

**U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT
AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Parides ascanius*

COMMON NAME: Fluminense swallowtail

HQ CONTACT: Elizabeth Maclin, Chief, Branch of Delisting and Foreign Species, 703-358-2646, elizabeth_maclin@fws.gov.

DATE INFORMATION CURRENT AS OF: July 2021

STATUS/ACTION

Species petitioned for listing which we have determined is not a listable entity

Species petitioned for listing which we have determined does not warrant listing (does not meet the definition of a threatened or endangered species)

Non-listed species for which we have not received a petition but for which we have undertaken a species status assessment on our own initiative and which we have determined does not warrant listing (does not meet the definition of a threatened or endangered species)

Listed species petitioned for delisting which we have determined does not warrant delisting

Listed species petitioned for downlisting which we have determined does not warrant downlisting

Listed species petitioned for uplisting for which we have made a warranted-but-precluded finding for uplisting (this is part of the annual resubmitted-petition finding)

Listed species petitioned for uplisting which we have determined does not warrant uplisting

New candidate

Continuing candidate

Date when the species first became a candidate (as currently defined): December 7, 2004

Listing priority number change

Former LPN: ____

New LPN: ____

Candidate removal: Former LPN: ____

A – Taxon does not meet the Act's definition of "endangered species" or "threatened"

species” because it is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

- U – Taxon does not meet the Act’s definition of “endangered species” or “threatened species” because it is not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.
- N – Taxon does not meet the Act’s definition of “species.”
- M – Taxon mistakenly included in past notice of review.
- X – Taxon believed to be extinct.

Petition Information:

Non-petitioned

Petitioned; Date petition received: January 10, 1994

90-day substantial finding FR publication date: May 10, 1994 (59 FR 24117)

12-month warranted but precluded finding FR publication date: December 7, 2004 (69 FR 70580)

FOR PETITIONED CANDIDATE SPECIES:

- A. Is listing warranted? Yes
- B. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes
- C. Why is listing precluded at this time? Higher-priority listing actions—including court-approved settlements, and court-ordered and statutory deadlines, for petition findings and listing determinations—continue to preclude the proposed and final listing rules for this species. We continue to monitor populations and, if necessary, will change the status of the species or implement an emergency listing. The “Progress on Revising the Lists” section of the current CNOR (<https://endangered.fws.gov/>) provides information on listing actions taken during the last 12 months.

PREVIOUS FEDERAL ACTIONS:

On January 10, 1994, we received a petition from Ms. Dee E. Warenycia to list seven foreign swallowtail butterflies, including the Fluminense swallowtail (*Parides ascanius*), proposing that they be included on the U.S. list of endangered species. On May 10, 1994, we published in the *Federal Register* (59 FR 24117) a 90-day finding in which we announced that the petition to add the seven species of foreign swallowtail butterflies contained substantial information indicating that listing may be warranted for all species. This document constitutes our 12-month finding on the January 10, 1994, petition to list the Fluminense swallowtail under the Act.

[ANIMAL GROUP AND FAMILY/PLANT GROUP, ORDER AND FAMILY]: Insects,

Butterflies/Moths, Swallowtail Butterflies (Insecta: Lepidoptera: Papilionidae)

DISTINCT POPULATION SEGMENT (DPS)

N/A

BIOLOGICAL INFORMATION

To assess viability of the Fluminense swallowtail (*Parides ascanius*), we followed the species status assessment (SSA) framework and used the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency is the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years, variation in demographic rates), redundancy is the ability of the species' populations to withstand catastrophic events (for example, droughts, large pollution events), and representation is the ability of the species to adapt to both near-term and long-term changes in its physical and biological environment (for example, climate change, disease). A species with a high degree of resiliency, representation, and redundancy is better able to adapt to novel conditions and to tolerate environmental change, stochasticity, and catastrophes. In general, species viability will increase with increases in resiliency, redundancy, and representation (Smith et al. 2018, p. 306). Using these principles, we identified the species' ecological requirements for survival and reproduction at the individual, population, and species levels, and described the beneficial and risk factors influencing the species' viability.

