STATEMENT ON THE DECLINE AND LOSS OF BUTTERFLY SPECIES IN SOUTHERN FLORIDA

by the Imperiled Butterflies Work Group
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BACKGROUND

Butterflies are iconic, high profile animals that have been prominently featured in contemporary global conservation thinking and action. Beyond their focal role as conservation flagships, they are widely regarded by the scientific community as model organisms for ecological and evolutionary research. Reports over the last decade point to steep, widespread declines of butterflies in Europe and North America, and increasing evidence that the problem represents an emerging global crisis (Thomas *et al*. 2004; Daniels 2010; Van Swaay *et al*. 2010).

Butterflies are increasingly being used to monitor ecosystem health (Swengel and Swengel 2005, Minno and Minno 2010) because they are relatively easy to identify in the field and exhibit a range of sensitivities to environmental changes. If butterflies are decreasing in abundance and/or distribution, it is likely that other groups of native insects as well as birds and mammals may be experiencing similar trends. Thus, butterflies are good surrogates of overall biodiversity patterns.

Legal protection for butterflies is available under both federal and state laws. The federal Endangered Species Act of 1973 prohibits the taking of any species of plants or animals that are listed as threatened or endangered by the U.S. Fish and Wildlife Service. The Florida Fish and Wildlife Conservation Commission also gives legal protection to species that it lists under Chapter 39-27 of the Florida Statutes and Chapter 68A-27 of the Florida Administrative Code.

In 1976 the Schaus' Swallowtail (*Heraclides aristodemus ponceanus*), a large butterfly found only in the Upper Florida Keys, was among the first insects given legal protection under the federal Endangered Species Act. Three other butterflies occurring in southern Florida, the Miami Blue (*Cyclargus thomasi bethunebakeri*), Bartram's Scrub-Hairstreak (*Strymon acis bartramii*) and Florida Leafwing (*Anaea troglodyta floridalis*), are candidates for listing (USFWS 2006). The Schaus' Swallowtail (Federally Endangered) and the Miami Blue (State Threatened) are listed by the Florida Fish and Wildlife Conservation Commission (FFWCC 2010a). An additional 18 species of butterflies occurring in southern Florida are unofficially listed as endangered, threatened, species of special concern, or rare by the Florida Committee on Rare and Endangered Plants and Animals (FCREPA) (Deyrup and Franz 1994).

URGENT CONSERVATION NEEDS

Scientific studies and surveys have shown that all of the agency-listed butterfly species in southern Florida and the Florida Keys as well as many of the other FCREPA-listed south Florida butterfly species are declining and disappearing from places where they were formerly abundant in the 1980's (Minno and Emmel 1993, Minno and Minno 2009, 2010, Lenczewski 1980, Leston *et al*. 1982, Perry 2000). Numerous recent surveys by members of the North American Butterfly Association, the Southern Lepidopterists' Society, Florida Natural Areas Inventory, as well as by scientists from the University of Florida and other institutions have confirmed this alarming trend.

Although the Schaus' Swallowtail and Miami Blue have formal recovery plans, they continue to decline and are currently near their minimum population viability limits. The abundance of adult Schaus' Swallowtails has dropped to less than one-half the number present in the late 1980's and early 1990's (Covell 1977, Emmel 1986, USFWS 1999, NABA 2005, USFWS 2008). The Miami Blue has been much studied (Ruffin and Glassberg 2000, FFWCC 2003, Daniels and Emmel 2004, Carroll and Loye 2006, Cannon 2007, FFWCC 2010b), but is still declining. It is currently only known to survive on a few tiny, remote islands west of Key West.

Two butterflies found only in southern Florida, the Florida Zestos Skipper (*Epargyreus zestos oberon*) and the Rockland Meske's Skipper (*Hesperia meskei pinocayo*) are now presumed to be extinct (Minno and Minno 2009, 2010). The loss of the Florida Zestos Skipper and the Rockland Meske's Skipper represent the first butterfly extinctions in Florida, and are among the few butterflies known to have become extinct in the United States

The Bahamian Swallowtail (*Heraclides andraemon bonhotei*) and Nickerbean Blue (*Cyclargus ammon*) have also disappeared from Florida, although they survive elsewhere in the West Indies. The Florida Leafwing, Bartram's Scrub-hairstreak, Florida Purplewing (*Eunica tatila tatilista*), Keys' populations of the Palatka Skipper (*Euphyes pilatka klotsi*), and others have declined to such limited geographic areas and small population sizes that they are unlikely to survive without recovery programs.

