

Grant Agreement Number: 12-006W

Timeframe of the report: June 2011-July 2012

“Silver-bordered Fritillary Repatriation at Indian Boundary Prairies”

Project Objectives

Rear imperiled species of butterflies, the Silver-bordered Fritillary and Baltimore Checkerspot, and release onto protected sites. The proposal called for release of Silver-bordered Fritillaries at Gensburg-Markham Prairie. There was an additional release of Baltimore Checkerspots at the Fermi National Accelerator Laboratory.

Introduction

Silver-bordered Fritillaries (*Boloria selene*) and Baltimore Checkerspots (*Euphydryas phaeton*) inhabit wetland remnants in Illinois. Both species are faring poorly along the southern edges of their ranges. NatureServe assigns heritage rankings in the states of Connecticut, Delaware, Indiana, Iowa, Maryland, Nebraska, Pennsylvania, Virginia, and West Virginia, all at the southern edge of the species' range, that reflect its decline. It is ranked anywhere from S3 (vulnerable) to S1 (critically imperiled) in these states. The species is assigned an un-rankable (SU) value in Illinois. Baltimore Checkerspots are more closely associated with fen wetlands in Illinois. They are ranked S3, vulnerable.

As a conservation measure for both of these species in Illinois, we are attempting to create additional populations on protected, managed lands. The sites that we have chosen have shown sufficient habitat enhancement such that we believe that they will now support viable populations of these species. Both Gensburg-Markham Prairie and the grounds of the Fermi National Accelerator Laboratory have been the subjects of decades-long habitat restoration programs.

Methods

Our approach to butterfly restoration involves field collecting a modest number of females, inducing oviposition in the laboratory, and rearing the larvae to a desired stage. In some cases this requires overwintering the larval stage. After pupation and eclosion we allow adults to mate and produce offspring which significantly increases the number of individuals we are able to field release. Breeding methods for the two species involved in this project differed slightly. Silver-bordered Fritillaries have at least three generations annually in Northern Illinois. This life history allows us to rear and release adults in the same summer, avoiding the need to hold larvae in diapause for the winter.

In contrast, Baltimore Checkerspots are univoltine, over-wintering as third instar larvae. This life history requires that we hold the larvae in diapause over the winter. Baltimore Checkerspot and Silver-bordered Fritillary larvae were reared from ova obtained by confining adult females with cut sprigs of host plant. Turtlehead (*Chelone sororia*) was used for the Baltimore checkerspots and Blue Wood Violet (*Viola pallida*) was used for the Silver-bordered Fritillaries. Larvae were fed on cut sprigs of host plant. Food was

changed every third day, until pupation (for the fritillary) or until larvae ceased feeding (for the checkerspot).

Silver-bordered Fritillary pupae were held in the breeding laboratory at the Peggy Notebaert Nature Museum until adults eclosed in September of 2011. Adults were transported to Gensburg-Markham Prairie and released.

Baltimore Checkerspot larvae were transferred to hibernation cages the first week in October and placed on the roof of the Peggy Notebaert Nature Museum in Chicago. In April of 2012, these larvae were removed from the wintering cages and reared on cut sprigs of Foxglove Beardtongue (*Penstemon digitalis*). Food was changed every third day, until pupation. Pupae were held in the breeding laboratory at the Peggy Notebaert Nature Museum until adults eclosed in June of 2012.

Results and Discussion

In 2011, 10 female Silver-bordered Fritillary adult females were obtained from the Commonwealth Edison and nine Baltimore Checkerspot adult males were obtained from private property in Crystal Lake Illinois. Survival through the various life stages is illustrated in Table 1. We released 136 Silver-bordered Fritillaries at Gensburg-Markham Prairie in three batches between August 16 and September 11 in 2011.

We successfully carried 290 Baltimore Checkerspot larvae over the 2011-2012 winter. We reared these to adulthood and released 131 adults at the FermiLab site in June of 2012. Adults are not expected at this site until June of 2013, however we were encouraged to find numerous egg masses on host plant leaves on a return visit in late June of last year.

It is significant that we had excellent survival of the over-wintering Baltimore Checkerspot larvae. This species had previously been very difficult to maintain alive in winter diapause. As a result of the funds provided by this grant we have been able to develop a new technique that elevates the humidity around larvae that are being housed outside during the winter months. As a result of this improvement, we are now able to achieve survival rates in excess of 80% for our wintering checkerspot larvae. This technique may have further applicability with other species.

