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Species Conservation Guidelines

South Florida

Schaus' Swallowtail Butterfly

The Species Conservation Guidelines for the Schaus' swallowtail butterfly (*Heraclides* (= *Papilio*) *aristodemus ponceanus*) provides a tool to assist the user in determining if their project may adversely affect the Schaus' swallowtail. Here we describe actions which might have a detrimental impact on the Schaus' swallowtail and how these effects can be avoided or minimized.

Life History

The U.S. Fish and Wildlife Service (Service) listed the Schaus' swallowtail as endangered in 1984 due to dramatic declines in numbers and range reduction. Rutkowski (1971), Smith et al. (1994) and Service (1999) describe the life history of the Schaus' swallowtail in detail. Briefly, the Schaus' swallowtail, a species endemic to south Florida and the Florida Keys, normally maintains a single annual brood (or generation) that occurs primarily in late spring (Minno and Emmel 1993). Most sightings have been recorded between mid-April and mid-July although a second much smaller brood has occasionally been noted in August (Brown 1976, Minno and Emmel 1993, Smith et al. 1994). The annual emergence and flight season of the Schaus' swallowtail appears to be triggered by rainfall (Smith et al. 1994, Emmel and Daniels 2002). The adults are short lived and use torchwood (*Amyris elemifera*) and occasionally wild lime (*Zanthoxylum fagara*) as a food plant for their larval development (Minno and Emmel 1993, Smith et al. 1994). Schaus' swallowtails are diurnal insects remaining almost entirely within the tropical hardwood hammock habitat, although individuals are known to travel between islands (Emmel 1986a).

The Schaus' swallowtail is frequently confused across much of its remaining historical range with the giant swallowtail (*Papilio cresphontes*) (Minno and Emmel 1993, Glassberg et al. 2000). Giant swallowtails are slightly larger in size and darker in coloration than the Schaus' swallowtail. A common species throughout south Florida and the Keys, the giant swallowtail uses numerous citrus species as larval host plants, unlike the Schaus' swallowtail which use only two specific species. Furthermore the giant swallowtail produces many generations per year, thereby flying throughout the year; as opposed to the single-brooded Schaus' swallowtail that only fly from late spring through early summer.

Habitat

Tropical hardwood hammock suitable for the Schaus' swallowtail has been reduced by an

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estimated 57 percent in Biscayne National Park and 83 percent for Key Largo. The decline has been attributed primarily to habitat destruction. North Key Largo contains a large, relatively contiguous expanse of tropical hardwood hammock habitat, but habitat on Key Largo south of County Road 905 is highly fragmented and greatly reduced from historical levels, placing greater importance on the preservation of tracts of hardwood hammock habitat remaining on Key Largo. Where stable habitat remains for the species, namely within the northern keys, numerous other anthropogenic and natural causes play a part in reducing the butterflies numbers. Expanded use of mosquito control pesticides within the northern Keys starting in the early 1970's was meant to better suppress pest species but has had collateral effects on non-target arthropod species, including numerous Lepidoptera (Baggett 1982, Emmel 1986b, Emmel and Tucker 1991, Eliazar 1992, Hennessey and Habeck 1991, Hennessey et al. 1992, Salvato 2001). Chemical applications are now restricted in virtually all areas where remaining populations of Schaus' swallowtail occur (Salvato 2001).

Distribution

The present distribution of the Schaus' swallowtail butterfly is limited to tropical hardwood hammocks in portions of Miami-Dade and Monroe Counties. The largest remaining populations of the Schaus' swallowtail occur on southern Elliott Key in Biscayne National Park and associated smaller islands and south to Key Largo, particularly Crocodile Lake National Wildlife Refuge and Key Largo Hammock State Botanical Site (Minno and Emmel 1993, Glassberg et al. 2000). Although Schaus' swallowtail butterflies were sighted on Lignumvitae Key (1973) (Covell 1976), Big Pine Key (1966) (Service 1982) and Upper Matecumbe Key (1986), regular sightings of this species are uncommon south of Key Largo (Service 1999, Emmel and Daniels 2002). The last known mainland specimen was collected at Coconut Grove in May 1924 (FWS 1982, Emmel and Daniels 2002), however following re-introduction efforts in 1995-1997 the Schaus' swallowtail has been observed within the Deering Estate in southeastern Miami-Dade County (Emmel and Daniels 2002, M. Salvato personal observations, USFWS, Vero Beach, FL).

