

**Conservation Matters:**  
**Contributions from the Conservation Committee**

# Efforts to Restore the Baltimore Checkerspot (*Euphydryas phaeton*) in Maryland

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Until the early 1990s, the Baltimore Checkerspot was common in central and far western Maryland within its wet meadow habitat, historically reported from 15 of the state's 23 counties. The orange-and-black wing markings of *Euphydryas phaeton*, the only representative of its genus on the East Coast, are reminiscent of the Maryland State flag, which is based on the family coat of arms of George Calvert, the first Lord Baltimore. At the urging of the Maryland Entomological Society, in 1973 the butterfly became Maryland's official state insect, joining 16 other icons of the state, which include the Baltimore oriole, blue crab and black-eyed Susan.

That few Marylanders have seen their state insect is not surprising. In recent decades, much of the state's Piedmont pastureland, where Baltimore Checkerspot colonies were once found with some frequency, has given way to development. Most of the state's few remaining colonies are remotely located in rocky bottomlands traversing power line rights of way or in high elevation bogs, and only where there also is an abundance of the species' primary regional host, white turtlehead *Chelone glabra*, and where adjacent fields provide consistent and plentiful sources of nectar throughout the univoltine species' June-July flight. The sedentary Baltimore Checkerspot tends to stay close to its natal colony.

By the early 1990s, field reports began to suggest that the species was losing ground in the state. Development radiating west from the Baltimore-Washington corridor was an obvious

cause, but colonies in undeveloped areas had winked out as well. Similar reports from other mid-Atlantic states suggested a region-wide decline. The loss of a population at Ward Pound Ridge in Westchester County, NY over the past decade suggests an even more extensive decline (H. Zirlin, pers. comm.) .

Circumstances in Maryland point, at least in part, to the region's rapidly expanding population of white-tailed deer, known for their taste for white turtlehead, primary host of the region's Baltimore Checkerspot population. Extensively browsed turtlehead has been observed at most Baltimore Checkerspot sites in Maryland. Browsing does not necessarily destroy the plant, but can sever eggs or larvae on ingested leaves. The top leaves, most preferred by deer, are also where the female Baltimore Checkerspot typically deposits her lifetime's production of eggs, usually in three or four nickel-sized batches of 100-700 eggs, and where early instar larvae locate their communal webs. It is not unusual to find more than one egg batch on a single plant – sometimes on the same leaf — or a number of egg batches on plants in close proximity. Thus, it is possible for a single browsing deer to destroy hundreds of eggs or larvae within a matter of seconds.

Deer overpopulation is increasingly implicated as a cause of butterfly species decline in the East. The apparent extirpation of Mottled Duskywing *Erynnis martialis* from Maryland is linked to extensive deer browse on the species' host, New Jersey tea. (R.H.

Smith Jr., pers. comm.) *The Connecticut Butterfly Atlas* ranks deer impact as the third highest threat to the state's butterfly species.

Other possible explanations for the Baltimore Checkerspot's decline in Maryland include introduced insect predators and parasitoids, stepped-up spraying for gypsy moth, increased use of herbicides to control vegetation on utility rights of way, succession of former pasture fields, and a trend in remaining rural areas away from dairy farming in favor of row crops. Global warming may also be a factor, possibly nudging the species into colder areas of the state.

By 2000, only five large and distinct colonies were known to remain in Maryland. When results of the Maryland Rare Butterfly Survey of 2002-2003, sponsored by the state's Wildlife and Heritage Service, confirmed the species' decline, *E. phaeton* was added to Maryland's endangered list, with the designation S-3 ("watch-listed"). At this level, the state is not required to track the species, nor is the species eligible for state-funded conservation funds. In 2002, the Washington (DC) Area Butterfly Club launched the Baltimore Checkerspot Restoration Project (BCRP) as its main conservation effort. BCRP has no formal funding and its work is performed entirely by a few knowledgeable volunteers.

## Surveying and Monitoring

From its inception, BCRP has conducted surveys to monitor existing Baltimore Checkerspot colonies and

search for previously unknown colonies. Because the flying season is so short, searching for potential sites continues into the summer. Promising sites are put on a list to survey the following year. In 2008, the state's Wildlife & Heritage Service hired two BCRP volunteers for a dedicated Baltimore Checkerspot survey, which will conclude in June 2009. The results of this survey may lead to an increased imperiled ranking of the Baltimore Checkerspot in Maryland, potentially making the species eligible for state-funded conservation efforts.

By 2008, five additional colonies had been added to the list, increasing the number of BCRP-verified Maryland colonies from five to ten. One of those colonies was a chance discovery by volunteer botanists searching for rare plants on recently sold Montgomery County farm. The surprising find in Montgomery County, where the Baltimore Checkerspot was thought to be extirpated, spurred a more intensive BCRP search of the county's 90,000-acre, rurally zoned Agricultural Reserve in 2006. BCRP developed and distributed a brochure on how to identify the Baltimore Checkerspot, and conducted an identification workshop for 26 residents of the Agricultural Reserve. A list of promising sites was drawn up and their owners contacted about permission to survey their land. Although no additional colonies were discovered during the six-week search of the Agricultural Reserve, one of the surveyed sites would become BCRP's first Baltimore Checkerspot introduction project.

