United States Department of the Interior

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

May 16, 2007

Memorandum

To: Jeffrey Weller, Chief of Planning and Permitting, Southeast Regional Office
Attention: Permit Coordinator

From: Paul Souza, Field Supervisor, South Florida Ecological Services Office

Subject: Biological opinion addressing effects of amending a recovery permit (TE075916-1) issued to Dr. Julie Lockwood for research on the Cape Sable seaside sparrow

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 conduct research on the endangered Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*) in south Florida, in accordance with section 7 of the Endangered Species Act of 1973, as amended (ESA) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). All proposed activities covered by the research permit will be conducted within Everglades National Park (ENP) and Big Cypress National Preserve (BCNP) in Monroe and Miami-Dade Counties, Florida.

This biological opinion is based on published literature, research reports, the permit application and subsequent correspondence, telephone conversations, field investigations, and other sources of information. A complete administrative record of this consultation is on file at the South Florida Ecological Services Office (SFEFO) in Vero Beach, Florida.

In addition to herself, Michelle Davis, David LaPuma, Stephen Karl, Dr. Lockwood has requested that Rebecca Boulton also be allowed to work under her permit. A curriculum vita for Dr. Boulton is on file in our office.

Consultation History

On June 3, 2003, Dr. Lockwood of Rutgers University submitted a recovery permit application to the Service's Southeast Regional Office (RO). Permit number TE 075916-0 was assigned for the proposed project.

On August 27, 2003, the SFESO received a request from the RO for formal consultation on the recovery permit mentioned above.

On February 5, 2005, permit TE 075916-0 was issued.

On November 21, 2006, the SFESO received a request from the RO for formal consultation on the renewal of TE 075916-0.

On November 21, 2006, the SFESO concurred with the RO determination that renewal of TE 075916-0 was not likely to adversely affect the Cape Sable seaside sparrow or its critical habitat.

On January 25, 2007, Dr. Lockwood submitted a recovery permit application to the Service's Southeast RO to amend permit number TE 075916-1. Permit number TE 075916-2 was assigned for the proposed project.

On February 2, 2007, the SFESO received a request from the RO for formal consultation on the recovery permit mentioned above.

On February 6, 2007, the SFESO contacted the RO via email to concur that the proposed action was likely to adversely affect the listed species and initiated formal consultation.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

Pursuant to section 10(a)(1)(A) of the ESA, the Service proposes to amend a recovery permit to the applicant, Dr. Lockwood, for take of Cape Sable seaside sparrow while doing research on the sparrow's demography. In addition to the activities currently authorized under TE 075916-1, Dr. Lockwood has requested her permit be amended to include the following research objectives; employing predator-proof barriers, nest cameras, and temperature loggers, each are described below. Dr. Lockwood and her staff have over 10 years of experience working with the Cape seaside sparrow performing the research outlined in her current permit.

There are only six known subpopulations of the Cape Sable seaside sparrow (Pimm et al. 2002). Although research will extend in all six subpopulations, most of the proposed action will take place in sparrow subpopulations E, and B, the latter of which is the largest subpopulation.

Nest cameras - Cameras will be placed at nests early in incubation to obtain information from all nesting stages. The researchers will not deploy cameras on nests during the laying period to minimize nest abandonment. These studies will employ Sentinel "micro-cam" (Sandpiper Technologies, Manteca, California) cameras which are made specifically for monitoring grassland birds. The camera has infrared LED lights which are undetectable by the birds or predators, but allow for night vision recording. The camera itself is small (6 x 4 x 5 cm) and is connected to a time-lapse VCR recorder and marine-cell battery via a 20 m cable. Thus, the bulk of the hardware for the camera can be placed well away from the nest itself. The camera will be placed 1 m from the nest during the late morning and camouflaged by grasses pulled from areas that do not have nesting sparrows. Vegetation around the nest site will not be modified. The VHS tape will need to be changed every 40 hours, and the battery every 24 hours. Once a nest camera has been placed near a nest (deployment time approximately 10 minutes) researchers will monitor the nests with binoculars for at least 1 hour after the camera is positioned to ensure

adults are attending the nests normally. If the parental birds are obviously upset (*i.e.* alarm calling, adults will not approach the nest) after 1 hour the camera will immediately be removed and researchers will leave the area. Tolerance for disturbance at nest sites may vary considerably among species (Thompson et al. 1999). Although it is possible that some sparrows may be susceptible to nest abandonment due to nest camera placement, these activities will coincide with ongoing nest monitoring procedures making additional disturbance from this protocol negligible.
The researchers will minimize stress on adults by deploying nest cameras during late morning and only during fine weather conditions (Pietz and Granfors 2000).

