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

SCIENTIFIC NAME: *Protographium (Eurytides) marcellinus*

COMMON NAME: Jamaican kite swallowtail (Blue 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
_X_ Continuing candidate
Date when the species first became a candidate (as currently defined): May 21, 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

_X_ 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 Jamaican kite swallowtail (*Protographium (Eurytides) marcellinus*), 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 Jamaican kite 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 Jamaican kite swallowtail (*Protographium (Eurytides) marcellinus*), 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 adult form of the Jamaican kite swallowtail is distinguishable from other swallowtail butterflies in Jamaica due to its small size relative to other swallowtail butterflies (Xerces 2015, unpaginated; Collins and Morris 1985, p. 206). The adults have slender tails on their hindwings that are primarily black with blue stripes, leading to another common name, "Blue swallowtail". Each hindwing also has a red spot near the end of the thorax (Xerces 2015, unpaginated; figure 1).

Jamaican kite swallowtail butterfly eggs, which are similar in appearance to other eggs of Papilionidae, are laid only on their host plant, *Oxandra lanceolata*, known as "black lancewood" or "West Indian lancewood". Larvae develop through five distinct stages before beginning to

pupate when they reach ~20-35 mm in length and are variable in color (Turner and Turland 2017, pp. 141-142; Garraway *et al.* 1993, pp. 151-152).

Figure 1: Pinned male adult Jamaican kite swallowtail butterfly (Butterflies of America 2021, unpaginated)

Taxonomy

The Jamaican kite swallowtail (*Protographium marcellinus*) is a butterfly in the Papilionidae (swallowtail) family. It was first illustrated in 1725 and named in 1775 (Bailey 1994, p. 8; Brown & Heineman 1972, pp. 339-340). In 1845, it was named *Protesilaus marcellinus* (Brown & Heineman 1972, p. 340), which is still used along with other variations for the genus (i.e., *Protographium, Eurytides, and Protesilaus). Protographium marcellinus* is used by International Union for the Conservation of Nature (IUCN), Catalogue of Life, and Xerces Society (Catalogue of Life 2015, unpaginated; Xerces 2015, unpaginated; Gimenez Dixon, 1996, p. 1). Its taxonomic rank as a full species is well established (Catalogue of Life 2015, unpaginated; Gimenez Dixon, 1996, p. 1; Smith *et al.* 1994, p. 162; Brown and Heineman 1972, p. 340) and we recognize the Jamaican kite swallowtail as a full species in a multi-species genus. The local common name for the species is “blue swallowtail” (Turner and Turland 2017, p. 140).

Habitat/Life History

The Jamaican kite swallowtail is endemic to Jamaica, a Caribbean island nation that is 10,992 square kilometers (km^2; 4,244 square miles (mi^2)). The species occurs in limestone forest containing dense stands of its only known larval host plant, black lancewood (Turner and Turland 2017, pp. 141, 459; Bailey 1994, p. 8; Tyler *et al.* 1994, p. 182; Collins and Morris 1985 p. 206). The butterfly is known to occupy primarily dry limestone forests (both primary and secondary forests), and, to a lesser degree, primary wet limestone forests (Turner and Turland 2017, pp. 32-34).

Swarms of adults have been observed feeding from the native flowering *Spathelia sorbifolia* (mountain pride; Turner and Turland 2017, p. 143), however they also feed from a variety of native flowering plants (Turner and Turland 2017, p. 143; Tyler *et al.* 1994, p. 182). Both sexes have also been seen "puddling" (drinking fluids and nutrients from wet soils) from roadside puddles (Turner and Turland 2017, p. 143; Tyler *et al.* 1994, p. 182, observed males only), wet seeps, salt spray on beaches, and moist manure (Turner and Turland 2017, p. 143).

Typically, adults are found in small colonies that generally produce two main broods per year (Turner and Turland 2017, p. 142; Bailey 1994, p. 8; Smith *et al.* 1994, p. 162; Garraway *et al.* 1993, p. 153; Collins and Morris 1985, p. 206). Adult emergence is strongly correlated with substantial local rainfall and they are most active between April and July during daylight hours (Turner and Turland 2017, p. 142).