Of equal concern to the region-wide collapse of so many butterfly species is that the major cause or causes of this decline and loss remain uncertain at this time. Many variables have been implicated in the overall decline of butterflies, including habitat loss and fragmentation (Hafernik 1992), chemical contaminants, exotic ants (Wojcik *et al*. 2001, Forys *et al*. 2001), illegal collecting (Wilcove and Master 2005), and climate change (McLaughlin *et al*. 2002, Parmesan 2003, Forister *et al.* 2010). Mosquito control insecticides have been frequently blamed for the decline (Eliazar and Emmel 1991, Emmel 1991, Salvato 2001, Hennessey and Habeck 1991). However, the butterflies have also disappeared from vast

areas where no spraying occurs or where it is extremely limited, such as Biscayne National Park and Everglades National Park.

In order to prevent a potential catastrophic loss of our endemic butterflies, immediate actions are needed. Time is of the essence. The most critically imperiled butterflies could disappear at any time. Once lost, they can never be regained.

RECOMMENDATIONS

Our high-priority recommendations are to:

- identify, monitor, and track remaining at-risk butterfly populations in southern Florida and protect them wherever possible;
- fund research to investigate the cause(s) of their decline, and threats to their continued persistence;
- determine best management practices to more effectively conserve existing populations of at-risk butterflies on conservation and private lands;
- pursue additional conservation actions including captive propagation, that will prevent the collapse and extinction of the remaining at-risk butterfly species in southern Florida; and
- improve coordination among conservation groups and agencies through developing and implementing integrated adaptive land management practices as well as species recovery plans to prevent further losses.

This statement was prepared by Marc C. Minno, Jaret C. Daniels (University of Florida), Sue Perry (retired from Everglades National Park), Paula Halupa (US Fish and Wildlife Service), Dean Jue (Florida Natural Areas Inventory), and David Cook (Florida Fish and Wildlife Conservation Commission).

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APPENDIX 1. At-risk Butterfly Species of Southern Florida.

FAMILY PAPILIONIDAE (SWALLOWTAILS)

Heraclides aristodemus ponceanus (Schaus' Swallowtail)

CONSERVATION PRIORITY: Urgent.

LISTING/RANKING:

Federal = Endangered.
State = Threatened.
FNAI = S1.
FCREPA = Endangered.

ENDEMIC: No. The population in the northern Bahamas is now thought to represent the same subspecies.

POPULATION TREND: Dr. Charles V. Covell, Jr. monitored the population in the 1970s. Dr. Thomas C. Emmel and students at University of Florida monitored the population in the 1980s, 1990s, and the early 2000s. North American Butterfly Association members have made counts in the late 1990s and 2000s. Marc Minno has made counts in the late 2000s. The Schaus' Swallowtail has disappeared from some parts of the Keys and the number of adults observed has declined dramatically to near minimum population viability. Captive breeding and re-introduction efforts by Dr. Emmel during the mid-1990s were not successful.

FAMILY PIERIDAE (WHITES & SULPHURS)

Appias drusilla neumoegenii (Florida White)

CONSERVATION PRIORITY: High.

LISTING/RANKING:

Federal = Not listed.
State = Not listed.
FNAI = S2S3.
FCREPA = Species of Special Concern.

ENDEMIC: Yes.

POPULATION TREND: Marc Minno has made counts in the 1980s and late 2000s. The Florida Natural Areas Inventory is currently organizing counts. This butterfly has disappeared from Everglades National Park and is now only a temporary colonizer in the Florida Keys, which have until recently been a stronghold for the Florida White.

Eurema dina helios (Dina Yellow)

CONSERVATION PRIORITY: Moderate.

LISTING/RANKING:

Federal = Not listed.
State = Not listed.

FNAI = S1
FCREPA = Species of Special Concern.
ENDEMIC: No.
POPULATION TREND: The Dina Yellow has not been monitored in a consistent way. It is only found in a few urban parks in close association with its rare host plants. Based upon anecdotal accounts, the number of adults fluctuates greatly. The colony at the Charles Deerhing Estate was recently thought to have become extirpated, but apparently has survived.

FAMILY LYCAENIDAE (HAIRSTREAKS & BLUES)

Chlorostrymon maesites (Amethyst Hairstreak)
CONSERVATION PRIORITY: Moderate.
LISTING/RANKING:
Federal = Not listed.
State = Not listed.
FNAI = S1
FCREPA = Threatened.
ENDEMIC: No.
POPULATION TREND: The Amethyst Hairstreak has not been monitored in a consistent or organized way. This butterfly has always been rare and secretive in Florida, but appears to now be extirpated from the Florida Keys, where it used to be most commonly found. There have only been a few observations of adults in Broward and Miami-Dade counties since 2004.