The researchers intend to use nest cameras during the breeding seasons of 2007 and 2008, using them throughout the whole sparrow breeding period March to July. All video footage from failed nesting attempts will be viewed to identify the cause of nest failure. However, it is not anticipated that a large enough sample size for analysis will be collected from using only one nest camera. Therefore only raw data will be collected on the identification of sparrow nest predators.
Predator-proof barriers - Wire and galvanized sheet metal fences will be placed to surround an active sparrow nest, protecting the nest from small-ground and avian nest predators (Figure 1). Barrier deployment time will be approximately 10 to 15 minutes. Following barrier placement the researchers will monitor the nests with binoculars for at least 1 hour to ensure adults are attending the nests normally. If after an hour parental birds are still obviously upset (*i.e.* alarm calling, adults will not approach the nest) the barrier will immediately be removed and the researchers will leave the area. It is possible that some sparrows may be susceptible to abandonment. However, in the closely related Seaside Sparrow (*Ammodramus maritimus*) all females (n = 51) accepted the barrier provided that the barrier circumferences were greater than 4.5 m (Post and Greenlaw 1989). Therefore this procedure should not be discarded after one nest abandonment. However, the researchers must modify their protocol (*i.e.* increase barrier circumference, height) quickly in response to sparrow behavior, or based on predator behavior, towards the barriers.

During the initial barrier trials the researchers will place a video camera near the protected nests to monitor adult and predator behavior. Cameras will also be used to monitor nests without barriers on adjacent territories to provide further documentation on which species are important nest predators of sparrows. Monitoring nests on other territories within the site but unenclosed will allow researchers to statistically test the effectiveness of the barriers at increasing nest survival. The same number of control and protected nests will be monitored. Researchers will attempt to protect five nests at all times in subpopulation B throughout each breeding season to provide a sample size of between 10 and 20 protected nests per year. Between 10 and 20 control nests will also be monitored in details within these same study sites.

The researchers intend to use the barriers during the breeding seasons of 2007 and 2008, using them throughout the whole sparrow breeding period March to July. In order to evaluate the effectiveness of using predator-proof barriers, a balanced study design will be used (same number of protected and unprotected nests), barriers will be randomly allocated to nests and appropriate nest survival analyses will be preformed (*e.g.* Mayfield 1961, Mayfield 1975, White

and Burnham 1999, Dinsmore et al. 2002, Rotella et al. 2004). Computer modeling will be used to evaluate daily nest survival rates between nests with and without predator-proof barriers and cameras. This modeling method will incorporate a range of biologically relevant variables (nest age, site, year, and water-flow) to evaluate nest survival.

Temperature loggers - Thermochrom iButtons (DS1921G and DS1922L) (iButtons) (Figure 2) will be employed to monitor temperatures in the nest. iButtons are small (16 x 6 mm, weight 3.3 g), rugged self-contained temperature data loggers that measure temperatures at 0.5°C increments from -30°C to + 70°C. iButtons will be placed in sparrow nests opportunistically as nests are discovered, therefore iButton instillation will vary depending on the stage of each nest when discovered. This may vary from the laying period, early or late incubation, or during the nestling period. These earlier nesting periods will provide valuable information about laying and incubation behavior. Up to 40 nests will receive iButtons, these nests, as well as those recording activity during the nestling period, will provide information about when the nest fails. The temperature information stored within the iButton will allow researchers to check the sparrow nests less frequently and will help accurately determine the time of nest failure. In addition, iButtons will also record valuable information on incubation and predator behavior.

Although no adverse reactions towards the iButtons are anticipated, researchers will monitor the nests with binoculars for at least 1 hour (or until the female returns and incubates normally) after the iButton is positioned to ensure adults are attending the nests normally. This procedure will be employed for the first 10 iButtons placed in sparrow nests during this project. If after an hour parental birds are still obviously upset (*i.e*. alarm calling, adults will not approach the nest) the iButton will immediately be removed and the researchers will leave the area.