Determination

The Schaus' swallowtail SLOPES flowchart in Figure 2 can help you determine the impact of your project on the Schaus' swallowtail. Check the consultation area map in Figure 1. If your project does not fall within the consultation area or if no suitable habitat occurs within your project, then a no effect is anticipated on Schaus' swallowtails and Federal action can proceed. If, by chance, you encounter a Schaus' swallowtail on your site outside the consultation area then appropriate conservation measures should still be implemented (see below).

The Service considers suitable habitat for the Schaus' swallowtail to include tropical hardwood hammocks within the consultation area. If suitable habitat is present, the Service assumes the species is still supported and the project may affect the species. In the flowchart two options are available to assess needed measures for the Schaus' swallowtail. You can either assume the

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Schaus' swallowtail is present or use a survey to determine its presence.

A survey of the tropical hardwood hammock should be carried out during the adult butterflies single flight season of mid-April to mid-July. We recommend that a person experienced with butterfly biology and field identification perform the survey.

If the survey do not detect Schaus' swallowtails, then the project is not likely to adversely affect the butterfly. To receive concurrence with this determination from the Service, supporting data documenting the level of survey effort in the suitable habitat must be provided in a report. See Service (2004) for guidelines on how to prepare a report.

If the Schaus' swallowtail is reported present in surveys or assumed present then the project is likely to adversely affect the butterfly and additional measures are necessary to minimize adverse effects to Schaus' swallowtails. If adverse effects can not be minimized then formal consultation should be initiated.

Conservation Measures

The majority of known suitable habitat for the Schaus' swallowtail presently occurs in Federal, State, and County protected areas making encounters with this species rare. However, smaller unprotected parcels of tropical hardwood hammock do still exist. These remaining areas represent suitable habitat for the Schaus' swallowtail. Should your project area include tropical hardwood hammock the first measure recommended by the Service is to modify the project footprint to avoid direct impacts to Schaus' swallowtail habitat. The Service also recommends that the habitat be designated as an environmentally sensitive area and set aside by deed restriction, easement, or other protective covenant. If suitable habitat is set aside on your property then a habitat management plan is also recommended. If these recommendations are incorporated into the project design and documented in the habitat management plan the project is not likely to adversely affect the Schaus' swallowtail.

The Service strongly recommends that occupied habitat be avoided. If substantial occupied Schaus' swallowtail habitat is proposed to be modified then replacement of its function is needed through acquisition of other suitable habitats. The unoccupied habitat acquisition requires a restoration component, as well. The restoration component for tropical hardwood hammock is to maintain structure, function, and ecological processes of the habitat by preventing any further loss, fragmentation, or degradation of this community.

If the project area has been physically altered by urban development, chemical pesticide applications, exotic species invasion, or other anthropogenic actions resulting in marginally suitable habitat for the survival and propagation of the Schaus' swallowtail then habitat restoration is an appropriate conservation measure. If the project proposes on-site habitat enhancements and management actions that provide habitat quality improvements that balance

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small losses of marginally suitable habitat then the project is not likely to adversely affect the Schaus' swallowtail. The habitat enhancement should be outlined in a habitat management plan. This plan also needs a monitoring program to document the success of the enhancement actions.

Where suitable habitat for Schaus' swallowtail is present the following measures can help minimize impacts and encourage conservation.

Conservation of the Schaus' swallowtail butterfly can be compatible with residential development. The host plants used by the Schaus' swallowtail butterfly for development include torchwood (*Amyris elemifera*) and wild lime (*Zanthoxylum fagara*). If not present on the property both of these plants are easily obtained at local native nurseries. We encourage you to consider improving the habitat value of the remaining tropical hardwood hammock on the project site after development by incorporating both of these species and nectar source species, such as wild coffee (*Psychotria nervosa*) and pigeon-plum (*Coccoloba diversifolia*), in the final landscape design. Many species of butterflies in addition to the Schaus swallowtail butterfly are attracted to these host plants, creating a unique opportunity to observe endangered species in a residential setting.

