

BEFORE THE SECRETARY OF THE INTERIOR

EMERGENCY PETITION TO LIST THE MIAMI BLUE BUTTERFLY
(*CYCLARGUS THOMASI BETHUNEBAKERI*)
AS ENDANGERED UNDER THE ENDANGERED SPECIES ACT



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CENTER FOR BIOLOGICAL DIVERSITY

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Notice of Petition

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Pursuant to Section 4(b) of the Endangered Species Act (“ESA”), 16 U.S.C. §1533(b); section 553(e) of the Administrative Procedure Act, 5 U.S.C. § 553(e); and 50 C.F.R. §424.14(a), the Center for Biological Diversity hereby petitions the Secretary of the Interior, through the United States Fish and Wildlife Service (“FWS”), to list the Miami Blue Butterfly (*Cyclargus thomasi bethunebakeri*) as an endangered species and to designate critical habitat to ensure recovery.

We further petition FWS to use its authority to promulgate an emergency listing rule for the Miami Blue Butterfly pursuant to section 4(b)(7) of the ESA, 16 U.S.C. § 1533(b)(7); section 553(e) of the Administrative Procedure Act, 5 U.S.C. § 553(e); and 50 C.F.R. § 424.20. As detailed in this petition, the butterfly is imminently threatened with extinction and warrants emergency listing.

The Center for Biological Diversity (“Center”) is a non-profit, public interest environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 42,000 members throughout the United States. The Center and its members are concerned with the conservation of endangered species, including the Miami Blue Butterfly, and the effective implementation of the ESA.



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I. EXECUTIVE SUMMARY

The Miami Blue butterfly (*Cyclargus thomasi bethunebakeri*) was first designated a candidate for protection as an endangered species in 1984, but at the time, the Service stated that they lacked sufficient information to provide protection and the species was thus considered a “category 2” candidate. The Service did not take action to protect the butterfly for the next seven years and in 1991, the species was listed as believed to be extinct and its candidate status was accordingly lowered to “category 3A.” In 1996, the Service eliminated candidate status for all species listed as category 2 or lower, including the Miami blue. In 1999, a colony was discovered in Bahia Honda State Park and in 2000, the North American Butterfly Association submitted an emergency listing petition for the Miami Blue. Two years later, the Service issued a positive-90 day finding on the petition, but decided against emergency listing. Instead, a propagation program was initiated. In 2004, after it became clear that propagated butterflies were not surviving in the wild, the Service initiated emergency listing, including budgeting the money for the administrative process. Instead of moving forward with emergency listing, however, the Service instead again designated the species a candidate for protection in 2005.

More than five years later, the Service has still not protected the Miami blue butterfly. Unfortunately, in 2010 surveys found that the one remaining population in Bahia Honda State Park had disappeared and the species is now limited to less than 100 individuals in another colony now known in the Marquesas Keys. Protection for the Miami blue butterfly—a species clearly on the brink of extinction—has thus been delayed for more than 25 years. To remedy this tragic situation, we submit this petition for emergency listing formally requesting that the Service immediately protect this rare and beautiful butterfly.

The Miami Blue Butterfly clearly warrants emergency listing as an endangered species under the Endangered Species Act. The Service has acknowledged that the species is threatened with serious imminent threats that are high in magnitude and present a significant risk to the survival of the Miami Blue (FWS 2010). Threats to the species include loss and degradation of habitat, loss of genetic diversity within small, isolated populations, herbivory of host plants by iguanas, mosquito control activities, stochastic weather events, and numerous other factors (FWS 2010). In the 2010 Candidate Assessment and Listing Priority Assignment Form, the Service stated that emergency listing was not presently warranted but that the “loss of or additional decline in either metapopulation would be detrimental to the status of the species” (FWS 2010). The status of the species was already dire, and the Miami Blue has continued to decline since the candidate review. The colony from Bahia Honda State Park appears to have been extirpated (Wadlow 2010), and the species now survives in a lone, declining population. There is no question that the Miami Blue now warrants emergency listing under the Act.

II. INTRODUCTION

FWS should immediately list the Miami Blue Butterfly as endangered. The Miami Blue has been a candidate for such protection for more than 25 years. The species has continued to decline since that time and now exists as a very small, lone population that numbered only 25 individuals in recent counts. The Service has acknowledged that threats to the species are imminent, high in magnitude, and ongoing. In May 2010 when the Service reviewed the status of the species, there appeared to be two remaining metapopulations, but one of those has now been extirpated (Wadlow 2010), and the other has suffered drastic decline. Attempts to reintroduce captive-bred individuals to the wild have failed, and have not been conducted in optimal habitat. Without immediate protection under the Endangered Species Act, the Miami Blue Butterfly will likely go extinct.