The researchers intend to use iButtons during the 2007 and 2008 breeding seasons of March to July. To test for the possible effects of iButtons on sparrow nest survival MARK will be used to evaluate daily nest survival rates between nests with and without iButtons. If no difference is identified then this will indicate that estimates using traditional methods (nest checking every 3 to 4 days) and iButtons are similar and therefore that the use of iButtons would be an extremely effective way of reducing the frequency of nest checks in the future.

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 that the action area for this project is ENP and BCNP in Monroe and Miami-Dade Counties, Florida.

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). Other sources are referenced.

Species/critical habitat description

The Cape Sable seaside sparrow is a medium-sized sparrow, 13 to 14 cm in length (Werner 1975). Of all the seaside sparrows, it is the lightest in color (Curnutt 1996). The dorsal surface is dark olive-grey and the tail and wings are olive-brown (Werner 1975). Adult sparrows are light grey to white ventrally, with dark olive grey streaks on the breast and sides. The throat is white with a dark olive-grey or black whisker on each side. Above the whisker is a white line along the lower jaw. A grey ear patch outlined by a dark line sits behind each eye. The lores of the head are yellow. The leading edge of each wing has a small yellow patch near the alula. The legs and bill are grey (Curnutt 1996). There are no noticeable differences in markings between the sexes. However, there are significant differences in the sizes of specific body parts between the sexes (Werner 1975). Young sparrows differ from adults in that they do not have whisker marks, lack the yellow lores, and have brown streaking on the back.

In the 1930s, Cape Sable was the only known breeding range for the sparrow (Nicholson 1928). Areas on Cape Sable that were occupied by Cape Sable seaside sparrows in the 1930s have experienced a shift in vegetative communities from freshwater vegetation to mangroves, bare mud flats, and salt-tolerant plants such as *Batis maritima* and *Borrichia frutescens* (Kushlan and Bass 1983). The hurricane of 1935 is believed to have initiated the succession of the plant community on Cape Sable from one dominated by freshwater plants to one dominated by salt tolerant plants. Sea level rise, reduced freshwater flows to the area resulting from upstream water management practices, and another hurricane in 1960 were also likely factors in this habitat change. As a result, Cape Sable seaside sparrows no longer use this area.

The currently preferred nesting habitat of Cape Sable seaside sparrows appears to be a mixed marl prairie community that often includes muhly grass (*Muhlenbergia filipes*) (Stevenson and Anderson 1994). These short-hydroperiod, mixed marl prairies contain moderately dense, clumped grasses, with open space permitting ground movements by the sparrow. Sparrows tend to avoid tall, dense, sawgrass-dominated communities, spike rush (*Eleocharis*) marshes, extensive cattail (*Typha*) monocultures, long-hydroperiod wetlands with tall, dense vegetative cover, and sites supporting woody vegetation (Werner 1975, Bass and Kushlan 1982). Cape Sable seaside sparrows avoid sites with permanent water cover (Curnutt and Pimm 1993).

The suitability of short-hydroperiod, mixed marl prairie communities for the sparrow is driven by a combination of hydroperiod and periodic fires (Kushlan and Bass 1983). Fires prevent hardwood species from invading these communities and prevent the accretion of dead plant material, both of which decrease the suitability of these habitats for Cape Sable seaside sparrows. In the Taylor Slough area, Werner (1975) found that sparrow numbers increased annually in areas that had been burned up to 3 years previously. Taylor (1983) suggested that the response of sparrow population following fire is dependent on the rate of vegetation recovery, the soil depth, and the amount of exposed pinnacle rock. Taylor (1983) found that on sites where soil depth was 40 cm or greater, or on soils without pinnacle rock, vegetation recovery is rapid, and the sparrows recovered more quickly following fire. At sites where soil depths are less than 20 cm and where considerable pinnacle rock occurs, the sparrows begin to reoccupy sites 4 years post fire (Taylor 1983). However, a recent study suggests that a 4 year fire return frequency reduces habitat suitability and causes decline in resident sparrow populations (Curnutt et al. 1998). Increased sparrow numbers were observed in this study up to at least 10 years post fire.

