



Global Re-introduction Perspectives: 2010

Additional case-studies from around the globe
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IUCN/SSC Re-introduction Specialist Group (RSG)





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Re-introduction of the Miami blue butterfly, Florida, U.S.A

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Introduction

The Miami blue butterfly (*Cyclargus thomasi bethunebakeri*, Comstock & Huntington, 1943) is a small, brightly colored polyommatine lycaenid endemic to Florida; additional subspecies occur in the Bahamas and Hispaniola (Smith *et al.*, 1994). The taxon is listed by the state of Florida as endangered and is currently a candidate for federal listing. It was formerly distributed across much of the south Florida mainland south through the Florida Keys to the Dry Tortugas (Minno & Emmel, 1993; Calhoun *et al.*, 2002). Over the last three decades, the Miami blue has experienced a significant reduction in overall geographic distribution and numerical abundance to the point where by the early 1990s it was presumed extirpated. Today, it is restricted to a few extant populations on conservation lands in the Lower Florida Keys, namely Bahia Honda State Park and the uninhabited Marquesas Islands and Boca Grande Island in Key West National Wildlife Refuge. Because these are widely separated sites and the adults have limited dispersal ability and longevity, gene flow between the populations is unlikely. Re-introduction of captive-bred organisms began in 2004 and has concentrated on the establishment of self-sustaining populations on conservation lands on the south Florida mainland and the northern Florida Keys.

Goals

- Goal 1: Determination of appropriate protocol for the re-introduction or augmentation of captive bred butterflies into existing populations or unoccupied suitable habitat areas.
- Goal 2: Identification, evaluation and ranking of potential recipient sites for re-introduction within the taxon's historic range.
- Goal 3: Monitor the status and trends of all known populations (both natural and re-introduced) on a regular basis.



Miami blue butterfly mating pair



Male Miami blue butterfly

Success Indicators

- Indicator 1: The establishment of self-sustaining populations at re-introduction sites.
- Indicator 2: Secure and maintain stable or increasing populations over a broad geographic range at a level that does not require listing.

Project Summary

A captive propagation program was established at the McGuire Center for Lepidoptera and Biodiversity, University of Florida in February 2003. As outlined by the approved management plan, the captive population served to reduce the immediate threat of extinction while providing organisms for research and re-introduction (FWC, 2003). The initial

population was founded with 100 eggs collected from all known subpopulations of the Bahia Honda State Park population, and is infused with new genetic material from the same source on a regular basis. This strategy was one of several components of a detailed genetic management plan employed to help minimize inbreeding depression in the captive population. Additionally microsatellite markers were developed, and are used in combination with non-invasive wing fragment sampling to monitor the heterozygosity of the captive and wild populations over time (Daniels, 2009). The results indicated that the wild populations retained relatively high levels of genetic diversity despite being significantly reduced in overall geographic distribution, numerical abundance and connectivity. Similarly, captive-bred organisms slated for re-introduction were genetically very similar to wild individuals and did not display any signs indicative of inbreeding depression. Some 45 generations resulting in more than 32,000 viable organisms have been produced in captivity between 2003 and 2009.

Extensive habitat assessment surveys were carried out in south Florida involving some 47 general localities and 23 islands. A detailed matrix of key variables was developed and used to help identify appropriate re-introduction sites. As mandated by the Miami blue management plan, a taxon working group (TWG) was formed to help direct recovery efforts. Under the supervision of the TWG, organism re-introduction efforts were initiated in 2004. Sites were divided into two categories (phase 1 and phase 2) that differed in their proximity to human inhabited areas due to tensions with local mosquito control operations concerning appropriate buffer distances and resulting non-target impacts. In cooperation with the Florida Department of Agriculture and Consumer Services and the Florida Coordinating Council on Mosquito Control, the TWG initiated a stakeholder driven research partnership to further investigate the potential non-target impact of mosquito control pesticides and develop appropriate recommendations to help mitigate any deleterious organism impacts before moving forward with the

approval of additional re-introduction locations. As a result, only a limited number of federal and state-owned conservation lands served as approved phase 1 recipient sites, all of which were severely impacted by prolonged drought and hurricane events in the two years following. Additional re-introductions have continued in 2007, 2008, and 2009.



Bahia Honda State Park showing habitat

All wild populations are monitored on a regular basis, typically 5-12 times/year, to assess habitat conditions,

patch occupancy, and trends in population numbers. Post-release surveys are carried out for at least three months following any organism re-introduction event and continue for an additional three months if signs of breeding were recorded. Despite the release of more than 7,000 captive-bred organisms at three recipient conservation land sites, there has been no evidence of prolonged population establishment at any location. However, the conservation program outlined by the Florida Fish and Wildlife Conservation Commission and the TWG has embraced an integrative approach to organism recovery involving more than captive breeding and organism re-introduction. Targeted program components have included basic and applied research, specifically population ecology, conservation genetics, non-target impacts of mosquito control adulticides, and ant-larval associations as well as a variety of public education and land manager training initiatives.

Major difficulties faced

- Stakeholder conflicts, most notably those surrounding the potential impacts from mosquito control and land management practices at or near re-introduction sites, remain key issues requiring final resolution.
- Limited number of recipient sites available for organism re-introduction due to the issues raised in the first point.
- Limited productivity and reduced quality of larval host and adult nectar plants at recipient sites following organism re-introduction due to prolonged multi-year drought conditions in south Florida.
- Disruptive effects of tropical cyclone impacts on the habitat and organisms at recipient sites.

Major lessons learned

- Although the formation of a taxon working group has provided significant program coordination and facilitated the open exchange of ideas and

Invertebrates

information between individuals and agencies, it has been unable to fully resolve discordant associations and conflicts in a timely manner.

- Because the Miami blue was emergency listed as endangered, management and recovery decisions were required to be made relatively quickly and before they could be better informed by scientific research.

Success of project

Highly Successful	Successful	Partially Successful	Failure
			√

Reason(s) for success/failure:

- Despite multiple re-introduction attempts at three recipient sites, there has been no evidence of prolonged population establishment at any location

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