Silver-bordered Fritillaries continue to be present only at very low numbers at Gensburg-Markham Prairie. Only two individuals were observed in 2012. It should be noted that the most recent releases of this species were in 2011, so there is at least some breeding continuing at that location.

Conclusion

The long-term success of these restoration efforts is unclear at this time. There is considerable concern regarding possible negative effects of the extreme heat and drought that characterized the summer of 2012.

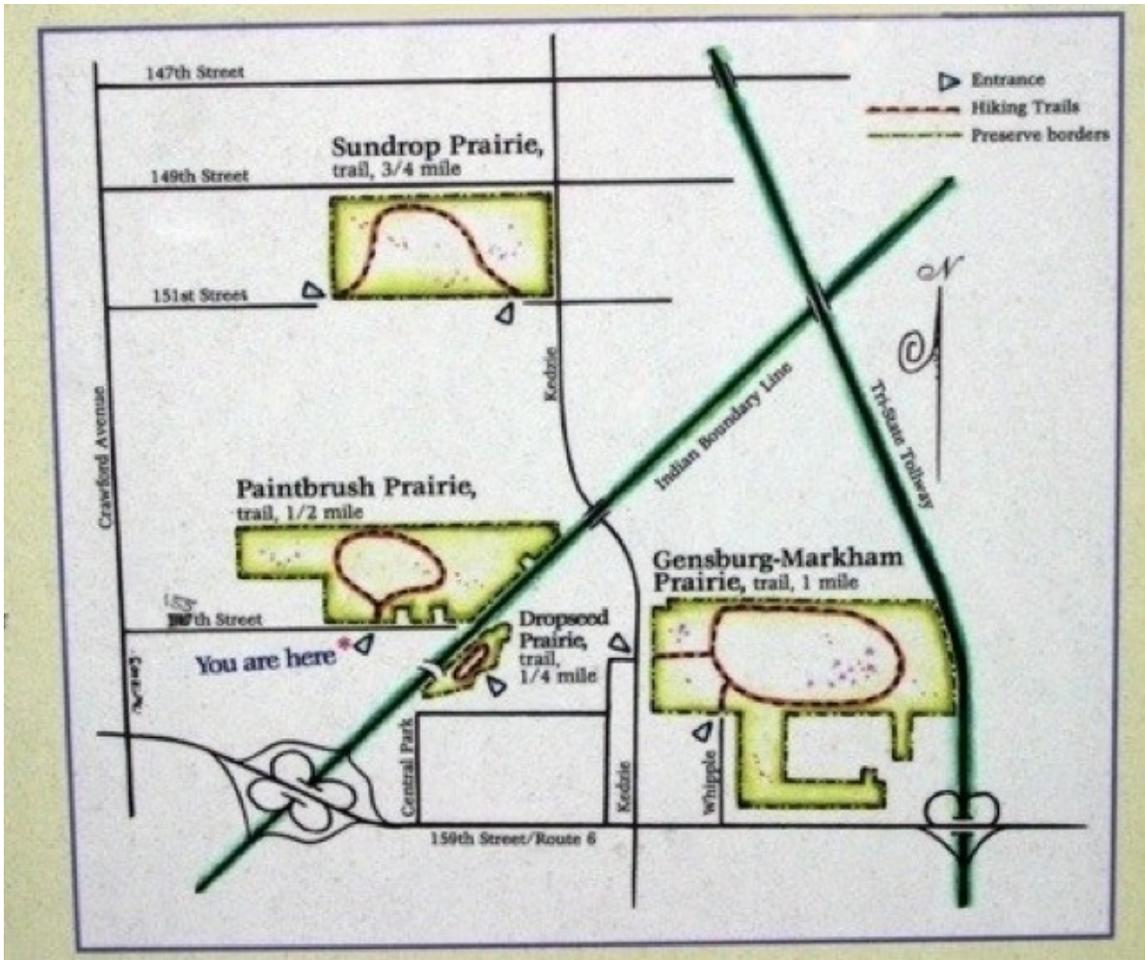
The citizen scientists of the Illinois Butterfly Monitoring Network will monitor the establishment, or lack thereof, of populations of these two species. We anticipate the need for further release of lab-reared adults to augment nascent populations as they grow and become established on the restoration sites.



