

**Recovery Outline For**  
**Miami Blue Butterfly (*Cyclargus thomasi bethunebakeri*)**  
March 2012

**I. INTRODUCTION**

This document outlines a preliminary course of action for the recovery of the Miami blue butterfly until a comprehensive recovery plan for the subspecies is approved. The Miami blue is a small (about an inch in length) bright blue butterfly. This butterfly is known to occur only in a few remote areas within the Florida Keys. The Miami blue was listed as an endangered species on (April 6, 2012; 77 FR 20948). The primary threats to the subspecies include extreme curtailment of its habitat and range, habitat destruction, modification and fragmentation, illegal collection, and its resulting vulnerability to natural or human induced catastrophic events (e.g., hurricanes, etc.).

Listing and Contact Information:

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|---|---|
| Listing Classification:   | Endangered range-wide   |
| Effective Emergency Listing Date:   | August 10, 2011   |
| [Note: This butterfly was emergency listed on August 10, 2011 (76 FR 49542). This designation applied for 240 days from this date.] |   |
| Effective Listing Date:   | April 6, 2012   |
| Lead Agency, Region:  | U.S. Fish and Wildlife Service, Southeast Region  |
| Lead Field Office:  | South Florida Ecological Services Field Office  |
| Contact Biologist:  | Paula Halupa, 772-562-3909, Paula_Halupa@fws.gov or<br>Mark Salvato, Mark_Salvato@fws.gov |

**II. RECOVERY STATUS ASSESSMENT**

**A. Biology/Threats Assessment**

*[Note: For a more detailed description of this butterfly's biology and an assessment of the listing factors as they relate to this butterfly, please see (April 6, 2012; 77 FR 20948).]*

The range of the Miami blue, which once extended from the Keys north along the Florida coasts to about St. Petersburg and Daytona, has been severely reduced. The only confirmed metapopulation(s) (group of smaller populations that have some interaction) of Miami blue is currently restricted to a few, small insular areas in the extreme southern portion of its historical range; the subspecies appears to be restricted to Key West National Wildlife Refuge (KWNWR) in Monroe County, Florida.

Population size is unknown, but estimated to be in the hundreds. Since only one or possibly two small metapopulations remain, the Miami blue butterfly is imminently threatened by its restricted range and the combined influences of habitat destruction or modification, impacts by iguanas, accidental harm from humans, loss of genetic heterogeneity, and catastrophic environmental events. Illegal collection could cause severe impacts, given the few populations and individuals remaining. If this butterfly is found to persist in other parts of its historic range, it would also likely be threatened by habitat loss and modification, pesticide application from mosquito control, displacement of native host plants by invasive exotic species, incompatible land management practices, inadequate regulatory protection, and restricted genetic exchange. Therefore, these threats constitute an immediate and significant risk to the subspecies.

**B. Conservation Actions**

The Miami blue was first recognized as a Federal candidate in 1984 but was removed when it appeared that the butterfly was more abundant than originally thought. The Miami blue was reinstated as a candidate in 2005. Throughout this timeframe the Service has worked closely with scientific experts, land managers, and stakeholders to implement actions that will help ensure survival and long-

term recovery of the Miami blue. The Miami blue is State-listed as threatened and FWC's Miami Blue Management Plan was recently updated.

For more than 10 years, the Service has engaged the State of Florida (Florida Fish and Wildlife Conservation Commission [FWC], Florida Department of Environmental Protection [FDEP]), NGOs (North American Butterfly Association), the National Park Service (Everglades National Park and Biscayne National Park), and researchers from the University of Florida (UF) and North Carolina State University (NCSU) to locate extant populations of the Miami blue and identify remaining suitable habitats. To date, these collaborative efforts have focused largely on 1) conducting comprehensive surveys of historic locations for presence or absence of the Miami blue and appropriate hostplants; 2) minimizing disturbance to the Miami blue and its hostplants from exotic green iguanas, incompatible management activities, and recreational use; 3) evaluating techniques to accurately and safely monitor extant populations; 4) improving techniques to captive rear and release the subspecies, to better ensure success in any future reintroduction efforts; 5) evaluating the influence of pesticide applications on Miami blue and other imperiled butterfly populations; and 6) increasing public awareness of this endangered butterfly.