Both sexes are fast flying and generally stay close to the ground and shrubbery, but also have been seen flying above the canopy (Turner and Turland 2017, pp. 142, 459; Xerces 2015, unpaginated; Garraway *et al.* 1993, pp. 151, 153; Collins and Morris 1985, p. 206). At night, adults roost singly on the leaves of low growing shrubs and vines (Turner and Turland 2017, p. 142). Historically, adult dispersal in the form of mass migrations of thousands of adults moving westward from one site (Rozelle, St. Thomas Parish) occurred, with the last documented occurrence in 1966 (Turner and Turland 2017, p. 462).

Females generally lay single eggs on the underside of fully-opened leaves of the butterfly's host plant, black lancewood (Turner and Turland 2017, p. 141; Garraway *et al.* 1993, pp. 151). Larvae emerge from eggs within approximately 2.5 days, grow through their five size stages, then pupate (transition to the adult stage) when cued by rain (Turner and Turland 2017, p. 141). Pupation occurs in leaf litter on the ground; most individuals enter diapause (a pause in development) for up to 191 days (Turner and Turland 2017, p. 142).

Historical and Current Range/Distribution

The Jamaican kite swallowtail is endemic to Jamaica, but the extent of its historical range is not known. Breeding populations of the Jamaican kite swallowtail are found only where there are dense stands of the larval host plant, black lancewood; these stands are rare (Turner and Turland 2017, p. 459). Historically, the species was likely relatively widespread within suitable habitat until its larval host plant was exploited for cabinet making, especially in the southwest region of Jamaica (Turner and Turland 2017, p. 459).

There are five known sites that support or recently supported colonies of the Jamaican kite swallowtail; three of these locations have confirmed records (Turner and Turland 2017, pp. 458-464; GBIF 2021, unpaginated; Table 1; Figure 1).

Table 1. Known colonies of Jamaican kite swallowtail, estimated occupied area, land ownership (if known), and status (Turner and Turland 2017, pp. 458-464).

Site	Estimated occupied area	Ownership	Status
Rozelle, St. Thomas Parish	Unknown	Private	Unknown
Hellshire Hills. St. Catherine Parish	2.25 km^2; 0.87 mi^2	Within the Portland Bight Protected Area	Extant, possibly strongest colony
Round Hill, Clarendon Parish	Not surveyed	Within the Portland Bight Protected Area	Possibly extirpated
East of Rio Bueno, northwestern St. Ann Parish	Not surveyed	Unknown	Possibly extirpated
Crown Lands in the Cockpit Country, south central Trelawny Parish	Not surveyed	Designated as a national forest reserve in 1950[1]	Extant; variable across years

Two of the sites (Rio Bueno and Round Hill) may have been recently extirpated and the colony at Rozelle is believed to be tenuous (Turner and Turland 2017, p. 458). The remaining two colonies (Round Hill and Cockpit Country) are variable with strong numbers in some years (Turner and Turland 2017, p. 458).

Figure 1. Yellow dots on map represent confirmed georeferenced records of Jamaica kite swallowtail butterflies (GBIF 2021, unpaginated).

Rozelle, St. Thomas Parish

The population that occurred in Rozelle in Southeast Jamaica was extirpated in 1971 when the area was developed rendering the habitat unsuitable for the Jamaica kite swallowtail. The area has never sustained a population of butterflies since. However, due to some local forest regeneration, there is renewed potential for the butterflies to inhabit the region (Turner and Turland 2017, pp. 459,462; Garraway *in litt.* 2011).

Hellshire Hills. St. Catherine Parish

The largest population, the Hellshire Hills colony, occupies approximately 2.25 km^2 (0.87 mi^2) within an area known as "Lancewood Valley" in which the host plant occurs (Turner and Turland 2017, p. 462). Occasional swarms of the butterfly appear in areas along the south coast, further indicating that this colony may be strong (Turner and Turland 2017, p. 462).