Strymon acis bartrami (Bartram's Scrub-Hairstreak)
CONSERVATION PRIORITY: Urgent.
LISTING/RANKING:
Federal = Candidate for listing.
State = Not listed.
FNAI = S1.
FCREPA = Threatened.
ENDEMIC: Yes.
POPULATION TREND: Mike Hennessey monitored the Big Pine Key population of Bartram's Scrub-hairstreak briefly during the 1990s. Mark and Holly Salvato have monitored populations of Bartram's Scrub-hairstreak in Everglades National Park and Big Pine Key during the 1990s and 2000s. Marc Minno has made counts since 2006. Chad Anderson has recently been tracking the abundance of this butterfly at the National Key Deer Refuge on Big Pine Key. Aerin Land has tracked the butterfly in Everglades National Park. The population on Big Pine Key has been declining since 2006 and appears to be near minimum population viability limits. It is uncommon and local in Everglades National Park, Larry

and Penny Thompson Memorial Park, and the Navy Wells Preserve. It has recently increased in abundance at Navy Wells Preserve, but is very locally distributed there.

Eumaeus atala florida (Atala)

CONSERVATION PRIORITY: Moderate.

LISTING/RANKING:

Federal = Not listed.
State = Not listed.
FNAI = S2
FCREPA = Species of Special Concern

ENDEMIC: Yes.

POPULATION TREND: Sandy Koi has been tracking the abundance and distribution of this butterfly in southern Florida. It fluctuates wildly in abundance and has declined or disappeared from a number of places where it had been well established, such as the grounds of the South Florida Water Management District in West Palm Beach. A series of cold winters are thought to have impacted the population.

Chlorostrymon simaethis (Silver-Banded Hairstreak)

CONSERVATION PRIORITY: Moderate.

LISTING/RANKING:

Federal = Not listed.
State = Not listed.
FNAI = S1S2
FCREPA = Not listed.

ENDEMIC: No.

POPULATION TREND: Marc Minno has been monitoring this butterfly in the Keys since 2006. Members of the North American Butterfly Association have kept track in southern Florida as well. It is very closely associated with the larval host plants, which are not common. Some patches of the host plants in the Keys are not occupied and some colonies of the butterfly have declined or disappeared.

Ministrymon azia (Gray Ministreak)

CONSERVATION PRIORITY: Moderate.

LISTING/RANKING:

Federal = Not listed.
State = Not listed.
FNAI = S2S3
FCREPA = Not listed.

ENDEMIC: No.

POPULATION TREND: Marc Minno has looked for this butterfly in the Keys since 2006 and has only found six individuals. He also

found one at the USDA Chapman Field property in Miami in February 2011. Members of the North American Butterfly Association have kept track in southern Florida as well. It has declined or disappeared from some sites.

Cyclargus thomasi bethunebakeri (Miami Blue)

CONSERVATION PRIORITY: Urgent.

LISTING/RANKING:

Federal = Candidate for listing.
State = Threatened.
FNAI = S1.
FCREPA = Species of Special Concern.

ENDEMIC: Not known for sure. Populations in Cuba and the western Bahamas may be the same subspecies.

POPULATION TREND: Dr. Jaret Daniels and students at the University of Florida have studied and tracked this species for many years. The Miami Blue has disappeared from most of its former range and only survives on a few tiny, remote islands in the Key West Wildlife Refuge. The Bahia Honda colony died out in 2010. Marc Minno has not found it at any new sites. Dr. Nick Haddad and students from North Carolina State University are currently monitoring the population. Captive breeding and re-introduction efforts by Dr. Daniels during the early 2000s were not successful.

Cyclargus ammon (Nickerbean Blue)

CONSERVATION PRIORITY: Urgent.

LISTING/RANKING:

Federal = Not listed.
State = Not listed.
FNAI = S1.
FCREPA = Not listed.

ENDEMIC: No.

POPULATION TREND: Marc Minno has looked but not found this species in the Keys. Paula Cannon and Alana Edwards found a single male nectaring on Pineland Croton on May 9, 2009 in northwestern Big Pine Key, just south of the Port Pine Heights subdivision. Chad Anderson found another individual in the same area several weeks later. No other individuals have been found and this butterfly now appears to be extirpated from Florida.

Strymon martialis (Martial's Scrub-Hairstreak)

CONSERVATION PRIORITY: Moderate.

LISTING/RANKING:

Federal = Not listed.
State = Not listed.
FNAI = S2S3

FCREPA = Rare.

ENDEMIC: No.

POPULATION TREND: This butterfly has disappeared from the Upper Keys, but Marc Minno has found it at a number of sites in the Lower Keys, some Miami-Dade County pineland preserves, and at coastal areas of Cape Sable in Everglades National Park. Alana Edwards found it in Palm Beach County recently.