### **III. PRELIMINARY RECOVERY STRATEGY**

#### **A. Recovery Priority Number with Rationale**

The Miami blue is assigned a recovery priority of 6c, which indicates the subspecies faces a high degree of threat, but a low recovery potential with conflict. Recovery potential is considered low for the Miami blue because the subspecies has been reduced to one or two small metapopulations in the extreme southern portion of its former range and attempts to reintroduce the butterfly to areas of its historic range have so far been unsuccessful. Widespread use of mosquito control pesticides in portions of its historic range may prevent natural recolonization, limit success of future reintroductions, and otherwise conflict with recovery goals and objectives.

#### **B. Recovery Strategy**

As recently as 2010, there were two distinct wild metapopulations. One was within Bahia Honda State Park (BHSP) in the Lower Florida Keys, owned by the State of Florida and administered by the Florida Department of Environmental Protection (FDEP). The Miami blue has not been observed at BHSP since July 2010 and may be extirpated. The remaining metapopulation(s) is within the KWNWR and managed by the Service.

Because of the very restricted range of the Miami blue, our initial recovery strategy will be to maintain and protect the known metapopulation in KWNWR. This will include working with partners to understand the natural history, population dynamics, and habitat needs of the Miami blue. Our next steps will likely be to establish an effective method to captive rear and release Miami blues within appropriate habitat on conservation lands. These efforts will include creation of a rigorous post-release monitoring protocol designed to evaluate factors influencing reintroduction failure or success. With agency (FWC, FDEP, NPS), educational institution, and non-government partners, we will continue to conduct comprehensive surveys of all historic locations for presence of extant Miami blue populations and appropriate hostplants. In addition, known and historic locations will be examined in an attempt to identify factors contributing to the decline of the subspecies. We will continue to work with our partners to protect, restore, and enhance appropriate habitat on conservation lands throughout the Miami blue's current and historic range. We will seek collaborative partnerships with universities and institutes to conduct further genetics studies of potential differences among Miami blue populations within KWNWR. We will work with our partners, FDEP, FWC, and USGS, to evaluate the potential influence of iguana activity, parasitoids, and predators (e.g., fire ants) and other threats

on Miami blue populations. We are also going to expand our efforts to increase public awareness of the Miami blue and other imperiled butterflies unique to South Florida that we are working to recover.

Survival of the Miami blue now depends on protecting the subspecies' occupied and suitable habitat from further degradation and fragmentation; restoring potentially suitable habitat within its historical range; evaluating and reducing threats from iguanas, pesticides, and accidental harm from humans; increasing the current population in size; reducing the threats of illegal collection; conserving genetic diversity; and, likely, establishing populations at additional locations.

### **C. Initial Action Plan**

*Anticipated Recovery Actions in relation to our recovery strategy described above:*

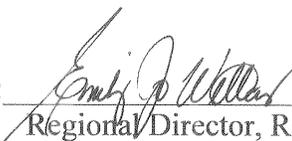
1. Conduct intensive monitoring to determine presence or absence of the Miami blue and appropriate hostplants on all suitable islands within KWNWR, Great White Heron NWR, and on BHSP;
2. Develop an emergency action plan to address imminent threat of catastrophic environmental event (hurricane) e.g., temporary capture and care of individuals;
3. Conduct monthly surveys of all occupied islands to determine phenology and relative seasonal abundance of Miami blues and host plants;
4. Seek advice and expertise from institutions and experts that have successfully reared and released blue butterflies, in particular, request their analysis of past efforts to rear and reintroduce Miami blues and recommendations on a path forward;
5. Establish methods to effectively release and monitor captive bred Miami blue butterflies including:
  - conduct experimental captive releases with an appropriate surrogate butterfly; develop a rigorous post-release monitoring protocol; determine if a captive colony is necessary or if rearing and releasing single broods would be more appropriate; identify suitable reintroduction or augmentation sites; evaluate Miami blue host plant preferences; explore the feasibility and efficacy of translocations; and ensure that reintroductions occur in the most suitable habitats.
6. Conduct studies of the Miami blue's natural history (evaluate symbiotic relationships with ants, identify predators and parasitoids of all life stages, regularly sample for presence of virus or bacterium, and determine what legumes are being used by Miami blue);
7. Evaluate the impact of green iguanas, parasitoids, and predators (e.g., fire ants) on Miami blue throughout the butterfly's current and historic range; and develop management strategies to reduce identified threats.
8. Conduct surveys of all historic locations of Miami blue for presence or absence and appropriate host plants;
9. Enhance the suitability of known sites and potential reintroduction/translocation sites with augmentation planting of host plants and control of predators, where appropriate;
10. Examine historic locations to identify possible factors that contributed to the decline of Miami blue and reduce threats where possible to increase the likelihood of natural recolonization;
11. Remove or reduce exotic vegetation and prevent its establishment on islands currently or historically occupied by the Miami blue to prevent outbreaks from threatening important hostplants;
12. Continue to coordinate with mosquito control districts in south Florida and in portions of the Miami blue's historic range to evaluate the impacts of pesticide applications, and as applicable, establish effective no-spray zones, maintain adequate buffer zones, and reduce application dosage and extent of drift.