Round Hill, Clarendon Parish

The Round Hill colony may not be self-sustaining, but rather a metapopulation of the Hellshire Hills colony (Turner and Turland 2017, p. 462). Further investigation of this site is needed (Turner and Turland 2017, p. 462). The host plant here may not be dense enough to support a permanent colony.

East of Rio Bueno, northwestern St. Ann Parish

Distribution of the host plant around the Rio Bueno is not ideal for Jamaican kite swallowtail reproduction, and no large migrations have been seen from this site (Turner and Turland 2017, p. 462).

Crown Lands in the Cockpit Country, south central Trelawny Parish

The Jamaican kite swallowtail colony in the Cockpit Country was discovered in 1968, within a cluster of lancewood trees near Troy in Trelawny Parish (Turner and Turland 2017, p. 464). The Cockpit Country is an approximately 600 km^2 (232 mi^2) region where the "cockpits" consists of steep-sided, enclosed depressions surrounded by hills or ridges (Chenoweth *et al*. 2001, p. 652 citing several sources). This area is difficult to access and has extremely challenging terrain to traverse (Chenoweth *et al*. 2001, p. 651). Because it is so difficult to access, much of the area remains forested and supports high levels of native species diversity (Newman *et al*. 2011, unpaginated). The Cockpit Country supports the only colony of the Jamaican kite swallowtail found in wet limestone forest habitat (Turner and Turland 2017, p. 464). Adult flight numbers vary at this site for unknown reasons; in some years there are many hundreds for a few weeks and in other years no butterflies are seen (Turner and Turland 2017, p. 464).

Population and Species Needs

The species occurs relies on dry limestone forests, and, to a lesser degree, primary wet limestone forests containing dense stands of its host plant, black lancewood. At night, adults roost singly on

the leaves of low growing shrubs and vines. Adults feed from the native flowering *Spathelia sorbifolia*; however they also feed from a variety of native flowering plants. The species needs puddles, or fluids from wet soils, seeps, salt spray on beach, and moist manure

SUMMARY OF BIOLOGICAL INFORMATION

The Jamaican kite swallowtail (Protographium (Eurytides) marcellinus) is a small blue-green and black butterfly endemic to Jamaica. This butterfly is regarded as Jamaica's most endangered butterfly. The Jamaican kite swallowtail is restricted to limestone forests; breeding populations only occur in rare, dense stands of its only known larval host plant, black lancewood (Oxandra lanceolata). Five known sites have supported colonies of the Jamaican kite swallowtail. Two of the sites may be extirpated, the status of one site is uncertain, and two sites are viable with strong numbers in some years. There is no known estimate of population size and numbers of mature adults are low in most years; however, occasionally there are strong flight seasons in which adult densities are relatively higher.

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, degradation, fragmentation, and loss of host plant are the primary factors affecting the Jamaican kite swallowtail. Because the population is small and its distribution limited, the species is vulnerable to stochastic (random) environmental events (e.g. drought, fire, excessive precipitation, hurricanes/tropical storms) as well as natural predation and illegal collection. The use of only one host plant species, particularly one with commercial value, means that the Jamaican kite swallowtail is particularly sensitive to habitat and host plant loss.

Jamaica's forests have been modified/cleared for agriculture and timber extraction for export or local use for home building and furniture making for centuries (Turner and Turland 2017, p. 455). Mining for limestone and bauxite also pose threats to remaining forested areas where the butterfly occurs. Limestone is used for roadbuilding and construction projects, and mining involves completely clearing the land and limiting regeneration potential (Turner and Turland 2017, p. 456). Steep rocky areas and hilltops and some large tracts of privately owned land, primarily in western and central Jamaica, have been largely spared from forest clearing because of challenges to access (Turner and Turland 2017, p. 455).

Today, only around 8% of the total land area of Jamaica is natural forest with minimal human disturbance (Forestry Department 2001 and PIOJ 2009, as cited in NEPA 2013, p. 17). Forested remnants are subject to periodic hand cutting of saplings to make yam sticks, fish pots, or charcoal (Turner and Turland 2017, p. 455). Therefore, all five areas that support colonies of the Jamaican kite swallowtail are subject to some level of continued deforestation, even protected areas. See Historical and Current Range/Distribution for details on the status of habitat quality at all known population locations of the Jamaican kite swallowtail.