The Cape Sable seaside sparrow was listed as an endangered species on March 11, 1967, pursuant to the Endangered Species Preservation Act of 1966 (32 FR 4001). That protection was continued under the Endangered Species Conservation Act of 1969 and the ESA, as amended. The Cape Sable seaside sparrow was listed because of its limited distribution and threats to its habitat posed by large-scale conversion of land in southern Florida to agricultural uses. Critical habitat for the Cape Sable seaside sparrow was designated on August 11, 1977 (50 CFR § 17.95) (42 FR 40685). Currently, the critical habitat includes areas of land, water, and airspace in the Taylor Slough vicinity of Collier, Dade, and Monroe Counties. Much of this area is within the boundaries of ENP.

Life History

Nesting has been observed from late February through early August (Service 1983). The majority of nesting occurs in the spring when large areas of the marl prairies are dry. Sparrows build new nests for each successive brood. The average height of the nests (*i.e*., from soil surface to bottom of the nest structure) increases after the onset of summer rains in early June (Lockwood et al. 2001). Nests that hatch young before June 1 sit an average of 17 cm off the ground, whereas nests that hatch young after June 1 sit an average of 21 cm off the ground (Lockwood et al. 2001). Similarly, average nest height varies from year to year. Lockwood et al. (2001) determined that during the 1996 and 1997 breeding seasons, Cape Sable seaside sparrows built nests closer to the ground than during the 1998 and 1999 breeding season. Sparrows construct their nests with materials that are locally common and sometimes place taller grasses over the nest to conceal it. Nests are placed in clumps of grasses composed primarily of *Muhlenbergia* and *Spartina* (Pimm et al. 1996).

Pimm et al. (2002) suggests that nesting will not be initiated if water levels are at a depth greater than 10 cm during the breeding season. The end of the breeding season appears to be triggered by the onset of the summer rains. When water levels rise above the mean height of the nests off the ground, sparrows cease breeding (Lockwood et al. 1997). Cape Sable seaside sparrows usually raise one or two broods in a season, although they may raise a third brood if weather conditions allow (Kushlan et al. 1982, Service 1983). Recent information indicates sparrows can produce up to four broods if conditions allow (Lockwood et al. 2001).

Cape Sable seaside sparrows typically forage by gleaning items from low vegetation or from the substrate (Ehrlich et al. 1992). The sparrow is a dietary generalist (Pimm et al. 1996). It commonly feeds on soft-bodied insects such as grasshoppers, spiders, moths, caterpillars, beetles, dragonflies, wasps, marine worms, shrimp, grass, and sedge seeds (Stevenson and Anderson 1994). Significant differences were detected in nestling diet between years and sites (Lockwood et al. 1997), reflecting the patchy distribution of insects and opportunistic nature of

the sparrow (Post and Greenlaw 1994). The sparrow appears to shift the importance of prey items in its diet in response to their availability (Pimm et al. 1996).

Competition and predation also threaten the Cape Sable seaside sparrow. Raccoons (*Procyon*

lotor), snakes, rice rats (*Oryzomys palustris*), and hawks may be the chief predators (Lockwood et al. 1997, Dean and Morrison 1998). Predation by cottonmouth (*Agkistrodon piscivorus*) has been documented (T. Dean, Service, personal communication 1998). Lockwood et al. (1997) also suggest that increasing water levels are associated with significant increases in predation rates.

The Cape Sable seaside sparrow is nonmigratory. The fidelity of breeding male sparrows to their territories is high, and many male seaside sparrows will defend the same area for 2 to 3 years (Werner 1975). Lockwood et al. (2001) followed banded individuals from one breeding season to the next and found that adult sparrows move an average of 212 m from the location where they were banded the previous year (or in some cases, two or more years previously). This means that many sparrows probably do not move their territories from one year to the next, and the majority only adjusts their positions (Lockwood et al. 2001).

Dean and Morrison (1998) utilized radio-transmitters to document sparrow movements over the non-breeding season within the western population (subpopulation B). Of the 17 individuals for which they recorded over 20 locations, all but two made movements greater than 370 m (Dean and Morrison 1998). Longer-range movements were recorded, sometimes up to 7 km. These movements were rare, however, and these individuals returned to their breeding territories by the end of the non-breeding season (Dean and Morrison 1998). Collectively, these observations indicate that adult sparrows are quite sedentary throughout the year. Adult immigration and emigration rates are low.

