United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

March 16, 2006

Memorandum

To: Gloria Bell, Chief of Endangered Species, Southeast Region
Attention: Victoria Davis

From: for James J. Slack, Field Supervisor, South Florida Ecological Services Office

Subject: Biological Opinion addressing effects of issuing a recovery permit (TE092891-0) to McGuire Center, University of Florida, for research on the Schaus swallowtail butterfly

This document transmits the Fish and Wildlife Service's (Service) biological opinion based on our review of the proposed issuance of a section 10(a)(1)(A) recovery permit to the McGuire Center, University of Florida, for research on the endangered Schaus swallowtail butterfly (*Papilio aristodemus ponceanus*), in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). All proposed activities covered by the research permit will be conducted in Monroe and Miami-Dade Counties, Florida. We concur with your determination that the proposed action is likely to adversely affect the Schaus swallowtail butterfly.

This biological opinion is based on information provided in research reports, the complete permit application and subsequent correspondence, telephone conversations, field investigations, and other sources of information. A complete administrative record of this consultation is on file in this office.

CONSULTATION HISTORY

The Southeast Regional Office (Region) received a recovery permit application from the McGuire Center, University of Florida, dated July 21, 2004, with Dr. Thomas Emmel listed as Principal Officer. Permit number TE092891-0 was assigned to the proposed research.

On August 30, 2004, the South Florida Ecological Services Office (SFESO) received a request from the Regional Office Recovery Permit Biologist for formal consultation on the permit application.

On February 3, 2005, the SFESO requested (via e-mail) additional information from the applicant in order to complete the following biological opinion.

On August 18, 2005, the SFESO sent a second request (via e-mail) to the applicant for the information initially requested on February 3, 2005.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

Proposed Action

The purpose of the proposed research is to provide information on the current population trends and geographic distribution of the Schaus swallowtail butterfly in south Florida. Researchers will monitor individual Schaus swallowtail butterfly populations on Key Largo and Biscayne National Park (both within Monroe County) using capture-mark-release-recapture methods to understand population trends, adult longevity, adult movement, sex ratio, and current geographic distribution. Additionally, researchers will actively monitor tropical hardwood habitat in southeastern Miami (namely the Deering Estate) and as far south as Lower Matecumbe Key, areas which historically maintained populations of the Schaus swallowtail butterfly.

Status monitoring of Schaus swallowtail butterfly population numbers and distribution will be carried out at all known colony sites in the Florida Keys (Biscayne National Park, Key Largo) as well as recent former colony locations such as the Deering Estate on mainland Florida. Adult butterflies will be gently netted with an aerial insect net and marked with a permanent ink marker (Sharpie) on the ventral surface of the left forewing. The forewing length, sex, and wing wear (indicator of adult age) will be recorded. All individuals will subsequently be released in the same location where they were captured. No individuals will be killed or collected. Population abundance calculations for the mark-recapture data will be performed using the Schnabel and Lincoln-Peterson indices.

The proposed research represents an extension of the previous annual survey and ecological work conducted by the University of Florida research team from 1984 to the present. The project will continue to generate data on population abundance trends, geographic distribution, and demographic parameters that can be used to enhance existing conservation and recovery efforts, and provide information needed for potential reclassification determination. The resulting information will be incorporated along with existing data to generate overall population and geographic distribution trends from 1984 to present.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The Service has determined the action area for this project is throughout the range of the Schaus swallowtail butterfly, which is limited to tropical hardwood hammocks in portions of southeastern Miami-Dade and northwestern Monroe Counties (upper and middle Florida Keys).

STATUS OF THE SPECIES AND CRITICAL HABITAT RANGEWIDE

Much of the following discussion is summarized from the *South Florida Multi-Species Recovery Plan* (MSRP) (Service 1999).

Species/Critical Habitat Description

The Schaus swallowtail butterfly is a large blackish-brown swallowtail butterfly with contrasting markings that are mostly dull yellow (Klots 1951, Pyle 1981, Opler and Krizek 1984). Wingspan is 8.6 to 9.5 centimeters (3.4 to 3.7 inches) (Klots 1951, Pyle 1981). The species was listed as threatened on April 28, 1976, because of population declines caused by the destruction of its tropical hardwood hammock habitat, mosquito control practices, and over-harvesting by collectors (41 FR 17740). It was reclassified as an endangered species on August 31, 1984, because its numbers and range had declined dramatically since the original listing (49 FR 34504). No critical habitat has been designated for this species.