The SSA process can be categorized into three sequential stages. During the first stage, we evaluated the species' needs. The next stage involved an assessment of the historical and current condition of the species' demographics and habitat characteristics, including an explanation of how the species arrived at its current condition (i.e., how threats and conservation actions have influenced the species). The final stage of the SSA involved assessing the species' plausible range of future responses to positive and negative environmental and anthropogenic influences. This process used the best available information to characterize viability as the ability of a species to sustain populations in the wild over time. We use this information to inform our regulatory decision.

Species Description

The Fluminense swallowtail butterfly is a black, white, and red swallowtail with a 45 millimeter (mm) wingspan (Otero and Brown 1984, p. 2; Figure 1). The sexes are similar in appearance (Racheli 2006, p. 72; Collins and Morriss 1985, p. 240) except that the white stripe is wider in the female (Tyler *et al.* 1994, p. 179). The species may be confused with the Harris' mimic swallowtail (*Mimoides* (syn. *Eurytides*) *lysithous harrisianus*), but the Harris' mimic swallowtail has a red streak on the underside of its wings (Xerces 2006; Collins and Morris 1985a, p. 208).



Figure 1. Image of Fluminense swallowtail butterfly (photo by Joe Schelling, 2014).

The Fluminense swallowtail butterfly (*Parides ascanius*) is in the genus *Parides* (Hübner, 1819; Papilionidae: Troidini) that contains 34 species occurring from Mexico to Argentina (Tyler *et al.* 1994, p. 50; Racheli 2006, as cited in Herkenhoff *et al.* 2013, p. 29). *Parides ascanius* resembles, and is closely related to *P. bunichus*, but differs in geographic distribution, size (*P. ascanius* is larger), use of food plants, and larval morphology (Otero and Brown, 1984, pp. 2-3, 9). The taxonomic rank of *Parides ascanius* as a full species is well established (Catalog of Life 2017, unpaginated; Racheli 2006, p. 73; Racheli and Olmisani 1998, entire, Tyler *et al.* 1994, p. 179). Therefore, we recognize the Fluminense swallowtail butterfly as a full species in a multi-species genus. In Brazil, it is called “borboleta-da-praia,” which means “beach butterfly” (Seraphim *et al.* 2016, p 534.).

Habitat/Life History

The Fluminense swallowtail is endemic to sand forests or “restingas”, which are herbaceous, shrubby coastal sand-dune habitats with characteristic vegetation from shrubs to forests up to 15 meters (m; 49 feet (ft)) tall within the larger Atlantic Forest region of coastal Brazil. The species prefers wet soils and low vegetation where larval host plants and nectar sources (for adult foraging) are found close to the beach (Otero and Brown 1984, p. 4).

Larvae feed exclusively on *Aristolochia trilobata* (pipevine or Dutch man’s pipe; formerly known as *A. macroura*; Seraphim *et al.* 2016, p. 534), which grows primarily in rich, wet soils

(Almeida 2015, unpaginated). *A. trilobata* contains toxins that are taken up by caterpillars making the Fluminense swallowtail toxic to certain predators (Tyler *et al.* 1994, p. 52).

Adult Fluminense swallowtails have been documented to feed on over 30 flowering plant species of more than 12 families, though *Lantana camara* (common lantana) was the most frequently visited (Almeida 2015, unpaginated).

This species develops from egg to adult in approximately 50–58 days (Otero and Brown 1984, pp 5–6, 8). Pupal diapause (a suspension of development in the non-feeding pupal stage) was noted in cooler winter weather, delaying maturation in both sexes (Otero and Brown 1984, pp 5–6, 8; Almeida 2015, unpaginated). Average life expectancy for adult males was 12.3 days (max. observed is 28 days) (Herkenhoff *et al.* 2013, pp. 29, 31). Adult males can travel distances of up to 400 m (approximately ¼ mile; Herkenhoff *et al.* 2013, pp. 29, 32).

