus/arb
www.facebook.com/carletonarboretum

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