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STATEMENT ON THE EXTINCTION, DECLINE, AND LOSS OF BUTTERFLIES IN SOUTHERN FLORIDA

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SUMMARY

Southern Florida now has one of the highest concentrations of imperiled butterflies in the United States. Two skippers unique to Florida are extinct and two species of tropical butterflies are extirpated. At least 18 other butterfly species in southern Florida are imperiled and seven of these need urgent conservation action if they are to survive much longer. These imperiled butterflies occur mostly on State and Federal conservation lands, but the agencies responsible for their management and protection have made only minimal efforts at saving the few species listed as endangered (Schaus' Swallowtail and Miami Blue). Funding for research, recovery, and monitoring is needed quickly to save Florida's imperiled butterflies from extinction.

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. In fact, most listed species of mammals and birds in the Florida Keys are also declining.

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. In 2012 the Miami Blue (*Cyclargus thomasi bethunebakeri*) was listed by the U.S. Fish and Wildlife Service as endangered. Three other butterflies occurring in southern Florida, Bartram's Scrub-Hairstreak (*Strymon acis bartramii*), Florida Leafwing (*Anaea troglodyta floridalis*), and the Keys population of the Palatka Skipper (*Euphyes pilatka klotsi*) are candidates for listing (USFWS 2006). The Schaus' Swallowtail (Federally Endangered) and the Miami Blue (State Threatened) are also 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). Neither the US Fish and Wildlife Service nor the Florida Fish and Wildlife Conservation Commission, which have sole legal authority to list threatened and endangered species of wildlife, acted upon the published FCREPA recommendations. Only the Florida Fish and Wildlife Conservation Commission listed the Miami Blue as endangered (in 2003) after a petition for emergency listing was filed in June 2000. It

took lawsuits, a second emergency petition, and more than 10 years for the U.S. Fish and Wildlife Service to add the Miami Blue to the endangered species list.

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 or less the number present in the late 1980's and early 1990's (Covell 1977, Emmel 1986, USFWS 1999, NABA 2005, USFWS 2008). Intensive surveys for the Schaus' Swallowtail in 2012 have found less than 10 individuals and this butterfly will likely be extinct in the near future. 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*), Florida White (*Glutaphrissa drusilla neumogenii*), 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, Forsy *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

- Identify, monitor, and track remaining at-risk butterfly populations in southern Florida and protect them wherever possible
- Investigate the cause(s) of their decline and threats to their continued existence
- Preserve genetic material for future research and conservation activities
- 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 imperiled butterfly species in southern Florida
- 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
- Provide funding for these recommended actions

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APPENDIX 1. Urgent Conservation action is needed for these imperiled butterflies of southern Florida, which are near their minimum population viability limits. FNAI = Florida Natural Areas Inventory. FCREPA = Florida Committee on Rare and Endangered Plants and Animals.

Schaus' Swallowtail (*Heraclides aristodemus ponceanus*)



FAMILY Papilionidae (Swallowtails)
LISTING/RANKING:
Federal = Endangered
State = Federally Endangered
FNAI = S1
FCREPA = Endangered

ENDEMIC: Yes? The population in the northern Bahamas may be 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.

Bartram's Scrub-Hairstreak (*Strymon acis bartrami*)



FAMILY Lycaenidae
SUBFAMILY Theclinae (Hairstreaks)
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.

Florida White (*Glutaphrissa drusilla neumogenii*)



FAMILY Pieridae
SUBFAMILY Pierinae (Whites)
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. 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.

Miami Blue (*Cyclargus thomasi bethunebakeri*)



FAMILY Lycaenidae
SUBFAMILY Polyommatae (Blues)
LISTING/RANKING:
Federal = Endangered
State = Federally Endangered
FNAI = S1
FCREPA = Species of Special Concern

ENDEMIC: Yes?. 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 historic 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.

Florida Leafwing (*Anaea troglodyta floridalis*)



FAMILY Nymphalidae
SUBFAMILY Charaxinae (Leafwings)
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 has disappeared from most of its historic range and is currently only known from the Long Pine Key pineland rocklands in Everglades National Park.

Florida Purplewing (*Eunica tatila tatilista*)



FAMILY Nymphalidae
SUBFAMILY Limenitidinae (Admirals)
LISTING/RANKING:
Federal = Not listed
State = Not listed
FNAI = S1
FCREPA = Species of Special Concern

ENDEMIC: No.