Historical and Current Range/Distribution

The Fluminense swallowtail was historically reported from the states of Rio de Janeiro and Espirito Santos in Brazil (Seraphim *et al.* 2016, p. 534, Otero and Brown, 1984, p. 3). Several sites where it was once observed now contain no suitable habitat and are entirely developed.

The species currently occupies an estimated 116 square kilometers (km²) in sparse habitat fragments across the swampy coastal forests of Rio de Janeiro state (Grice *et al.* 2019, p. 1). The Fluminense swallowtail occupies at least eight sites in the State of Rio de Janeiro across which there is movement of individuals (Seraphim *et al.* 2016, p. 534). Several of the populations occur in protected areas including the Poço das Antas Biological Reserve, Três Picos State Park, and Guapiaçu Ecological Reserve (Soares *et al.* 2011; Seraphim *et al.* 2016, p. 544).

Population and Species Needs

The species relies on restinga habitats which are herbaceous, shrubby coastal sand-dune habitats with characteristic vegetation from shrubs to forests up to 15 meters (m; 49 feet (ft)) tall within the larger Atlantic Forest region of coastal Brazil. The species prefers wet soils and low vegetation where larval host plants and nectar sources. Larvae feed exclusively on *Aristolochia trilobata*, which grows primarily in rich, wet soils. This food source contains toxins that are taken up by caterpillars making the Fluminense swallowtail toxic to certain predators. Adult Fluminense swallowtails have been documented to feed on over 30 flowering plant species of more than 12 families

SUMMARY OF BIOLOGICAL INFORMATION

The Fluminense swallowtail (*Parides ascanius*) butterfly is a black, white, and red swallowtail. The species may be confused with the Harris' mimic swallowtail (*Mimoides* (syn. *Eurytides*) *lysithous harrisianus*), but the Harris' mimic swallowtail has a red streak on the underside of its wings. The Fluminense swallowtail is endemic to sand forests or “restingas”, of the Atlantic Forest in coastal Brazil. The species currently occupies an estimated 116 km² (45 mi²) in sparse habitat fragments across the swampy coastal forests in the State of Rio de Janeiro. The

Fluminense swallowtail occupies at least eight sites across which there is movement of individuals. Several of the populations occur in protected areas including the Poço das Antas Biological Reserve, Três Picos State Park, and Guapiaçu Ecological Reserve. A study at Biological Reserve of Poço das Antas estimated that the subpopulation ranged from about 10 to 50 individuals. The best available information does not provide estimates for butterfly numbers in the remaining subpopulations.

FACTORS INFLUENCING THE STATUS

The Act directs us to determine whether any species is an endangered species or a threatened species because of any factors (or threats) affecting its continued existence (i.e., whether it meets the definition of a threatened species or an endangered species). We use the term “threat” to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term “threat” includes actions or conditions that have a direct impact on individuals, as well as those that affect individuals through alteration of their habitat or required resources. The term “threat” may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an “endangered species” or a “threatened species.” In determining whether a species meets either definition, we must evaluate all identified threats by considering the expected response by the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species—such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an “endangered species” or a “threatened species” only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

The Act does not define the term “foreseeable future,” which appears in the statutory definition of “threatened species.” Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis. The term foreseeable future extends only so far into the future as the Services can reasonably determine that both the future threats and the species’ responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. “Reliable” does not mean “certain”; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

It is not always possible or necessary to define foreseeable future as a particular number of years. Analysis of the foreseeable future uses the best scientific and commercial data available and should consider the timeframes applicable to the relevant threats and to the species’ likely

responses to those threats in view of its life-history characteristics. Data that are typically relevant to assessing the species' biological response include species-specific factors such as lifespan, reproductive rates or productivity, certain behaviors, and other demographic factors.

