**Recovery Plan for Florida grasshopper sparrow (*Ammodramus savannarum floridanus*)**
https://www.fws.gov/verobeach/MSRPPDFs/FloridaGrasshopperSparrow.pdf

**Original Approved:** May 18, 1999
**Original Prepared by:** South Florida Ecological Services staff

## DRAFT AMENDMENT 1

We have identified best available information that indicates the need to amend recovery criteria for the Florida grasshopper sparrow (FGSP) since the recovery plan was completed. In this proposed modification, we synthesize the adequacy of the existing recovery criteria, show amended recovery criteria, and provide the rationale supporting the proposed recovery plan modification. The proposed modification is shown as an addendum that supplements the South Florida Multi-Species Recovery Plan (MSRP; U.S. Fish and Wildlife Service [Service] 1999) by adding delisting criteria for the FGSP that were not developed at the time this recovery plan was completed. The original recovery objectives and the step-down outline are described on pages 4-387 through 4-391 of the MSRP (Service 1999). Recovery plans are a non-regulatory document that provide guidance on how best to help recover subspecies.

**For**
**U.S. Fish and Wildlife Service**
**Region 4**
**Atlanta, GA**

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## METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT

These proposed amendments to the recovery criteria were developed using the most recent and best available information for the subspecies. This information was prepared by the Service biologists and managers in the South Florida Ecological Services Field Office in order to develop the recovery criteria for the FGSP.

## ADEQUACY OF RECOVERY CRITERIA

Section 4(f)(1)(B)(ii) of the Endangered Species Act (Act) requires that each recovery plan shall incorporate, to the maximum extent practicable, "objective, measurable criteria which, when met, would result in a determination…that the species be removed from the list." Legal challenges to recovery plans (see Fund for Animals v. Babbitt, 903 F. Supp. 96 (D.D.C. 1995)) and a Government Accountability Audit (GAO 2006) also have affirmed the need to frame recovery criteria in terms of threats assessed under the five listing factors.

**Recovery Criteria**

The MSRP only provides downlisting criteria for the FGSP, and they can be found on page 4-387 of the document (https://www.fws.gov/verobeach/MSRPPDFs/FloridaGrasshopperSparrow.pdf).

**Synthesis**

The FGSP was listed as endangered in 1986 (51 FR 27492) due to habitat loss and degradation resulting from conversion of native vegetation to improved pasture and agriculture (Factor A). The MSRP and FGSP 5-Year Review (Service 2008) also identified habitat loss and degradation as the primary threat to FGSP and, while admitting that limited data on the biology, ecology, and management needs of the subspecies existed, suggested that appropriate habitat protection and management was the key to growing the FGSP population. Other threats identified in the MSRP included altered or unfavorable hydrology (Factor A) and predation (Factor C), and these still remain relevant to FGSP recovery. Since the MSRP was published, however, much has been learned about the FGSP's biology, ecology, habitat use, and additional factors contributing to the continued decline of the subspecies. The FGSP is currently threatened by Factors A, C, D, and E.

The historical range of the FGSP is not known with certainty, but there are records from Collier, Miami-Dade, DeSoto, Glades, Hendry, Highlands, Polk, Okeechobee, and Osceola counties (Service 1999). At present, the range of the FGSP is generally restricted to three management units under public ownership – Avon Park Air Force Range (APAFR), Kissimmee Prairie Preserve State Park (KPPSP), Three Lakes Wildlife Management Area (TLWMA) – and two known private ranches. This is a decline from the eight occupied locations documented by Delany et al. (2007) during their 2000 – 2004 surveys, which is around the time the FGSP began declining at most sites. Populations have declined to historic lows at all known sites, and as of 2018, there were only 23 estimated wild breeding pairs at sites were FGSP are being monitored (Florida Fish and Wildlife Conservation Commission [FWC], unpublished data).