The Schaus swallowtail butterfly is endemic to south Florida and the Florida Keys. Historically, it occurred in hardwood hammocks from south Miami to Lower Matecumbe Key, Florida. As a result of urban development and pesticide spraying, only about 12 isolated colonies of this butterfly remain. The stronghold of the population resides on several islands in Biscayne National Park and north Key Largo, in areas protected from development.

Life History

Habitat suitable for Schaus swallowtail butterfly occurs at relatively high elevation of 3.0 to 4.6 meters (9.8 to 15 feet) above sea level, away from tidal waters, and has a mature overstory of trees such as gumbo-limbo (*Bursera simaruba*), pigeon plum (*Coccoloba diversifolia*), black ironwood (*Krugiodendron ferreum*), West Indian mahogany (*Swietenia mahagoni*), and wild tamarind (*Lysiloma latisiliquum*) (Covell 1976). These plants grow on a substrate of Key Largo limestone, which characterizes the Upper Keys.

The Schaus swallowtail butterfly normally produces 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). Eggs are laid on torchwood (*Amyris elemifera*) and wild lime (*Zanthoxylum fagara*), and take 3 to 5 days to hatch (Grimshawe 1940, Rutkowski 1971, Brown 1973, Loftus and Kushlan 1984). Torchwood is the primary food source for caterpillars (Minno and Emmel 1993, Smith et al. 1994). Pupal mortality rates are high and most likely result from bird predation (Emmel 1995b). The Schaus swallowtail may remain in the chrysalis stage for 1 or 2 years (Grimshawe 1940).

The annual emergence and flight season of the Schaus swallowtail butterfly appears to be triggered by rainfall (Smith et al. 1994, Emmel and Daniels 2002). Adults are diurnal and short lived, with survival rates in the wild averaging 3.3 days for males and 3.6 days for females (Emmel 1988, 1995b). They remain almost entirely within the tropical hardwood hammock

habitat, although individuals are known to travel between islands (Brown 1973, Emmel 1986a). The males prefer trails and hammock edges while the females more often fly within the hammock, occasionally venturing out to feed on flowers but typically staying within the hammocks proper (Rutkowski 1971). Nectaring activity usually occurs on blossoms of cheese shrub (*Morinda royoc*), blue porterweed (*Stachytarpheta jamaicensis*), sea grape (*Coccoloba uvifera*), wild sage (*Lantana involucrata*), wild coffee (*Psychotria nervosa*), or guava (*Psidium guajava*) along the margins of these hammocks. However, up to 30 different wild plant species may be exploited (Emmel 1988, 1995a). This species rarely feeds in areas open to direct sunlight (Service 1982, Rutkowski 1971).

Little is known about predation by spiders, lizards, birds, or other predators. Damage to wings occurs soon after adult emergence, and beak marks on some individuals indicate frequent bird attacks (Emmel 1985). Flight behavior among the many obstacles in hammock habitat seems unusually deliberate, in that the butterflies can fly slowly and painstakingly to avoid the many large orb spider webs and branches to a remarkable degree (Emmel 1985). Ants and lizards are the most likely predators of the immatures (M. Minno, personal communication 1998, cited in Service 1999). Larval predation is probably minimized by oviposition behavior (one egg per leaf and few per food plant), lizard-dropping appearance of the larvae (as in other *Papilio* larvae), secretive behavior of larvae, and bad-smelling scents from the osmeteria when larvae are disturbed (Grimshawe 1940, Rutkowski 1971). Crypsis in the pupa (Grimshawe 1940) as in other swallowtails is also a factor in avoiding predation. Nothing is known about parasites of this species. No information is available regarding diseases of the Schaus swallowtail butterfly; however, high egg mortality has been observed at times (Rutkowski 1971, Service 1982).

Population Dynamics

Although population numbers of the Schaus swallowtail butterfly fluctuate year to year, there was a general decline in range and numbers between 1924 and 1981. The Schaus swallowtail butterfly has been considered rare on north Key Largo since the mid-1970s.