### Introduction

Rubin's Marsh was chosen for a small, trial introduction site for a number of promising attributes. Its small but healthy white turtlehead population indicated conducive conditions for the plant. The wetland supports a vibrant population of MulberryWing *Poanes massasoit*, a skipper species that often occurs with Baltimore Checkerspot. The surrounding fields are well-populated with nectar sources that

bloom during the annual Baltimore Checkerspot flight. Moreover, the landowner, an enthusiastic conservationist, was willing to help underwrite the project, and he had already placed his land in permanent conservation, meaning that any colony that might be established would be protected from development. The landowner provided manpower to install 400 additional first-year turtlehead plants in five plots and installed deer exclosures around each plot. BCRP prepared the plots, supplied the turtlehead "plugs," and supervised the project.

In late June 2008, BCRP collected four gravid females from existing Maryland colonies, two from a Piedmont colony in Frederick County and two from a colony in a privately owned high-altitude bog in Garrett County. The females were confined on white turtlehead, where they deposited only three batches of eggs. The resulting larvae were hand-reared on the turtlehead through the third instar, when Baltimore Checkerspot larvae enter a period of aestivation that extends into late fall. In early August, two webs, containing an estimated 300-400 aestivating larvae, were attached to mature turtlehead plants within the marsh. The larvae were checked by BCRP in late September, early October, late October and mid-November. After more than three months on their own, the larvae had consolidated within a single web and appeared healthy. By late November, they had abandoned the web and presumably retreated to the leaf litter for the winter. BCRP will resume regular monitoring in mid-April, when Baltimore Checkerspot larvae normally emerge to complete metamorphosis. During spring and summer 2009, BCRP will periodically weed the turtlehead plots to prevent the young plants from being overrun by more mature vegetation and will introduce more captive-bred larvae. If this trial introduction is successful, BCRP will attempt similar introductions at other sites where conditions seem promising.

### Habitat Enhancement

Meanwhile, five sites in Maryland are in the process of being enhanced with white turtlehead and appropriate nectar plants in preparation for potential introductions. The high cost of nursery-grown perennials and the eventual need for potentially thousands of white turtlehead plants to enhance habitat has necessitated BCRP's learning how to propagate the plant in quantity. Success was elusive until we discovered that white turtlehead seeds take much longer than most perennials to germinate, and that fumigating the seeds to destroy parasite larvae was necessary to achieve a satisfactory germination rate. Fumigating, which is done before the seeds are stratified, is achieved by storing the seeds for three days in an air-tight container containing a No-Pest Strip. (D. Gibbs, pers. comm.) A number of volunteers are propagating white turtlehead for future enhancement projects.

BCRP is still working out methods to prevent young turtlehead plants installed at remote enhancement sites from being overrun by existing vegetation and from drying out before their roots become established. At Rubin's Marsh in 2008, we tried plantings in the fall, when adjacent vegetation is less active and cooler weather is less likely to desiccate the newly installed plants.

### Captive Rearing

With the turtlehead propagation problem resolved, BCRP's next challenge is to develop a source of captive-reared stock for our initial introduction project at Rubin's Marsh and for possible future introductions. In anticipation, BCRP has been working with the Maryland Zoo in Baltimore since 2004 to establish a captive-rearing facility, the Zoo's signature project for the Butterfly Conservation Initiative, sponsored by the American Zoo and Aquarium Association. The Zoo's horticultural department has successfully propagated

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hundreds of white turtlehead plants. With the generous advisory assistance of Dr. M. Deane Bowers, Professor and Curator of Entomology, University of Colorado at Boulder, BCRP helped the Zoo staff set up a breeding tent and other necessary equipment, provided a day-long training session for the volunteers who would care for the breeding stock, and brought in a half-dozen gravid females to start the project. After three unsuccessful attempts and restarts in following years, the 2008 crop survived the summer. In the fall, webs of aestivating larvae were placed in the Zoo's manmade bog to over-winter. If the larvae emerge in the spring, finish their metamorphosis, and successfully breed, the Zoo will be on course to expand its captive-rearing effort. Long range plans include a permanent Baltimore Checkerspot conservation exhibit, where the public can observe the butterfly and captive breeding practices.

With the hope of creating one or two additional captive-rearing projects, BCRP presented a captive-breeding workshop to 21 participants in November 2008. The day-long event included BCRP's PowerPoint show on the life history of the Baltimore Checkerspot, sessions on propagating

white turtlehead and on setting up a low-budget captive-rearing facility, and a field trip to Rubin's Marsh. Participant evaluations were encouraging. To date, one participant has committed to starting a captive-rearing facility; three more are considering the undertaking. BCRP will work with these volunteers to set up their captive rearing facilities.

### Public Education

Informing the Maryland public about their state insect and its conservation status has been an important aspect of BCRP's work. The BCRP brochure on the life history and conservation status of the Baltimore Checkerspot has been widely circulated to Maryland-based nature centers, garden clubs and other organizations. BCRP's PowerPoint show, "Saving Maryland's Baltimore Checkerspot," a 30-illustrated lecture on the life history of the butterfly and its decline in the state, has been presented to more than a dozen natural history and garden groups. A simplified version of the show with a teacher's script has been incorporated into Montgomery County's second-grade science unit on butterflies. With BCRP's assistance, the Maryland Zoo has developed its own comprehensive youth outreach program on the species. *The Baltimore Sun*, Maryland's newspaper of record, has steadily

reported on efforts to restore the Baltimore Checkerspot in the state, each article illustrated with a striking color photo of the butterfly. The result of these efforts is an enthusiastic Maryland constituency for the Baltimore Checkerspot.

Where do we stand? Admittedly, still a long way from restoring the Baltimore Checkerspot in Maryland. Dependable captive-rearing and introduction techniques have yet to be developed, wild colonies need long term protection, and many more volunteers must be recruited and trained to take on the workload. However, because the Baltimore Checkerspot is not yet hopelessly imperiled, BCRP believes there is still time to reverse its decline in the state.

### References

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