Bauxite mining for aluminum production is an important economic activity for Jamaica that has significant environmental concern (Newman et al. 2010, unpaginated; Neufville 2001, unpaginated). While it is required by law that companies restore land when mines close, direct impacts of mining limit regeneration potential. Further, the "regenerated" land has not been found to return to original forest cover, therefore never becoming suitable habitat for this species (Neufville 2001, unpaginated). Mining operations increase road access, which increases access to

loggers, coal burners, and yam stick traders whose extractive practices negatively impact habitat availability for the butterfly (Neufville 2001, unpaginated). Although more than 22,000 hectares (54,363 acres) of Cockpit Country are designated as forest reserves, prospecting or mining is permissible within a forest reserve if a license or lease can be obtained (JEAN 2007, p. 6). To date, plans for the Cockpit Country are on hold while conservation boundaries are being established by the Government; and permissions for mining or mining surveys have not yet been granted (Turner and Turland 2017, p. 457).

Human-caused fires, particularly brush fires started by slash-and-burn methods for agriculture, may threaten remaining Jamaican kite swallowtail colonies by engulfing stands of the hostplant. Fires could also burn pupae in the leaf litter beneath the host plants (Turner and Turland 2017, p. 457). Charcoal-making not only removes trees, but also increases the risk of brush fires (Turner and Turland 2017, p. 457).

Illegal collection and trade of the species may be occurring (Melisch 2000, p. 93; Schütz 2000, p. 19). The species was listed in 2001 as part of the Jamaican Wildlife Protection Act of 1945, which carries a maximum penalty of $777 U.S. dollars (USD; $100,000 Jamaican dollars) and 24 months of imprisonment for violating its provisions (JWPA 1945. p 9). With this legal prohibition in place, the threat of collection is thought to be negligible (Garraway *in litt*. 2011). However, there have been specimens of the Jamaican kite swallowtail recently listed for sale online.

Natural predation may adversely affect the few remaining Jamaican kite swallowtail populations. Known native predators include: (1) the Jamaican tody (*Todus todus*) – a bird that captures adults in flight, (2) unknown species of spiders (order Araneae) that have ensnared first and second instar larvae overnight in spider webs, and (3) praying mantises (Order: Mantodea) that have captured feeding adults (Turner and Turland 2017, pp. 141, 143). In years where large numbers of spiders were observed, very few butterfly larvae survived (Turner and Turland 2017, p. 141).

Jamaica is vulnerable to natural environmental events such as tropical hurricanes (cyclones), earthquakes, landslides, floods, droughts, and tsunamis, which can result in loss of habitat and host plant (DRRC 2012, p. 1). Other environmental events such as droughts have the potential to adversely affect remaining colonies of the Jamaican kite swallowtail. For example, in Rozelle in May l969, when the rains that brought on adult emergence subsided, the new growth on the larval host plant withered and, as a result, most eggs and emerging larvae did not survive (Turner and Turland 2017, p. 464). Effects from climate change are expected to exacerbate the intensity of tropical storms and droughts, as projections for the Caribbean region include increased drought, greater variability in rainfall, and drier summers (Lehnert *et al.* 2017, citing several sources).

The Jamaican kite swallowtail is only known from five small colonies and as few as two of these colonies may currently be viable (see historical/current range; Turner and Turland 2017, pp. 458-464; Table 1). Small and increasingly isolated colonies of the Jamaican kite swallowtail are

subject to both demographic and unpredictable environmental events that can contribute to loss of genetic diversity and local extirpations including habitat loss, predation, disease, and stochastic (random) environmental events, such as storms (Davies *et al.* 2004, pp. 265–271). Several of the stressors identified above (habitat loss and destruction, storms, fire, and predation) have the ability to increase the risk to this small population of Jamaican kite swallowtails.

Conservation Measures

The two largest sustaining populations of the Jamaican kite swallowtail occur in protected areas (the Portland Bight Protected Area and the Forest Reserve in the Cockpit Country), though habitat destruction within these areas continues to be a problem.

