

# **Biocore Prairie Restoration Project Report**

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**Prairie Management Team:** Janet Batzli, Seth McGee, Curt Caslavka, Evelyn Howell, Ann Burgess

## **Overview**

The Biocore Prairie is a diverse prairie community in the Lakeshore Nature Preserve. Within a relatively small area of 11.8 acres, the prairie is home to more than 110 prairie plant species native to South Central Wisconsin and a vast array of insects, birds, amphibians, and small mammals. The Biocore Prairie vegetation, animals, microbiota, physical environment, and ecosystem are being studied, monitored, inventoried, and enjoyed by a diverse group of students, UW community members, and the public. The Biocore Prairie is now a recognized destination, and a valuable natural landscape within the Lakeshore Nature Preserve.

The Biology Core Curriculum (Biocore) has managed the Biocore Prairie under permit since 1997. This report provides information on the overall goals, relevant site history, management approach, current (2013) expenditures, land management status for 2013, and plans for 2014. For more background, see Biocore Prairie Annual Report 2010-2011 and other previous reports. This report provides background for discussions on how and to what extent the Biocore Prairie should be incorporated into the general work plan for the Lakeshore Nature Preserve.

**Location and Site description** The Biocore Prairie is situated at the base of Picnic Point adjacent to the Eagle Heights Community Gardens, Second Point Woods, Caretaker Woods, the Old Orchard, and Anthropology and Art Kilns. The site consists of three main areas (east, central, and west) that include established mesic, dry, dry-mesic prairie plant communities and a future wet-mesic community (Figure 1).

## **Project Goals**

1. Establish a prairie ecosystem in accordance with the 2006 Lakeshore Nature Preserve Master Plan with implementation to include a diversity of prairie plant communities (dry, mesic, and wet)
2. Engage Biocore students in the process of scientific research in field biology and in the process of ecological restoration and stewardship through classroom projects and summer field work
3. Support restoration efforts as an outdoor living laboratory
4. Engage and collaborate with other UW faculty, courses, and programs in education, outreach, and research at the Biocore Prairie

Central to this restoration project is *ecological education*.

Our instructional goals are to teach ecological principles and procedures as well as research design and analysis to Biocore students through the process of restoring an abandoned agricultural field to prairie. The Biocore Prairie serves as a site for undergraduate research projects, the home of the Biocore Prairie Bird Observatory, for outreach and service learning opportunities, and for collaborative research and teaching efforts with other UW-Madison programs and departments. In addition to Biocore courses, the prairie is used by a wide array of other UW courses, including Wildlife Ecology, Ornithology, Landscape Architecture, and Computer Engineering, also for both undergraduate and graduate student research projects throughout the campus community.

## **Relevant Site History**

In 1997, following the Kline-Bader report, the Biocore staff and students began the Biocore Prairie restoration project. Before then, the site was an old agricultural field that had been used as a soil and organic waste dump site and had accumulated a large bank of weed seeds in the soil. The Southeast mesic prairie area was originally covered with large pile of soil put there during construction of the UW Hospital. The South Central area was a dump site for a floating bog that had piled up on the shore of Lake Mendota in the mid 1990s. In addition to these factors, historic use of the site, time of planting, neighboring plant communities, physical soil properties, topography and the Lakeshore Nature Preserve Master Plan all have influenced the planning, implementation and establishment of the Biocore Prairie.

## **Management Approach**

The process of ecological restoration is an evidenced-based, research-based effort to manage land toward a specific ecological outcome (Howell et al. 2012). The Prairie Management Team has utilized an adaptive management approach for small to large scale planning and implementation in each of the intended prairie communities (Figure 1). Adaptive management is a systematic process of selecting practices based on documented evidence in research literature or success at analogous sites, experimentally adapting those practices to a new site, and using the results to plan the next step. Adaptive management in each area of the Biocore Prairie has been iterative and subject to continuous evaluation and review. This approach has resulted in an established, robust natural prairie community within the Lakeshore Nature Preserve.