Lockwood et al. (2001) resighted or recaptured juveniles an average of 577 m from their place of hatching. This value is significantly different from that observed for equivalent time frames in adults and is in contrast to adult dispersal distances (Lockwood et al. 2001). Juvenile sparrows are more apt to move longer distances with a maximum recorded natal dispersal distance of over 1 km (Lockwood et al. 2001).

Population Dynamics

The results of several studies suggest that Cape Sable seaside sparrows exist as several subpopulations whose distribution, size, and importance to the persistence of the species changes with time. Bass and Kushlan (1982) described two core subpopulations of the sparrow, one northwest of Shark River Slough in the southeast portion of the BCNP (subpopulation A), and a second one in the Taylor Slough area southeast of Shark River Slough (subpopulation B). Curnutt and Pimm (1993) recognized six subpopulations (A-F) of the Cape Sable seaside sparrow that roughly correspond to the groupings recognized by Bass and Kushlan (1982). Pimm (1998) suggested that three breeding subpopulations are critical to the long-term survival of the Cape Sable seaside sparrow.
In 1981, Bass and Kushlan (1982) estimated a total of 6,656 sparrows in the six subpopulations, with most of the sparrows in two core subpopulations (A and B), and four peripheral subpopulations (C-F) (see attached Table 1). Core subpopulation A inhabited the marl prairies west of Shark River Slough extending into BCNP and held an estimated 2,688 individuals. Core subpopulation B held approximately 2,352 sparrows inhabiting the marl prairies southeast of

Shark River Slough near the center of ENP. Peripheral subpopulation E, north of subpopulation B, held about 672 sparrows, while subpopulation C, located along the eastern boundary of ENP, and subpopulation D, just to the southeast of subpopulation C, held about 400 sparrows each. Peripheral subpopulation F, the northernmost peripheral subpopulation located on the western edge of the Atlantic coastal ridge, was the smallest subpopulation with an estimated 112 sparrows. Bass repeated the survey in 1992, with population estimates similar to those in 1981.

In 1981 and 1992, the area west of Shark River Slough (subpopulation A) supported nearly half of the total Cape Sable seaside sparrow population. Starting in 1993, the number of individuals declined precipitously in this area. By 1994 and 1995, the sparrows were absent from this area except for a few locations, and the number of individuals had dropped to less than 10 percent of 1992 numbers. Population estimates improved slightly during the 1996 breeding season as the numbers of sparrows found west of Shark River Slough increased from approximately 240 in 1995 to 384 sparrows in 1996. The 1997 and 1998 estimates indicate a continued decline of individuals within subpopulation A. In 1999 and 2000, the number of individuals more than doubled compared to the 1998 survey results. However, in 2001, the total number of sparrows west of Shark River Slough declined once again to approximately 128 individuals and this trend has since continued with total sparrow numbers of 96, 128, 48, 96 and 68 for 2002 to 2006, respectively (Pimm 2007). Subpopulation A estimates for 2006 are 3 percent of what they were in 1992.

Core subpopulation B increased by 35 percent from 1981 to 1992, declined 33 percent from 1992 to 1995, then fluctuated annually from 11 to 50 percent up to 2000, and returned to its 1995 size in 2001. By 2006, the estimated population size for subpopulation B was 2080 (Pimm 2007). Subpopulation B remains one of the most abundant subpopulations.

By 1992, subpopulation C had declined to 11 percent of its 1981 value. After at least 2 years with no sparrows, 48 sparrows were estimated in this area in 1996 and 1997, and 80 sparrows were estimated in 1998. This subpopulation has since remained stable and in 2006 increased to its highest level since 1981 with an estimated 160 sparrows.

Subpopulation D declined 76 percent from 1981 to 1993. Although no sparrows were found in 1995, the population was estimated at 80 sparrows in 1996 and 176 in 1999. Numbers have decreased since 1999 with 32 sparrows estimated in 2001, and no greater than 3 birds observed during each survey year since.

Subpopulation E decreased 12 percent between 1981 and 1992, fluctuated in the mid 1990s, and reached an estimated 912 sparrows in 1998. Numbers have fluctuated annually from 576 to 1040 sparrows estimated annually since 1998, including an estimated 704 sparrows in 2006 (Pimm 2007).