Suitable habitat remaining for this species is estimated as 43 percent in Biscayne NP and 17 percent for north Key Largo. The decline has been attributed primarily to habitat destruction. North Key Largo contains one of the last remaining protected areas of tropical hardwood hammock habitat. The majority of the Schaus swallowtail butterfly population is found on Adams, Elliott, Old Rhodes, Swan, and Totten Keys within Biscayne National Park.

Monitoring was initiated in 1984, when only 70 adults were detected range-wide. Within the historical period of monitoring, the range-wide high point occurred in 1996-1997, when the population was estimated to be 1,200 to 1,400. However, these estimates apparently included reintroduced individuals, including colonies that are no longer extant.

Between 1985 and 1990, the Elliott Key population fluctuated between 600 to 1,000 adults annually, with smaller populations of at least 50 to 100 individuals on each of the other Keys. Although Hurricane Andrew temporarily reduced the Biscayne National Park population in 1992 to 58 identified individuals, the population rebounded to over 600 in 1994 and was presumed stable (Emmel 1995a).

The most recently completed study of the Schaus swallowtail butterfly provided population estimates for Elliot Key in Key Biscayne National Park for 1999 through 2003 (Emmel and Daniels 2004). Elliot Key contains the largest Schaus population. Abundance (mark-recapture) estimates for 1999 through 2003 were 212, 253, 115, 264, and 255, respectively. The range-wide population in 2003 was estimated to be approximately 360 to 400 adults, including the 255 on Elliot Key. Based on the most recent survey, the 2004 point estimate for the Elliott Key population was approximately 300 to 350 individuals (Emmel and Daniels 2004).

Status and 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 in 1973 (Covell 1976), Big Pine Key in 1966 (Service 1982), and Upper Matecumbe Key in 1986 (Emmel 1986a), regular sightings of this species are uncommon south of Key Largo (Emmel and Daniels 2002). The last known mainland specimen was collected at Coconut Grove in May 1924 (Service 1982, Emmel and Daniels 2002), however following re-introduction efforts in 1995 and 1997 the Schaus swallowtail has been observed within the Deering Estate in southeastern Miami-Dade County (Emmel and Daniels 2002; M. Salvato, Service, personal observations, 2004).

During May and June 2004 the Schaus swallowtail was observed not only on Elliott Key, but at several locations on northern Key Largo (Salvato, Service, personal observations, 2004). Although, abundant in 2004, numbers of the Schaus swallowtail were considerably lower during the normal flight season of May and June in 2005, likely the result inadequate spring rains needed to encourage emergence of the species (Salvato, Service, personal observations, 2005). Salvato (2005, unpublished data) only observed the Schaus swallowtail on Adams Key during the flight season of 2005, despite extensive searching throughout its range.

Captive propagation efforts for the Schaus swallowtail butterfly began in May 1992, and the first pupae were released at several sites in the Deering Estate and the northern keys during the butterfly's flight seasons in 1995-1997. These captive releases have not resulted in a sustained increase in numbers of the Schaus swallowtail at the release sites.

ENVIRONMENTAL BASELINE

Status of the Species/Critical Habitat Within the Action Area

The entire range of the Schaus swallowtail butterfly is included within the action area. All information presented in the preceding Status of the Species and Critical Habitat Range-wide section is relevant here. No critical habitat has been designated for this species.

Factors Affecting Species Habitat Within the Action Area

The principal threats to Schaus swallowtail butterfly survival and recovery are, in descending order: loss of habitat for residential and commercial construction; introduction of pesticides and other hazardous chemicals; road kills; extreme climatic conditions, such as hurricanes, freezes, and droughts; and death by predators, parasites, and collectors.

Dense, mature, subtropical hardwood hammock habitat on well-drained substrate with dappled sunlight penetration is essential for the continued survival of both the Schaus swallowtail butterfly and its primary food plant, torchwood (Emmel 1985, Service 1982, Covell 1976, Rutkowski 1971, Brown 1973, Loftus and Kushlan 1984). Suitable tropical hardwood hammock has been reduced by an estimated 57 percent in Biscayne National Park and 83 percent in Key Largo. 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.