Removal of exotic vegetation on the project site encourages repopulation by native vegetation that is important to this species and other endangered species, such as the Key Largo woodrat (*Neotoma floridana smalli*) and Key Largo cotton mouse (*Peromyscus gossypinus allapaticola*).

Restrict application of chemical pesticides within or provide a no-spray buffer around areas that have food plants of the Schaus' swallowtail. Insecticides used for mosquito, agricultural and residential pest control are toxic towards numerous butterfly species found in south Florida and the Keys, including the Schaus' swallowtail. The threat to the butterfly occurs first in the larval form, either from direct contact with the insecticide or ingestion of food plants containing chemical residues, and in the adult form, as the butterfly associates with the host plant and comes in contact with the insecticides. Furthermore applying chemical pesticides on your project area without proper buffer zones around the Schaus' swallowtails food plants could still result butterfly mortality in the form of pesticide drift from the treatment area. Although the period of larval development and adult flight for the Schaus' swallowtail only occurs from mid-April to mid-July chemical pesticide applications should be restricted and buffer zones enforced in suitable butterfly habitat throughout the year. The next years' generation of butterflies lays dormant in the pupal form from mid-July until the following spring. As with the larval and adult forms, exposure of this stage in the butterfly's life cycle to insecticides could be fatal. We recommend a buffer area from chemical pesticide applications of 500 m (1,640 ft) around suitable Schaus' swallowtail habitat.

Schaus' swallowtails have specific flight paths that cross roads. You can reduce vehicular mortality by posting caution signs at known crossing locations during flight season. This measure is especially useful on northern Key Largo where the adult flight patterns may take them across roads within and between Crocodile Lake National Wildlife Refuge and Key Largo

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Hammock State Botanical Site, and southeastern Key Largo near and within John Pennekamp State Park. The Ocean Reef Club, a community on northern Key Largo, seems an unlikely area to be visited by an endangered butterfly; however, this residential area lies directly between butterfly populations on central Key Largo and the species' stronghold populations in Key Biscayne National Park, and thus travel of the Schaus' swallowtail through this area is possible.

Other measures that can minimize impacts to the Schaus' swallowtail include fire prevention. Wildlife fires can destroy tropical hardwood hammock habitat thereby reducing suitable habitat for the butterfly. If fire use is required then development of an effective fire management plan is recommended. Prevent direct clearing and disturbance of tropical hardwood hammock habitat and direct new construction activities to areas already cleared or previously disturbed. Restrict and monitor access to Schaus' swallowtail habitat. The majority of present Schaus' swallowtail populations occur on lands where entry is restricted without permission. Such actions prevent damage to the butterfly and suitable habitat.

The incorporation of minimization measures into the project design and provided to the Service in a habitat management plan will expedite the consultation process.

Habitat Management Plan

A Habitat Management Plan is necessary when a project may affect the Schaus' swallowtail. In general, the plan includes a project introduction, proposed action, project habitat descriptions, species effects, recommendations to minimize species effects, and conclusions and commitments. The plan should also include the survey protocol, survey data sheets, Schaus' swallowtail observations, and any land preservation covenants. If habitat enhancements are proposed, the management plan needs to include a habitat monitoring component. See Service (2004) for a discussion of report requirements and level of detail needed in the report.

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GIS Layers

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Appendices

None

Followup

Please note that the correct genus name for this animal is *Papilio*, not *Heraclides* as incorrectly stated in the MSRP. *Heraclides* has been used by select authors who have been pushing for over two decades to break *Papilio* swallowtails into separate genus types. Perhaps one day this new genus name will be widely accepted. However, in the here and now this renaming has not been formally accepted, nor are there plans to formally accept this or other genus names for *Papilio* swallowtails. The genus name of the Schaus' swallowtail will need to be corrected in the next edition of the MSRP.