Estimates for subpopulation F declined 71 percent from 1981 to 1992. No sparrows were observed in 1993 or 1995. Only 16 sparrows were estimated for each year from 1997 to 1999. The population increased in 2000 to an estimated 112 sparrows, but no more than an estimated

32 sparrows have been recorded in this subpopulation since (Pimm 2007).

The most recent survey, from 2006, indicates that the total Cape Sable seaside sparrow population across its range has declined 47 percent since 1992. However, estimates have remained relatively stable since 1993, with the highest estimate of 4,048 sparrows occurring in 1997.

Status and Distribution

Critical habitat for the Cape Sable seaside sparrow was designated on August 11, 1977 (50 CFR § 17.95), before the full distribution of the subspecies was known. The critical habitat, as designated, does not adequately account for the distribution of the present-day core subpopulations, or the areas necessary for continued survival and recovery. The Service has recently concluded that re-designation of critical habitat is warranted, and will be completed as funding and priorities allow. An important area west of Shark River Slough, which had supported one of two core subpopulations, nearly half of the entire population, until 1993, is not included within the original designation. This area has experienced detrimental changes in habitat structure as a result of water management practices. Other parts of the originally designated critical habitat have been converted to agriculture, and are no longer occupied by sparrows.

Constituent elements are not included within the original designation of critical habitat for the sparrow. A key constituent element should be a hydroperiod pattern that maintains the preferred vegetative communities for successful breeding. During the breeding season, surface water levels should be at or below the surface within the short hydroperiod prairies, and should be achieved through adherence to a rainfall-driven operational schedule. Adherence to such a regulation schedule will provide for restoration of hydropatterns that best support Cape Sable seaside sparrows, in addition to other native Everglades species. Other constituent elements should include vegetative structure necessary to support successful breeding.

ENVIRONMENTAL BASELINE

The environmental baseline includes the effects of past and ongoing human and natural factors leading to current status of the species and their habitats.

Status of the species/critical habitat within the action area

The entire range of the Cape Sable seaside sparrow is included within the action area, as are portions of the designated critical habitat where sparrows actually occur. The estimated total sparrow population size for 2006 was 3,088 (Pimm et al. 2007).

Critical habitat for the Cape Sable seaside sparrow was designated on August 11, 1977.

Factors affecting the species habitat within the action area

Before the sparrow was listed as an endangered species, the distribution and abundance of the short hydroperiod prairies that provide habitat for it had declined by more than 50 percent due to destruction, fragmentation, and degradation of habitat for residential housing construction or agriculture. These areas are probably not restorable. Many of the remaining short-hydroperiod prairies that supported the Cape Sable seaside sparrow have been converted into long-hydroperiod wetlands, or have been degraded due to increased fire frequencies and/or woody species invasion as a result of reduced hydroperiods by water management practices in south Florida. The feasibility of fully restoring these areas is still uncertain.

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 ESA 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.

Factors to be considered

The Cape Sable seaside sparrow monitoring program has provided critical information about the sparrow population, and allowed biologists to identify serious threats to the persistence of sparrow populations. In addition, it has provided data on parameters such as survival, productivity, site fidelity, dispersal, and recruitment. Habitat measurements have also allowed biologists to analyze sparrow habitat selection, prey utilization, and the effects of fire and hydroperiod. Continuation of this research will allow biologists and resource managers to continue to evaluate the status of the sparrow and identify potential threats.

Analysis for effects of the action

Beneficial Effects - The expected benefit of the proposed research is the collection and analysis of data on current population trends and management tools that will ultimately aid in the recovery of the Cape Sable seaside sparrow.

Adverse Effects - During nest monitoring, and predator-proof barrier instillation individual Cape Sable seaside sparrows may be temporarily and permanently harmed through behavioral modification, physiological stress, and death. While this type of effect is uncommon during nest monitoring and instillation of predator-proof barriers, the potential for such injuries or deaths remains.

Species' response to the proposed action

Although the Applicant does not anticipate any injury or mortality of Cape Sable seaside sparrow, the monitoring of this species, as well as the instillation of predator-proof barriers

around nesting locations may result in injury or mortality of some individuals.

To help prevent possible nest abandonment, nest activity will be closely monitored following instillation and all experimental equipment will be immediately removed from the nest or nest area should parental birds respond negatively in any way to the instillations. This type of work has been on-going for several years, in studies of either the Cape seaside sparrow or similar species, with little documented adverse effects. Therefore, few adverse impacts are anticipated to occur. Because habitat alteration is not part of the proposed action, no destruction or adverse modification of critical habitat is anticipated.