Clearing of habitat for urban and agricultural purposes in southern Miami-Dade County southward to Lower Matecumbe Key (in the central Florida Keys) certainly were instrumental in eliminating the Schaus swallowtail butterfly at the extremes of its historic range. Food plants were either eliminated or reduced to small stands incapable of sustaining Schaus swallowtail butterfly populations (Service 1982). Similar clearing has occurred within its known north Key Largo habitat, but litigation has slowed development of the area (Covell 1976) and many areas have been acquired by Florida Department of Environmental Protection. Slight alteration of habitat, such as dirt roads and trails through the hammocks, seem to be harmful only in that they permit easy access to collectors, who can catch butterflies when they fly low along these trails. However, small clearings and trail edges seem to promote proliferation of torchwood plants. Natural succession in such places, particularly following hurricanes and fires, could account for population increases in the species and its food plants. But large fires and extensive forest clearing are detrimental to the species. Paved roads through Schaus swallowtail butterfly habitat, particularly C.R. 905 on northern Key Largo, permit road kill of adults, one case of which is documented (Covell 1976).

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 1970s 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, Hennessey et al, 1992). Mortality of Schaus swallowtail butterfly occurs from the use of these chemicals directly, and indirectly, by application to food sources and other components of the habitat. Pesticides can also cause behavioral modification and impaired reproduction and it is very likely the extensive use of mosquito control pesticides has greatly reduced butterfly populations. Chemical applications are now restricted in virtually all areas where remaining populations of Schaus swallowtail occur (Hennessey et al. 1992, Eliazar 1992, Salvato 2001).

Collecting of immature stages as well as adults may have reduced numbers on Key Largo in the period from 1969 to 1974 and earlier; but the lasting effects cannot be gauged (Covell 1976). Collection of specimens has been illegal since the early 1970s and today, there is no known poaching activity.

Prior to human influences, populations of this butterfly were probably subject to naturally occurring population depressions caused by hurricane damage, drought, and rare freezes (Covell 1976).

EFFECTS OF THE ACTION

This section includes an analysis of the direct and indirect effects of the proposed action on the species and/or critical habitat and its interrelated and interdependent activities. All activities authorized by the Service under section 10(a)(1)(A) of the Act must meet permit issuance criteria at 50 CFR 17.22 and 17.32. All activities considered must be justified in relation to enhancement of survival and recovery, effects to the wildlife species, peer review, and qualifications of permittees. By definition, authorized activities should benefit species recovery with minimal adverse effects by qualified permittees.

Researchers have used the same capture-mark-release-recapture methods as those in the proposed action since annual surveys began in 1984 to determine population numbers, present distribution, phenology, adult movement, aging sex ratio, evidence of predator attack, and other aspects of the biology of the Schaus swallowtail butterfly and its sympatric congeners, the giant swallowtail (*Papilio cresphontes*) and Bahaman swallowtail (*Papilio andraemon bonhotei*). The successful implementation of this survey methodology has resulted in the majority of all current information available on the biology, population trends, and distribution of the species over the last 2 decades.

Potential adverse effects from the proposed research include harassment, injury, and death. During the capture, marking, and handling of the Schaus swallowtail butterfly, individuals may be temporarily and permanently harmed through physical injury, behavioral modification, physiological stress, capture myopathy, and death. However, this type of research has been on-going since 1984, and all work will be carried out by trained researchers experienced in collection methods, net usage, and organism marking and handling techniques. Dr. Emmel and Peter Eliazar have studied the biology and ecology of the Schaus swallowtail butterfly from 1984 to the present. They have participated directly in all components of the field and laboratory studies regarding this species. Dr. Jaret Daniels and Dr. Andrei Sourakov have participated in annual status surveys, researched aspects of the biology and ecology, and supervised the captive propagation and reintroduction of the species over the past 14 years (1991 to 2004). The remaining research personnel have a combined 15 years of experience working with the Schaus swallowtail butterfly. In total, the University of Florida research team has more experience with the Schaus swallowtail butterfly than any other group of scientists in the world. Dr. Emmel estimates less than 1 percent of individuals would be injured or accidentally killed by the monitoring methods. Therefore, few adverse impacts are anticipated to occur.

The expected benefit of the proposed research is the collection and analysis of data on current population trends that will ultimately aid in the recovery of the Schaus swallowtail butterfly.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

State, local, and private actions not associated with the proposed actions, such as development and agriculture, are likely to continue throughout the action area covered by the proposed permit. These actions are likely to result in varying degrees of adverse effects to the Schaus swallowtail butterfly. Therefore, cumulative effects may occur. Considering the scientific and conservation goals of the applicant, these activities in the project area in the foreseeable future are not expected to be extensive enough to jeopardize their continued existence of the Schaus swallowtail butterfly.