Threats

Habitat loss and destruction caused by road and building construction are the main threats affecting the Fluminense swallowtail (Seraphim 2016, p. 534, Brown 1996, pp. 45–46, 52, 57; Collins and Morris 1985a, pp. 67, 152). Sea level rise may result in further habitat loss as suitable habitat is lost and humans continue to develop suitable habitat as they relocate to avoid coastal flooding (Darby 2016, unpaginated).

Fluminense swallowtail larvae feed only on a single plant species, which is not widely distributed across otherwise suitable habitat, further limiting where populations can persist.

Illegal collection of the species is likely occurring and ongoing. As of June 2021 there are no listings for biological material of this species on relevant websites, though other similar appearing swallowtail butterflies are listed for sale (ebay 2021, unpaginated).

Parasitism is another stressor for the Fluminense swallowtail; five species of parasitic wasps within the genera *Brachymeria*, *Conura*, and *Telenomus* and at least one parasitic fly have been associated with Fluminense swallowtails (Tavares *et al.* 2006, entire; Almeida *et al.* 2015, p. 388; Almeida 2015, unpaginated). Currently we lack information regarding mortality rates within affected subpopulations; thus, the magnitude of this stressor on the species is not known. Mortality of these early life stages, in combination with other stressors, could potentially contribute to local extirpations of remaining small, fragmented subpopulations.

Small and increasingly isolated populations of the Fluminense swallowtail (as noted in Seraphim *et al.* 2016, p. 533) are subject to both demographic and unpredictable environmental events that can contribute to extirpations. While data suggest movement of individuals across fragments (Seraphim 2016, p. 534), increasing habitat loss will limit the ability of dispersal. We considered specific stressors that may affect the small population size for the Fluminense swallowtail and conclude that several of the stressors identified above (particularly habitat loss and destruction and illegal collection), can exacerbate risks to this small population of Fluminense swallowtail.

Conservation Measures

Between 2001 and 2006 biological corridors were planned or created to connect existing protected areas to 13 privately protected forests by restoring habitat, which should assist the habitat connectivity for this species (De Roy 2002, unpaginated), though this has not yet been evaluated for the Fluminense swallowtail.

The 2007 management plan for the Restinga National Park of Jurubatiba addresses conservation of the Fluminense swallowtail (ICMBio 2007, p. E4-26), including the recommendation to promote planting of adult food sources such as *Lantana camara*, *Stachytarpheta jamaicensis* (gervão), *Brunfelsia pauciflora* (manacá de cheiro), *Clerodendrum speciosum* and citrus species

in reserves or neighborhoods where subpopulations occur (ICMBio 2007, p. E3-97).

Likewise, the Poço das Antas Biological Reserve Management Plan includes support for detailed studies of the spatial and temporal distribution of Fluminense swallowtail and to identify possible occurrences of Harris' mimic swallowtail in the reserve (MMA/IBAMA 2005, pp. E4-31, 66).

Captive-reared Fluminense swallowtails were released over several years throughout the City of Rio de Janeiro to increase subpopulation sizes and genetic diversity (Almeida *in litt.* 2017a; Monteiro *et al.* 2004 as cited in ICMBio 2007, p. E2-89), but there was no post-release monitoring of success (Monteiro *in litt.* 2017c). Captive rearing may be reinitiated in the future (Almeida *in litt.* 2017a).

Cumulative Effects

Interactions between small population sizes and continued habitat loss will further the Fluminense swallowtail's decline throughout its range by limiting suitable habitat and decreasing ability of dispersal across populations. These effects decrease the viability of this species and further warrant listing.

CURRENT CONDITION

Resiliency: The Fluminense swallowtail has moderate resiliency. Population estimates for this species are variable from below ten to 50 individuals at a given site. Data suggest that there is dispersal between sites of individual butterflies. The butterflies are described as locally abundant where they occur.