III. NATURAL HISTORY AND BIOLOGY

A. Taxonomy and Description

The Miami Blue is a subspecies of butterfly in the family Lycaenidae, subfamily subfamily Polyommatae (Swainson), and genus *Cyclargus*. Although it was originally described as *Hemiargus thomasi bethunebakeri*, the currently recognized scientific name is *Cyclargus thomasi bethunebakeri* (Pelham 2008, p. 256).

The Service reviewed the available taxonomic information on surviving populations of Miami Blue and concluded that the species is a valid taxon (FWS 2010), as the Integrated Taxonomic Information System (2010, p. 1) uses the name *Cyclargus thomasi bethunebakeri* (W. Comstock and Huntington 1943) and indicates that this species' taxonomic standing is accepted; the Florida Natural Areas Inventory (FNAI) (2010, p. 19) and NatureServe (2009, p. 1) use the name *C. t. bethunebakeri*; and the broader scientific community and the State of Florida use the name *C. t. bethunebakeri*.

The Miami Blue is a brightly colored, small butterfly that is approximately 0.8 to 1.1 inches (1.9 to 2.9 centimeters) in length (Pyle 1981, p. 488). The forewing length is 0.3 to 0.5 inches (8.0 to 12.5 millimeters) (Minno and Emmel 1993, p. 134). The wings of males are blue above, and have a narrow black outer border with white fringes. The wings of females are bright blue above, and have black borders and a red and black eyespot near the anal angle of the hindwing (Minno and Emmel 1993, p. 134). During winter or the dry season, they are much lighter blue (Opler and Krizek 1984, p. 112). Larvae are bright green and have a black head capsule, and pupae vary in color from brown to black (Minno and Emmel 1993, p. 134-135).

B. Distribution

The range of the Miami Blue Butterfly has been drastically reduced, and this species now occurs only in Monroe County, Florida. Historically the species occurred from Key West north to Volusia County, FL, and was recorded as common in numerous areas including

Dade and Monroe counties (FWS 2010). Historically the Miami Blue was recorded on at least 10 islands of the Florida Keys (Adams Key, Big Pine Key, Elliott Key, Geiger Key, Key Largo, Lignumvitae Key, Old Rhodes Key, Plantation Key, Stock Island, Sugarloaf Key) (Minno and Emmel 1993, p. 134). There is also a record of this species from the Bimini Islands in the Bahamas (Riley 1975, p. 110).

In May 2010 there were only two remaining metapopulations of this species, one at Key West National Wildlife Refuge (KWNWR) and one at Bahia Honda State Park (BHSP) (FWS 2010). The population at Bahia Honda has since been extirpated (Wadlow 2010).

C. Habitat

The Miami Blue is a coastal butterfly that uses open sunny areas around the edges of hardwood hammocks, coastal berm hammocks, dunes, scrub, tropical pinelands, pine rocklands, trails, and other openings that are prone to frequent natural disturbances (Opler and Krizek 1984, p. 112; Minno and Emmel 1994, p. 647; Emmel and Daniels 2004, p. 12),

Larval host plants include vines, shrubs, and trees. Known host plants are blackbeads (*Pithecellobium* spp.), nickerbeans, balloonvines, *Acacia* spp., snowberry, and peacock flower (*Caesalpinia pulcherrima*) (Kimball 1965, p. 49; Lenczewski 1980, p. 47; Pyle 1981, p. 489, Opler and Krizek 1984, p. 113, Calhoun *et al.* 2002, p. 18).

In addition to host plants for larvae, the butterfly requires nectar sources for adults which are in close proximity to the larval host plants. Adults forage from a wide variety of nectar sources from the families Boraginaceae, Asteraceae, Fabaceae, Polygonaceae, and Verbenaceae (Emmel and Daniels 2004, p. 12). Known plants include Spanish needles (*Bidens alba*), Leavenworth's tickseed (*Coreopsis leavenworthi*), scorpionstail (*Heliotropium angiospermum*), turkey tangle fogfruit or capeweed (*Lippia nodiflora*), buttonsage (*Lantana involucrata*), snow squarestem (*Melanthera nivea* [*M. aspera*]), blackbead, Brazilian pepper (*Schinus terebinthifolius*), false buttonweed (*Spermacoce* spp.), coastal searocket (*Cakile lanceolata*), black torch (*Erithalis fruticosa*), yellow joyweed (*Alternanthera flavescens*), buttonsage, bay cedar (*Suriana maritima*), sea lavender (*Argusia gnaphalodes*), sea purslane (*Sesuvium portulacastrum*), and seaside heliotrope (*Heliotropium curassavicum*) (Pyle 1981, p. 489; Opler and Krizek 1984, p. 113; Minno and Emmel 1993, p. 135; Emmel and Daniels 2004, p. 12, Cannon *et al.* 2007, p. 15).