## **Management, Planning, and Implementation**

Janet Batzli and Seth McGee serve as the Biocore Prairie project leaders. Batzli is the Associate Director of the Biocore program and the lead instructor for Biocore 382, Evolution, Ecology, and Genetics Laboratory. She has a PhD in plant ecology and directs the prairie restoration project. McGee serves as Biocore Lab Manager and is co-instructor for Biocore 382. He is an expert naturalist who supervises the prairie crew and manages the prairie restoration efforts.

The Prairie Management Team includes Batzli (Chair), McGee, Evelyn Howell (Prof. of Landscape Architecture and a prairie restoration expert), Curt Caslavka (retired Biocore Lab Manager, founder of Biocore Prairie, and restoration expert), and Ann Burgess (retired Biocore Director, founder of Biocore Prairie, and active volunteer with the Lakeshore Nature Preserve).

Along with the considerable expertise of our Prairie Management Team, the group regularly consults with experts from the Prairie Enthusiasts, Michler & Brown Ecological Restoration, Quercus Land Stewardship Services, faculty in the Departments of Agronomy, Soils, and Landscape Architecture. Specific experts include Mark Renz (UW Agronomy professor and weed ecologist), Mark Martin (Manager of Audubon's Goose Pond prairie restoration project), Willis Brown and Chris Knief (Mickler and Brown), Steve Glass (UW Arboretum prescribed burning), Jim Elleson (Quercus) and Tom and Kathie Brock (Managers of Pleasant Valley Conservancy).

Small-scale land management, such as hand weeding, hand planting, spot spraying, and mowing, are planned by McGee, Batzli, and Caslavka and implemented by McGee and the Biocore Prairie Crew (a group of 5-8 Biocore student hourly workers).

Large-scale land management tasks, such as tilling and plowing, soil manipulation, herbicide application, prescribed burning, crop planting and harvesting, are recommended by the Prairie Management Team, and then discussed, revised, and approved by Cathie Bruner (FPM) through the Biocore Prairie Restoration Project permit. Implementation of large-scale land management is done by Caslavka (with equipment loaned by Lynn Hummel), Tom Wright (UW West Side Agricultural Station), Quercus

(prescribed burn), Quercus and Mickler and Brown (herbicide application), and Adam Gundlach (Lakeshore Nature Preserve field technician).

**Expenditures:** 2013 calendar year

- Student hourly salaries \$6,232
- Supplies & Expenses \$1,061 [TBD UW West Side Ag Station- Tom Wright \$950]
- In kind time of Biocore Lab Manager (McGee) and Associate Dir (Batzli) equivalent to 0.12 FTE

**Land Management Plan for 2014**

***Whole site management***

- Continue prairie restoration efforts as an ecological education and research project
- Control invasive weeds, specifically targeting Canada thistle and leafy spurge
- Mow grassy strips between and surrounding prairie areas
- Continue seed collecting, inter-seeding, and transplanting
- Prepare for prescribed burns

***Northeast mesic prairie (1 acre)***

- Cut Canada goldenrod in specified research plots
- Hand weed invasives and remove woody plants
- Transplant from nursery and greenhouse-grown plants

*Status:* This is a tallgrass prairie plant community with a low density of grasses and high density of Canada goldenrod. The area lacks sufficient grasses to fuel a strong burn and is, thereby, susceptible to invasion by non-native weeds and woody plants given its proximity to foot trails and forest. The Biocore staff and students have concentrated on hand pulling problem weeds and planting native seedlings and plants in this area.