## **IV. PREPLANNING PROCESS**

We will prepare a recovery plan for the Miami blue that includes objective and measurable criteria which, when met, will ensure the conservation of the subspecies. Recovery criteria will address all meaningful threats, as well as estimate the time and the cost to achieve recovery. The recovery planning effort will be led by the South Florida Ecological Services Field Office in coordination with the Florida Keys National Wildlife Refuges Complex. The Service anticipates either writing the recovery plan or appointing a recovery team to help us effectively draft a recovery plan for the Miami blue. Individuals brought into a recovery team to advise the Service would include experts in butterflies and other relevant areas; team members would be capable of sharing information on recovery population thresholds and important short and long term actions important to butterfly recovery.

The draft recovery plan should be finalized and sent to the Regional Office for review in October 2013. The final recovery plan should be finalized and sent to the Regional Office for review by December 2014. These timelines may be affected by available resources and regional priorities.

During the recovery planning process, input, comments and review will be sought from multiple stakeholders within the State of Florida. These will include State, Federal and local agencies, industrial and agricultural groups, mosquito control districts, universities, conservation organizations and others. Many of these stakeholders are currently cooperating in on-going conservation efforts for the Miami blue. Primary authorship of the Recovery Plan will be the responsibility of Service staff, though State partners will be heavily involved in all phases of the planning and implementation processes. Existing documents such as the FWC's Miami Blue Revised Management Plan will aid considerably in the planning effort. Throughout the listing process we worked closely with our State (FWC, FDEP) and Federal (NPS, USGS) partners regarding possible conservation efforts, as well as the need for timely consultations between Federal agencies in the event of future actions which might affect the Miami blue. We are developing guidance internally to be shared soon with other Federal (e.g., U.S. Army Corps of Engineers, FEMA) and non-Federal partners (e.g., Monroe and Miami-Dade counties) to help clarify new regulations, improve compliance, and help safeguard the butterfly and its habitat through sections 7 and 10 of the ESA.

Approve:  \_\_\_\_\_  
Regional Director, Region 4

Date: 4/4/2012

## REFERENCES CITED

- Florida Fish and Wildlife Conservation Commission. 2010. Miami blue butterfly management plan. *Cyclargus thomasi bethunebakeri*. Adopted: October 31, 2003. Revised: June 2010. Florida Fish and Wildlife Conservation Commission; Tallahassee, Florida.
- U.S. Fish and Wildlife Service. 2010. Species assessment and listing priority assignment form. *Cyclargus thomasi bethunebakeri*. May 13, 2010. U.S. Fish and Wildlife Service, South Florida Ecological Services Office, Vero Beach, Florida.
- U.S. Fish and Wildlife Service. 2011. Endangered and Threatened Wildlife and Plants; Emergency Listing of the Miami Blue Butterfly as Endangered, and Emergency Listing of the Cassius Blue, Ceraunus Blue, and Nickerbean Blue Butterflies as Threatened Due to Similarity of Appearance to the Miami Blue Butterfly. Federal Register 76: 49542-49567.
- U.S. Fish and Wildlife Service. 2011. Endangered and Threatened Wildlife and Plants; Proposed Listing of the Miami Blue Butterfly as Endangered, and Proposed Listing of the Cassius Blue, Ceraunus Blue, and Nickerbean Blue Butterflies as Threatened Due to Similarity of Appearance to the Miami Blue Butterfly. Federal Register 76: 49408-49412.