D. Biology

Female Miami Blues can lay up to 300 eggs which are deposited singly onto host plants (Opler and Krizek 1984, p. 113; Minno and Emmel 1993, p. 134). The same or other females may deposit additional eggs near the first egg. Oviposition takes place throughout the day. Females prefer areas that are sheltered from the wind (Emmel and Daniels 2004, p. 13). Mortality in the stages preceding adulthood is likely high (FWS 2010).

It takes approximately 19.5 days for eggs to develop into pupae, and an additional 30 days to emerge as adults (Carroll and Loye 2006, p. 19). Larvae that hatch on balloonvine chew a hole through the outer capsule wall to access seeds (Minno and Emmel 1993, p. 134). Larvae must then seek seeds from additional capsules to grow large enough to pupate. Miami Blues have attendant ant species, and the attendant ants follow the larvae through the hole created in the capsule.

Adults likely live for only 9 days (FWS 2010), and may be found throughout the year, and it is thought that there are multiple, overlapping broods (Pyle 1981, p. 489, Opler and Krizek 1984, p. 112-113; Minno and Emmel 1993, p. 135; 1994, p. 647; Emmel and Daniels 2004, p. 9), though there is some evidence that brooding is not continual (FWS 2010).

The larvae of Miami Blue have attendant ants which use the larvae to obtain honeydew via palpation and may provide some defense against predation. Known attendant ant species for the Miami Blue include *Camponotus floridanus*, *C. planatus*, *Crematogaster ashmeadi*, *Forelius pruinosus*, and *Tapinoma melanocephalum*, and potentially *Paratrechina longicornis* and *P. bourbonica* (Saarinen and Daniels 2006, p. 71).

Miami Blues are highly sedentary with the mean distance moved by marked adults being only 6.5 feet, and more than 85 percent of marked adults being recaptured within 25 feet of their original capture site (Emmel and Daniels 2003, p. 4). Movement between the remaining isolated colonies has not been documented, inhibiting genetic exchange and threatening the long-term persistence of the species (Cushman and Murphy 1993, p. 40).

E. Population Status

In May 2010 there were only two remaining metapopulations of Miami Blue, one at Bahia Honda State Park (BHSP) and one at Key West National Wildlife Refuge (KWNWR). The metapopulation at BHSP was composed of a couple hundred individuals at most (FWS 2010), and now appears to be extirpated (Wadlow 2010), with no adults having been observed at the park during 2010 and the last larvae being encountered in March 2010 (FWS 2010). There were several hundred individuals in the metapopulation at KWNWR but abundance has declined in the past three years. In 2006-2007, hundreds of adult Miami Blues were counted in the Marquesas Keys at KWNWR. Surveys in 2009-2010 have counted a maximum of 25 individuals within KWNWR (FWS 2010). With only a few dozen individuals remaining in a single metapopulation, it would be unconscionable for the Service to deny emergency listing for the Miami Blue.

IV. PRESENT OR THREATENED DESTRUCTION, MODIFICATION, OR CURTAILMENT OF HABITAT OR RANGE

Habitat loss and fragmentation is an ongoing and significant threat to the survival of the Miami Blue and is known to have been a primary contributor to the species' decline. The vast majority of the species' original habitat has been lost, degraded, or fragmented. Development has caused most former sites to become incapable of supporting host plants, and development of remaining suitable habitat fragments continues (FWS 2010).

In addition to development, several other factors threaten Miami Blue habitat. Land management practices that remove nectar sources and larval host plants threaten the survival of this species, including exotic species removal projects, trail and road maintenance, mowing and trimming, and use of herbicides (FWS 2010).

Habitat loss due to global climate change and sea level rise also poses a dire threat to the survival of this coastal butterfly, as known occurrences are in low-lying areas that are subject to inundation and salt-water intrusion (FWS 2010).

Habitat fragmentation has inhibited gene flow and the remaining population of this species is at high risk of loss of genetic diversity. Because this species is highly sedentary, colonization of new areas is unlikely and suitable habitat is limited.

V. OVERUTILIZATION

With only one known surviving population, overutilization now poses a serious threat to the Miami Blue. Rare butterflies are highly valued by collectors, and the localized distribution and small size of the lone remaining colony render this lovely species extremely vulnerable to collection.