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 ESA.

Because nearly the entire remaining potential habitat for the Cape Sable seaside sparrow occurs within publicly-owned land, actions resulting in cumulative effects are unlikely. Management activities within ENP and BCNP are entirely conservation-oriented. The Service is not aware of any State, local, or private activities that are reasonably certain to occur within the action area that would adversely affect the Cape Sable seaside sparrow.

SUMMARY OF EFFECTS

Although short-term, minimal adverse effects may occur to the Cape Sable seaside sparrow; this research will lead to an increased understanding of the natural history of this endangered species. Results from the proposed study could lead to modification of current hydrological and fire management strategies for the maximum benefit of the species. The net effect of the research is expected to be beneficial.

CONCLUSION

After reviewing the current status of the Cape Sable seaside sparrow, 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 this species and is not likely to destroy or adversely modify designated critical habitat.

INCIDENTAL TAKE STATEMENT

Sections 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA 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 ESA provided that 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

None of the proposed activities are expected to routinely result in death or injury to any individuals. Nest monitoring with cameras and iButtons, as well as instillation of predator-proof barriers, may result in a small increase in nest abandonment and predation risk to nests or nestlings. It is nearly impossible to determine whether visitation of nests increases abandonment or predation risk because it is not possible to monitor nests without visitation. However, based on the expectation that up 100 nests will be monitored with cameras and iButtons, and will receive predator-proof barriers, the researchers acknowledge that visitation may result in a 1 to 3 percent increase in abandonment or predation risk, and consequently, up to three nests per year may be taken in the form of harm as a result of the proposed activities.

The Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712), or the Bald

Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

EFFECT OF THE TAKE

In summary, as many as three Cape Sable seaside sparrow nests per year may be taken. However, in the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the applicant has incorporated all reasonable and prudent measures necessary and appropriate to minimize impacts of incidental take of the Cape Sable seaside sparrow. The applicant and designated agents acting on behalf of the applicant must provide resumes or summary of qualifications demonstrating their ability to safely install predator-proof barriers and to safely conduct monitoring of the Cape Sable seaside sparrow. To monitor the effect and extent of take, the applicant must provide a written report on the results of the research activities. The applicant will immediately cease all activities if an individual Cape Sable seaside sparrow is injured or killed, or if a nest is abandoned.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Service must comply 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 non-discretionary.

1. The Service shall require the applicant and designated agents acting on behalf of the applicant to furnish resumes or summary of qualifications demonstrating their ability to safely conduct monitoring and install predator-proof barriers. Only those individuals who can demonstrate that they hold all necessary permits and have sufficient experience to monitor and install predator-proof barriers with a minimum of risk to the Cape Sable seaside sparrow, and those individuals that are capable of recognizing indications of injury or ill health in the species will be permitted.

2. 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.

3. Permit issuance will be conditioned to require the permittee and designated agents acting on behalf of the permittee to immediately cease all activities if an individual Cape Sable seaside sparrow is injured or killed and to report any such injury or death to the Service (Field Supervisor, South Florida Ecological Services Office; 1339 20th Street; Vero Beach, FL 32960; 772-562-3909; AND Permit Coordinator; 1875 Century Boulevard, Suite 200; Atlanta, Georgia 30345-3301; 404-679-4176).

4. Upon locating a dead, injured, or sick threatened or endangered species, initial notification must be made 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 Florida Fish and Wildlife Conservation Commission; 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 that evidence intrinsic to the specimen is not unnecessarily disturbed. 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.

5. Permit issuance will be conditioned to require the permittee and designated agents acting on behalf of the permittee to immediately cease all activities if an individual Cape Sable seaside sparrow nest is abandoned due to nest monitoring with cameras, temperature loggers, or instillation or operation of predator-proof-barriers and to report any such abandonment to the Service (Field Supervisor, South Florida Ecological Services Office; 1339 20th Street; Vero Beach, FL 32960; 772-562-3909; AND Permit Coordinator; 1875 Century Boulevard, Suite 200; Atlanta, Georgia 30345-3301; 404-679-4176).