***Southeast mesic prairie (1 acre)***

- Hand weed invasives and remove woody plants
- *Introduce new rare and conservative plant species*

*Status:* This is a healthy tallgrass prairie community that supports most of the 57 prairie species originally planted (surveyed by Biocore students in Fall 2005). The site was formerly occupied by a large dirt pile placed there during construction of the UW Hospital. The dirt pile was removed leaving a nutrient poor, yet, heterogeneous and relatively weed-free soil. In 2000, this area was plowed repeatedly and seeded in a cover crop of oats and seeded to prairie in spring 2001. Over the last 12 years, Biocore staff and student workers have transplanted hundreds of young prairie plants into this area and hand removed problem weeds.

***North Central mesic prairie (4.5 acres)***

- Hand weed invasives and remove woody plants
- Spot spray thistle in southwest corner
- Maintain trails

*Status:* This area is doing well except for the southwest corner. From vegetation surveys, we have documented 50 prairie species (of 53 planted in 2004). Grass establishment is good and can now easily fuel a fire. Forbs have continued to grow and establish well except in a small 10 x 15 m area in the southwest corner where problem weeds, particularly Canada thistle, stinging nettle, and annual wormwood, are established.

***South Central wet-mesic (2 acres)***

Two options we are considering are:

- Removing all or a portion of the weed and nutrient-laden topsoil
- Continuing another two rounds of planting and removing oats (the reverse fertilization procedure described below)

*Status:* This area was originally planted in prairie in 2004 but was subsequently plagued with problem weeds, including stinging nettle, crown vetch, Canada thistle, and reed canary grass that prevented establishment of most prairie plants. The soil is rich in weed seeds and nitrogen that encourage weed growth. Both of these problems are partly due to the floating bog that was put there many years prior to the start of this restoration. In fall 2008, 2009, and summer 2010-12, this area was deep plowed to turn over and bury all vegetation, both weeds and prairie plants. To induce uptake and removal of nutrients from the site (a procedure referred to as reverse fertilization), the area was planted in oats, mowed and treated with herbicide to reduce growth of weeds. In summer 2013, the area was planted again in oats and then all vegetative biomass was removed with the intention of depleting the nutritive content of the soil, making it less fertile for weed growth.

***West dry prairie (2.8 acres)***

- Hand weed and spot spray to control thistle and leafy spurge
- Inter-seed dry prairie species
- Treat leafy spurge in research plots

*Status:* This area is unique and particularly well suited to growing dry adapted prairie species. It slopes to the west with relatively dry soil. The upper one-half of the site was planted in short grass species, including little blue stem, prairie dropseed, and side oats grama grass, together with many forbs. The bottom one-half, sloping toward a moist ditch, was planted with tall grass species, including big blue stem and Indian grass. The prairie plant community is starting to establish well, however, there continue to be large pockets of weeds, particularly Canada thistle and leafy spurge.

***West Inset dry-mesic prairie (0.5 acres)***

- Perform reverse fertilization by growing and removing oats (April 2014)
- Follow by treating area with Glyphosate
- Repeat growing and removing oats (Sept 2014)
- Repeat Glyphosate treatment
- Seed to prairie – in Nov. 2014 and/ or May 2015

*Status:* This area has been undergoing site preparation since 2010 to control remnants of the garden plantings and weeds and to level the soil from many years of rototilling and row cropping. The area has been plowed and mowed through summer 2012 and 2013.

References:

Biocore Prairie Annual Report 2010-2011

Howell, E. A., Harrington, J. A. and Glass, S. B. 2012. Introduction to Restoration Ecology pp. 436

Lakeshore Nature Preserve, Benchmark Documents – Boundary Biocore Prairie

[http://lakeshorepreserve.wisc.edu/plans/docs/CNA\\_Biocore-Eagle\\_Hts\\_Boundary\\_Rept\\_2-21-2002.pdf](http://lakeshorepreserve.wisc.edu/plans/docs/CNA_Biocore-Eagle_Hts_Boundary_Rept_2-21-2002.pdf)

Lakeshore Nature Preserve Master Plan 2006



Figure 1. Biocore Prairie aerial photo (Sept. 2010 Google Earth) indicating established and intended prairie communities, area size, and dates planted.