VI. DISEASE OR PREDATION

The threat posed to the Miami Blue by disease or predation is magnified now that there is only a single surviving colony. The species has numerous potential predators and parasitoids including small birds, spiders, wasps, and ants (Cannon *et al.* 2007, p. 16). Invasive species of ants pose an additional threat to the Miami Blue because they could disrupt the dynamics between the butterfly and its native ant associates (Emmel and Daniels 2004, p. 14). Consumption of butterfly eggs and pupae by iguanas is also a threat.

Disease is not known to be a current threat to the Miami Blue, but the risk posed to the species by disease is heightened by its existence as a lone, small population.

VII. INADEQUACY OF EXISTING REGULATORY MECHANISMS

There are no existing regulatory mechanisms which adequately protect the Miami Blue, as is evidenced by the species ongoing decline. As the Service has acknowledged, “Federal, State, and local laws have not been sufficient to prevent past and ongoing impacts to Miami blue habitat within its historical range,” and “the protection currently afforded the Miami blue butterfly is limited” (FWS 2010). Though the species is listed as endangered by the state of Florida, this designation has not been adequate to reduce threats to the species and prevent ongoing decline because it provides no substantive habitat protection. The Service itself concluded, “existing regulatory mechanisms are inadequate to protect the Miami blue and its habitat” (FWS 2010).

VIII. OTHER NATURAL OR ANTHROPOGENIC FACTORS

Several other factors threaten the Miami Blue including fire suppression, invasive species, recreation, iguana herbivory, mosquito control efforts and pesticide use, severe weather events, and small population size.

Historically the butterfly used open, sunny disturbed edges maintained by natural fire events, but ongoing fire suppression has allowed succession of these habitats rendering them unsuitable for the Blue. Because this species is sedentary, fire suppression has contributed to increased habitat fragmentation, and has reduced the availability of habitat patches which provide both nectar sources for adults and host plants for larvae in proximity to one another.

The spread of invasive exotic plants has displaced native larval host plants for the Miami Blue. The spread of invasive ants may also have increased the risk of larval predation. The Blue is also severely threatened by the loss of larval host plants and adult nectar plants due to herbivory by iguanas. Consumption of butterfly eggs and pupae by iguanas is also a threat.

The trampling of larval host plants and nectar plants by recreationists is a documented threat to the Miami Blue, in addition to impacts from illicit camping, fire pits, groundings, smugglers, treasure hunters, vandals, poachers, and immigrant landings.

Mosquito suppression efforts and use of pesticides are also known threats to the Miami Blue. Throughout south Florida, second-generation organophosphates (naled) and pyrethroid (permethrin) adulticides are applied by mosquito control districts, which threatens non-target species such as the Miami Blue.

Severe weather and stochastic environmental events are a major threat to the survival of the Blue, especially now that the species has been reduced to a single small population. Hard freezes, prolonged cold temperatures, hurricanes, flooding, and drought are all known to have contributed to the decline of the butterfly. Because the status of the species is now so dire, a single severe weather event could push the butterfly to extinction.

The risk of extinction for the Miami Blue is highly exacerbated by its existence as a small, lone population. The butterfly is threatened by loss of genetic diversity, inbreeding depression, reduced fitness, and low viability.

In sum, the Miami Blue is highly threatened by numerous factors and clearly warrants immediate protection under the Endangered Species Act.

IX. CRITICAL HABITAT

Section 4(a)(3) of the Endangered Species Act and implementing regulations (50 C.F.R. § 424.12) require that, to the maximum extent prudent and determinable, FWS designate critical habitat at the time the species is determined to be endangered or

threatened. 16 U.S.C. § 1533(a)(3)(A)(i); *see also id.* at § 1533(b)(6)(C). The Endangered Species Act defines the term “critical habitat” to mean:

- i. the specific areas within the geographical area occupied by the species, at the time it is listed . . . , on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and
- ii. specific areas outside of the geographical area occupied by the species at the time it is listed . . . , upon a determination by the Secretary that such areas are essential for the conservation of the species.

Id. at § 1532(5)(A).

The petitioners expect that FWS will comply with this unambiguous mandate and designate critical habitat concurrently with the listing of the Miami Blue Butterfly. Because of the limited range of this highly imperiled butterfly, all habitat utilized for breeding, shelter, movement, and foraging meet the definition of critical habitat and must therefore be designated as such.

X. CONCLUSION

During the most recent surveys, only 25 Miami Blue Butterflies were known to exist. This species is at extremely high risk of extinction and needs immediate protection under the Endangered Species Act to have any chance at survival. Existing regulatory mechanisms have not adequately protected the species, and it faces multiple threats which are imminent and high in magnitude. The Service should grant emergency protection to this species.

XI. LITERATURE CITED

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XII. ACKNOWLEDGEMENTS

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