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA 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 this action as outlined in the request. As required by 50 CFR § 402.16, reinitiation of formal consultation is required if:

1. The amount or extent of incidental take is exceeded;

2. New information reveals effects of the 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.

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Table 1. Estimated total numbers of Cape Sable seaside sparrows in six subpopulations, A-F, during 15 different years. Two surveys were done in 2000. Estimated totals are derived from the number of sparrows actually observed during surveys in each subpopulation, using methods developed by Bass and Kushlan (1982).

	Year																
	1981	1992	1993	1994	1995	1996	1997	1998	1999	2000a	2000b	2001	2002	2003	2004	2005	2006
A	2688	2608	432	80[a]	240	384	272	192	400	448	400	128	96	128	16	96	68
B	2352	3184	2464	2224	2128	1888	2832	1808	2048	1824	2448	2128	1904	2368	2784	2272	2080
C	432	48	0	-	0	48	48	80	144	112	64	96	112	96	80	80	160
D	400	112	96	-	0	80	48	48	176	64	16	32	0	0	0	3	0
E	672	592	320	-	352	208	832	912	768	1040	704	848	576	592	640	576	704
F	112	32	0	-	0	-	16	16	16	0	112	32	16	32	16	32	32
Total	6656	6576	3312	2416[a]	2720	2624	4048	3056	3552	3488	3744	3264	2704	3216	3536	3059	3044

Data from Pimm et al. (2002, 2007). [a]minimum estimate.

Figure 1. A diagram of the proposed predator-proof barriers to protect Cape Sable seaside sparrow nests from nest predation.

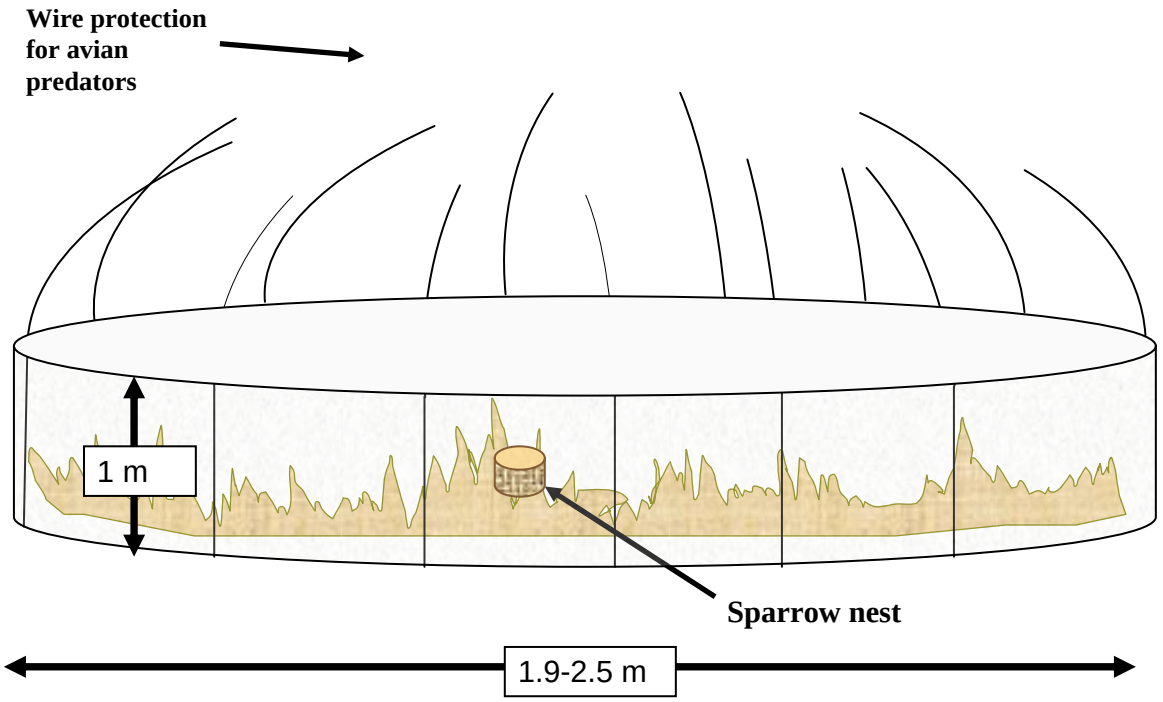

Figure 2. A thermochrom iButton temperature logger.