Silver-bordered Fritillary (*Boloria selene*)



Oviposition cages



Indian Boundary Prairie Map



Baltimore Checkerspot (*Euphydryas phaeton*)



Release of adult Baltimore checkerspots at Fermilab in 2011

Media Coverage/Outreach/Education related to project

Butterfly Restoration Project



The names are as detailed and descriptive as the butterflies are beautiful: Baltimore Checkerspot, Regal Fritillary, Silver-bordered Fritillary, Swamp Metalmark.

These are just a few of the species that have benefited from the Nature Museum's pioneering work to bolster populations of rare and endangered butterflies native to the region. A rite of early summer in Chicago has been the day when a species of rare butterflies are triumphantly released back into nature.

Butterflies are an important indicator of a healthy environment and ecosystem. They are considered a model species to study the impact of habitat destruction and fragmentation. Nature Museum scientists obtain species of females and their host plants in the hopes of seeing caterpillars emerge in the spring.

Recently, the Butterfly Restoration Project has focused on the threatened Regal Fritillary, imperiled Baltimore Checkerspot and the endangered Swamp Metalmark.

In 2010, the Museum released nearly 200 Regal Fritillaries just south of Chicago at Paintbrush Prairie Nature Preserve. To get to that point, Museum scientists had to figure out a way for the fragile, tiny larvae to survive the winter. The solution turned out to be placing them in covered cages on the Museum's roof to give them the full effect of the winter cold. The release of the Regal Fritillary received nationwide attention.

Over the last two years, Museum scientists have released Baltimore Checkerspots in a restored wetland at Fermilab in Batavia. The site features host plants such as Turtlehead and Mullein Foxglove.

Become a Butterfly Monitor

The Museum's [Illinois Butterfly Monitoring Network](#) monitors butterflies at more than 100 sites. Monitors identify and count butterflies along a fixed route at a predetermined location. This is crucial data for scientists to better understand area butterflies and population and habitat changes.

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Conservation page of the Peggy Notebaert Nature Museum website



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Imperiled Butterfly Conservation & Management Sharepoint

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Imperiled Butterfly Conservation and Management (IBCM) is an intensive cross-training program designed to strengthen the capacity of institutions and their staff to play a strategic role in the emergent and increasingly important field of insect conservation biology, with a targeted focus on imperiled butterfly recovery.

Impacts from habitat loss and fragmentation, invasive species, and climate change continue to accelerate the rate of biodiversity loss and necessitate increased and often aggressive conservation action. Zoos, natural history museums, botanical gardens, and state and federal wildlife agencies are progressively focusing on insects, particularly charismatic groups such as butterflies and pollinators, to help advance local conservation efforts and foster increased environmental stewardship, science literacy and community engagement. However, insufficient experience and familiarity with insects prevent staff and institutions from adequately planning, implementing and evaluating conservation activities. The three-year IBCM program directly addresses this critical gap by focusing on institutional and staff development.

Participants will learn the latest techniques, resources and tools available in the field. This increased knowledge base will enhance existing imperiled butterfly programs, facilitate the development of new programs, and advance overall local conservation efforts. Successful conservation programs and an informed staff further improve institutional capacity to deliver accurate and relevant environmental education programs and foster increased public interest and community engagement.

Led by the [Florida Museum of Natural History's McGuire Center for Lepidoptera and Biodiversity at the University of Florida](#) and the [Butterfly Conservation Initiative](#), IBCM is a broad partnership that also involves the [Chicago Academy of Sciences' Peggy Notebart Nature Museum](#); the [Oregon Zoo](#) in Portland, OR; the [Toledo Zoo](#) in Toledo, Ohio; [Fairchild Tropical Botanic Garden](#) in Miami, FL; the [Association of Zoos and Aquariums \(AZA\)](#) in Silver Spring, MD, and the [University of Florida IFAS Department of Entomology and Nematology](#).

The three-year program, Imperiled Butterfly Conservation Management, was a key outlet for sharing the conservation programs detailed and supported by the grant. Additionally; media coverage occurred with a local news station when a release of adults was made in June 2011 out at Fermilab during the Chicago portion of the program for Imperiled Butterfly Conservation and Management workshops.

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The conservation efforts of the Chicago Academy of Sciences during the 2011- 2012 season were supported in part by funding from the Illinois Department of Natural Resources Grant # 12-006.