SUMMARY OF EFFECTS

Although short-term, minimal adverse effects may occur to the Schaus swallowtail butterfly, this research will lead to an increased understanding of the natural history of this endangered species. The net effect of the research is beneficial.

CONCLUSION

After reviewing the status of the Schaus swallowtail butterfly, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the issuance of a recovery permit, as proposed, is not likely to jeopardize the continued existence of the species. No critical habitat has been designated for this species; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Sections 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as

part of the agency action is not considered to be prohibited taking under the Act provided such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are nondiscretionary, and must be undertaken by the Service so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in action 7(o)(2) to apply. The Service has a continuing duty to regulate the activity covered by this incidental take statement. If the Service (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Service and researchers must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement.

AMOUNT OR EXTENT OF TAKE

The Service anticipates incidental take of the Schaus swallowtail butterfly will be difficult to detect due to the secretive nature of the species and the difficulty of separating natural mortality from that related to the research. None of the proposed activities are expected to routinely result in death or injury to any individuals. Capture, handling and marking associated with research and monitoring may result in the injury or death of up to one Schaus swallowtail butterflies per year. Incidental take is expected to be in the form of harassment and kill.

EFFECT OF THE TAKE

In summary, the proposed action will result in unintentional injury and mortality to the Schaus swallowtail butterfly during capture, handling and marking. Capture, handling and marking associated with research and monitoring may result in the injury or death of up to one Schaus swallowtail butterflies per year. In the accompanying biological opinion, the Service determined this level of anticipated take is not likely to result in jeopardy to the species.

REASONABLE AND PRUDENT MEASURES

The Service is not aware of any further actions that can be taken to minimize incidental take. However, to monitor the effect and extent of take, the applicant must provide a written report on the results of the research activities.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Service must comply, or ensure that the applicant complies, with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

1. The reporting and monitoring requirements outlined in the section 10(a)(1)(A) permit will also satisfy the reporting/monitoring requirements required pursuant to section 7 of the Act and its implementing regulations.

2. An annual report summarizing the authorized activities must be submitted to this office by December 31 of each year for which the permit is valid. A report must be submitted whether or not activities were conducted during the reporting period. Negative data should also be reported. Each report should include, at a minimum, the following information:

    - Locations of where each activity took place, identified using figures and maps, and by referencing a common coordinate system (*e.g.*, latitude, longitude, Universal Transverse Mercator System);
    - Survey methods, including a description of area sampled, noting biotic and abiotic features that might influence results;
    - The numbers and condition of all marked Schaus swallowtail butterflies, their disposition, and GPS location of each localized population;
    - Results of all surveys, monitoring, and other research, with discussions and interpretations of the data in context of recovery of the species; and
    - Copies of all published papers and reports that result from activities authorized under the permit.

3. If any injury or mortality should occur to the Schaus swallowtail butterfly as a result of authorized activities, all authorized activities must stop, and the permittee shall contact the Field Supervisor of this office by the next work day. The permitte shall also contact the Regional Permit Biologist. Based upon discussions between these offices, a decision will be made as to whether or not the authorized activities will be allowed to continue. A decision will also be made regarding the disposition of any injured or killed species. Permitted activities that appear to be resulting in excessive injury or death will be immediately suspended until more protective measures or an alternative resolution can be initiated.

4. Upon locating a dead, injured, or sick Schaus swallowtail butterfly under circumstances not addressed in the permit, or any other threatened or endangered species, initial notification must be made immediately to the nearest Service Law Enforcement Office (9549 Koger Boulevard, Suite 111, St. Petersburg, Florida 33702; 727-570-5398). Secondary notification should be made to the FWC, South Region, 3900 Drane Field Road, Lakeland, Florida 33811-1299; 1-800-282-8002. Care should be taken in handling sick or injured specimens to ensure effective treatment and care or in the handling of dead specimens to preserve biological material in the best possible state for later analysis as to the cause of death. In conjunction with the care of sick or injured specimens or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure evidence intrinsic to the specimen is not unnecessarily disturbed.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to further minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service should continue to implement the MSRP (Service 1999).

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects, or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the proposed action. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions, please contact Mark Salvato at 772-562-3909, extension 340.

cc:
Service, Big Pine Key, Florida (Phillip Hughes)

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