The Jamaican kite swallowtail is protected under Jamaica's Wildlife Protection Act of 1945, which prohibits the taking or possession of any animal (or part of an animal) listed under the act with maximum fines of 100,000 Jamaican dollars (777.00 USD) and two years in jail (JWPA 2017, p. 9). The Forest Act of 1996 and the Forest Regulations Act of 2001 have increased the power of Jamaican authorities to protect the species' habitat (Gartner *et al.* 2008, pp. 9–10). These Acts included mandates to determine the biodiversity in the forest as well as the ability to acquire private lands as forest reserves (Gartner *et al.* 2008, p. 9).

The Jamaican kite swallowtail is included in Jamaica's National Strategy and Action Plan on Biological Diversity, which establishes specific plans for protected areas in Rozelle and the Cockpit Country (NBSAP 1997, p. 54). However, although these projects were identified as high priority, they have not been initiated due to funding and capacity constraints (NEPA 2013, pp. 38, 50). Therefore, conservation management continues to be lacking for this species.

Cumulative Effects

Interactions between small population sizes and continued habitat loss (due to development and host plant harvest) will further declines of the Jamaican kite swallowtail throughout its range. These effects decrease the viability of this species and further warrant listing.

CURRENT CONDITION

Resiliency: To our knowledge there is no population estimate for this species. Its reliance on a single species of host plant for larval development coupled with its low population density results in low resiliency.

Redundancy: There were five documented populations of this butterfly, however, only two are known to be extant. While there is potential for the butterfly to occur in more sites, there is limited capacity at many historical sites because of limitations in host plant quality and availability. Redundancy of this species has decreased over time.

Representation: The Jamaican kite swallowtail has low representation because it has specialized habitat requirements and resides in a small range of occupancy, which are limited to small areas of Jamaica. While the species was known to move in mass migrations when habitat quality was

higher, there is no information to date on genetic diversity of the species/populations.

FUTURE CONDITION

Condition of the Jamaican kite swallowtail is expected to decline in the future as habitat loss/loss of required host plant will continue to limit population numbers, which have been low for the last several decades (Turner and Turland 2017, pp. 458-464). Climate change, increased disturbance (e.g. hurricanes, drought), and human impacts (e.g. habitat destruction, host plant harvesting) will continue to put this species at risk of extinction.

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 Jamaican kite swallowtail experiences present and threatened destruction, modification, and curtailment of its habitat. In particular, limited availability of host plants limits potential reproductive output of existing adults and limits population growth. Thus, after assessing the best available information, we conclude that the Jamaican kite swallowtail (*Protographium marcellinus*) is warranted for listing, but precluded by other higher priority actions.

RECOMMENDED CONSERVATION MEASURES

- Support monitoring and conservation efforts by governmental agencies in Jamaica, academic researchers, and NGOs
    - Xerces Society
    - Save Homerus Alliance (organization for butterfly conservation in Jamaica's forests – Homerus Swallowtail & Cockpit Country Conservation Project)

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	**2***
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		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 Jamaican kite swallowtail is high. Five known sites have supported colonies of the Jamaican kite swallowtail. Two of the sites may be extirpated, the status of one site is uncertain, and two sites are viable with strong numbers in some years. Remaining colonies are on small, fragmented parcels that are vulnerable to extirpation. Despite the conservation measures in place, the species continues to face stressors (particularly habitat loss and destruction, Factor A) that are high in magnitude.

Imminence: Threats associated with habitat loss and destruction—primarily deforestation from timber extraction, sapling cutting, mining and brush fires, are currently affecting the species and are expected to continue in the future. Other stressors that could affect the smaller, fragmented colonies include illegal collection and trade and predation. Therefore, threats to Jamaican kite swallowtail are considered imminent.

Rationale for Change in Listing Priority Number:
NA

Is Emergency Listing Warranted?
No; There is currently no emergency posing a significant risk to the conservation of the Jamaican kite 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 statis 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 (Jamaica).

COORDINATION WITH STATES

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

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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