Redundancy: There are several populations from at least three sites within protected areas in Brazil making the species at least moderately redundant throughout its range. However, limited suitable habitat limits the species' ability to increase redundancy.

Representation: The Fluminense swallowtail is well represented across the small suitable range of occupancy (i.e. restinga habitats where its host plant occurs). Genetic data suggest that this representation is a large metapopulation because multiple small move between the small populations where there is exchange genetic diversity.

FUTURE CONDITION

Condition of the Fluminense swallowtail is expected to decline in the future as habitat loss continues, thereby limiting population numbers and dispersal ability between occupied sites. Additional affects to the species habitat from climate change such as sea level rise will continue to affect the Fluminense swallowtail in the future.

FINDING

Standard for Review

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an “endangered species” or a “threatened species.” The Act defines an endangered species as a species that is “in danger of extinction throughout all or a significant portion of its range,” and a threatened species as a species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The Act requires that we determine whether any species is an “endangered species” or a “threatened species” because of any one or a combination of the following factors:

- (A) The present or threatened destruction, modification, or curtailment of its habitat or range;
- (B) Overutilization for commercial, recreational, scientific, or educational purposes;
- (C) Disease or predation;
- (D) The inadequacy of existing regulatory mechanisms; or
- (E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species’ continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

Summary of Analysis

After evaluating threats to the species and assessing the cumulative effect of the threats under the section 4(a)(1) factors, we determine that the Fluminense swallowtail experiences present and threatened destruction, modification, and curtailment of its habitat. In particular, limited availability of host plants limits population sizes and connectivity of the metapopulation dynamics. Additionally, less host plants reduces reproductive output and limits population growth. These threats persist despite conservation measures being implemented, including captive releases and management focused on the butterfly. The species is likely collected for international trade. Thus, after assessing the best available information, we conclude that the Fluminense swallowtail (*Parides ascanius*) is warranted for listing, but precluded by other higher priority actions.

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2*
		Subspecies/population	3
		Monotypic genus	4

	Non-imminent	Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude: The magnitude of threats to Fluminense swallowtail is high. The overall number of and connectivity between populations is small and declining; currently only one is found within a highly protected area (Poço das Antas Biological Reserve), and others persist in small, fragmented patches of habitat. However, the butterflies are currently described as locally abundant where they occur. Despite the conservation measures in place, the species continues to face stressors (e.g., habitat loss and destruction, and illegal collection and trade) that are high in magnitude.

Imminence: Threats associated with habitat loss—primarily by road creation, construction, drainage of swamps, vegetation suppression, and illegal collection/trade—are currently affecting the species and are expected to continue in the future. Therefore, threats to the Fluminense swallowtail are considered imminent..

Rationale for Change in Listing Priority Number:

N/A

Is Emergency Listing Warranted?

No; There is currently no emergency posing a significant risk to the conservation of the Fluminense swallowtail.

DESCRIPTION OF MONITORING

The candidate notice of review (CNOR) and accompanying species assessment forms constitute the Service’s system for monitoring and making annual findings on the status of petitioned species under sections 4(b)(3)(c)(i) and 4(b)(3)(c)(ii) of the Act. We review all new information on candidate species as it becomes available, prepare annual species assessments that reflect monitoring and research results and any other new information. We are unaware of any systematic monitoring or conservation efforts in the species’ range (Brazil).

COORDINATION WITH STATES

No countries provided information or comments on the species or latest assessment. The range country, **Brazil**, did not provide information or comments.

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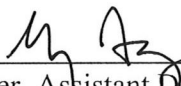
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Approve:  _____ 2/16/22
Gary Frazer, Assistant Director for Ecological Services Date

Concur:  _____ 03/31/2022
Director, U.S. Fish and Wildlife Service Date

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: July 2021
Conducted by: Branch of Delisting and Foreign Species