POPULATION TREND: The Florida Purplewing has not been monitored in a consistent way. It has disappeared from most of its historic 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).

Palatka Skipper-Keys Population (*Euphyes pilatka klotsi*)



FAMILY HesperIIDae
SUBFAMILY HesperIIDae (Grass Skippers)
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 historic range and now occurs in low abundance only on Big Pine Key, mostly on the National Key Deer Preserve.

APPENDIX 2. Imperiled butterflies of southern Florida with high priority conservation needs. FNAI = Florida Natural Areas Inventory. FCREPA = Florida Committee on Rare and Endangered Plants and Animals.

Dina Yellow (*Eurema dina helios*)



FAMILY Pieridae
SUBFAMILY Coliadinae (Sulphurs)
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.

Amethyst Hairstreak (*Chlorostrymon maesites*)



FAMILY Lycaenidae
SUBFAMILY Theclinae (Hairstreaks)
LISTING/RANKING:
Federal = Not listed
State = Not listed
FNAI = S1
FCREPA = Threatened

ENDEMIC: No.

POPULATION TREND: The Amethyst Hairstreak has always been a rare and secretive butterfly in Florida. It appears to now be extirpated from the Florida Keys, where it used to be most commonly found. There have been a few observations of adults in Broward and Miami-Dade counties since 2004.

Silver-Banded Hairstreak (*Chlorostymon simaethis*)

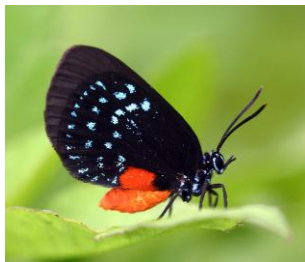


FAMILY Lycaenidae
SUBFAMILY Theclinae (Hairstreaks)
LISTING/RANKING:
Federal = Not listed
State = Not listed
FNAI = S1S2
FCREPA = Not listed

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 of it 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.

Atala (*Eumaeus atala florida*)



FAMILY Lycaenidae
SUBFAMILY Theclinae (Hairstreaks)
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 headquarters of the South Florida Water Management District in West Palm Beach. A series of cold winters are thought to have impacted the population.

Gray Ministreak (*Ministrymon azia*)



FAMILY Lycaenidae
SUBFAMILY Theclinae (Hairstreaks)
LISTING/RANKING:
Federal = Not listed
State = Not listed
FNAI = S2S3
FCREPA = Not listed

ENDEMIC: No.

POPULATION TREND: Marc Minno and members of the North American Butterfly Association have looked for this butterfly in the Keys and southern Florida in recent times. Only found a few individuals have been found. It also occurs in low abundance in the lower Florida Keys and at a few parks in Miami and near Naples. It has declined or disappeared from some sites.

Martial Scrub-Hairstreak (*Strymon martialis*)



FAMILY Lycaenidae
SUBFAMILY Theclinae (Hairstreaks)
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.

Cuban Crescent (*Anthanassa frisia*)



FAMILY Nymphalidae
SUBFAMILY Nymphalinae (Brushfoots)
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. Members of the North American Butterfly Association found many adults at a location in Everglades National Park during the fall of 2011, but none have been seen there since. No other colonies are currently known.

Dingy Purplewing (*Eunica monima*)



FAMILY Nymphalidae
SUBFAMILY Limenitidinae (Admirals)
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.

Tropical Buckeye (*Junonia genoveva*)



FAMILY Nymphalidae
SUBFAMILY Nymphalinae (Brushfoots)
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. Hybrid and typical adults with Tropical Buckeye characteristics still occur in the Lower Keys and on the mainland near Everglades National Park.

Malachite (*Siproeta stelenes*)



FAMILY Nymphalidae
SUBFAMILY Nymphalinae (Brushfoots)
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 way. This butterfly has local breeding populations in urban parks in Miami-Dade, Broward, and Palm Beach counties. Adults sometimes disperse widely into the Keys and other parts of southern and central Florida, especially during the fall and winter months. It has disappeared from some areas of Miami-Dade County.

Florida Duskywing (*Ephyriades brunnea floridensis*)



FAMILY HesperIIDae
SUBFAMILY Pyrginae (Spread-wing Skippers)
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 since 2006 in the Florida Keys and elsewhere. It has declined in abundance and distribution. 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.