FAMILY NYMPHALIDAE (BRUSH-FOOTED BUTTERFLIES)

SUBFAMILY CHARAXINAE (LEAFWINGS)

Anaea troglodyta floridalis (Florida Leafwing)

CONSERVATION PRIORITY: Urgent.

LISTING/RANKING:

Federal = Candidate for listing.

State = Not listed.

FNAI = S1.

FCREPA = Threatened.

ENDEMIC: Yes.

POPULATION TREND: Mark and Holly Salvato have tracked this butterfly for many years on Big Pine Key and in Everglades National Park. Marc Minno has looked for it on Big Pine Key since 2006, but has not found any. Aerin Land has tracked the butterfly in Everglades National Park. It is currently only known from the Long Pine Key pinelands in Everglades National Park.

SUBFAMILY NYMPHALINAE (TRUE BRUSH-FOOTED BUTTERFLIES)

Anthanassa frisia (Cuban Crescent)

CONSERVATION PRIORITY: Moderate.

LISTING/RANKING:

Federal = Not listed.

State = Not listed.

FNAI = S1S2

FCREPA = Not listed.

ENDEMIC: No.

POPULATION TREND: This butterfly has disappeared from the Keys and other sites in southern Florida. Marc Minno found a colony on Dismal Key in Ten Thousand Islands National Wildlife Refuge. No other colonies are currently known.

Junonia genoveva (Tropical Buckeye)

CONSERVATION PRIORITY: High.

LISTING/RANKING:

Federal = Not listed.

State = Not listed.

FNAI = S1
FCREPA = Not listed.
ENDEMIC: No.
POPULATION TREND: This butterfly has hybridized with the Mangrove Buckeye and the Common Buckeye. Adults with Tropical Buckeye characteristics occur in the Lower Keys and on the mainland near Everglades National Park.

Siproeta stelenes (Malachite)
CONSERVATION PRIORITY: Moderate.
LISTING/RANKING:
Federal = Not listed.
State = Not listed.
FNAI = S2
FCREPA = Not listed.
ENDEMIC: No.
POPULATION TREND: The Malachite has not been monitored in a consistent or organized way. This butterfly has local breeding populations in urban parks in Miami-Dade, Broward, and Palm Beach counties. Adults sometimes disperse widely in southern and central Florida, especially in the fall and winter months.

SUBFAMILY LIMENITIDININAE (ADMIRALS)
Eunica monima (Dingy Purplewing)
CONSERVATION PRIORITY: High.
LISTING/RANKING:
Federal = Not listed.
State = Not listed.
FNAI = S1
FCREPA = Species of Special Concern.
ENDEMIC: No.
POPULATION TREND: This butterfly has not been tracked in a consistent way. It has disappeared from Everglades National Park, but still occurs in a few Miami-Dade County preserves.

Eunica tatila tatilista (Florida Purplewing)
CONSERVATION PRIORITY: Urgent.
LISTING/RANKING:
Federal = Not listed.
State = Not listed.
FNAI = S1
FCREPA = Species of Special Concern.
ENDEMIC: No.
POPULATION TREND: The Florida Purplewing has not be monitored in a consistent way. It has disappeared from most of its

former range. It occurs mostly on upper Key Largo and on Lignumvitae Key. Marc Minno has only seen one individual since 2006 (Elliott Key in Biscayne National Park).

FAMILY HESPERIIDAE (SKIPPERS)

Ephyriades brunnea floridensis (Florida Duskywing)

CONSERVATION PRIORITY: High.

LISTING/RANKING:

Federal = Not listed.
State = Not listed.
FNAI = S2
FCREPA = Species of Special Concern.

ENDEMIC: Yes.

POPULATION TREND: Mary Truglio has monitored populations of the Florida Duskywing in Everglades National Park and a few Miami-Dade County preserves recently. Marc Minno has made counts in the Florida Keys. It has declined in abundance and seems to have disappeared from Sugarloaf Key. The Key West Tropical Forest and Botanic Garden on Stock Island has planted additional locustberry shrubs, the larval host plant, to help insure that this isolated, southern-most colony survives.

Euphyes pilatka klotsi (Palatka Skipper-Keys Population)

CONSERVATION PRIORITY: Urgent.

LISTING/RANKING:

Federal = Not listed.
State = Not listed.
FNAI = S1
FCREPA = Threatened.

ENDEMIC: Yes.

POPULATION TREND: Marc Minno has searched for this skipper in the Keys since 2006. It has disappeared from most of its former range and seems to only be found on Big Pine Key. It occurs in low abundance mostly on the National Key Deer Preserve on Big Pine Key.