Dry prairie habitat on protected lands, representing 67 percent of the dry prairie remaining (Delany 2007), is being managed for FGSP; and one of the private ranches (Ranch) with FGSPs is currently implementing a management plan drafted by the Service, which includes actions to benefit the FGSP. Management of FGSP habitat is a primary focus for lands within the Everglades Headwaters National Wildlife Refuge (EHNWR); however, this refuge is newly established (2012) and does not currently have lands occupied by FGSP. Though these actions, in part, address Factor A, they cannot fully mitigate for the loss of nearly all of the sparrow's native dry prairie habitat, and the remaining protected habitat may not be adequate to recover the subspecies (Kautz and Cox 2001).

The FGSP population is at a record low and is at high risk of extinction due to environmental, demographic, and genetic stochasticity, as well as natural catastrophic events (Shaffer 1981; Factor E). Low population densities can lead to inbreeding and loss of genetic diversity, biased sex ratios, difficulty locating mates, and increased susceptibility to diseases (Dale 2001, Redford et al. 2011). Especially when coupled with events such as flooding, reduced food availability, and/or reduced reproductive success, small and isolated populations may experience severe

declines or extirpation (Caughley and Gunn 1996). Additionally, low or isolated population densities may lead to increased likelihood of birds dispersing from breeding sites in search of conspecifics (Dale 2001). This was illustrated at the Ranch in 2016 when an isolated, paired male abandoned his female with an active nest to set up a territory 1 kilometer (km) (0.6 mile [mi]) away near a cluster of other males (Hewett Ragheb and Miller 2016). This phenomenon was also observed with several males at Kissimmee Prairie Preserve State Park (Hewett Ragheb and Miller 2016), which indicates that males may disperse from a known breeding area in search of other conspecifics.

In 2015 due to the severe population decline, a captive propagation program was intiated with the goal of ultimately releasing captive-reared FGSP to supplement the wild population. At the end of the 2018 breeding season, there were 81 FGSP in captivity. The Service, FWC, and conservation partners are aiming to release captive-reared birds to the wild as early as the spring of 2019.

Despite the severe population decline, FGSP do not appear to have experienced significant losses of genetic diversity (Delany et al. 2000, Mylecraine et al. 2008; Factor E). A more recent study found that genetic diversity at TLWMA was comparable to estimates from historical data, and that inbreeding coefficients have remained low over the last 100 years (Reece 2014). However, reductions in genetic diversity often lag several generations behind the time period of population reduction (Allendorf et al. 2012) and with such a small remnant wild population, entire genetic lines have likely been lost. The high genetic diversity remaining among FGSP may illustrate that there was substantial gene flow between sites historically (Delany et al. 2000) and/or that isolation has occurred relatively recently (Bulgin et al. 2003).

FGSP require relatively large tracts of treeless prairie (Factor A), as habitat suitability can shift radically – annually, seasonally, and even within seasons – largely due to variability in fire history and hydrology. Frequent fire is necessary to maintain open prairie habitat and prevent encroachment of trees and overgrowth of woody vegetation. Delany et al. (2007) estimated that less than 45,000 hectares (111,197 acres) of potential FGSP habitat exists, which represents a 95 percent loss from pre-settlement estimates (Kautz et al. 1993). Loss of habitat (Factor A) was certainly a factor in the subspecies' decline to endangered status; however, habitat availability is not believed to currently limit population growth, as populations are so low and large areas of seemingly high quality habitat are not currently occupied. Nevertheless, it remains possible that the quality of the current available habitat is suboptimal for the sparrow in a way that we are not presently detecting. Further research is necessary to reveal subtleties of habitat quality, its past and present land management, and their effects on sparrow habitat selection and recruitment.

Although habitat loss and degradation continues to be a factor in the decline of the FGSP, recent research shows that adult annual survival and productivity rates are too low to halt or reverse the current population decline (Hewett Ragheb et al. 2017). Disease (Factor C) is currently hypothesized as a possible contributor in the overall population decline, but additional research is needed to determine its potential role. The main cause of adult mortality appears to be predation, primarily by wintering raptors (Factor C; Dean 2001). However, reasons for the current, continued steady decline in adult survival are unclear.

Predation (Factor C) of nestlings during the breeding season is a significant threat and nest predation is the cause of most nest failures (Perkins et al. 2003, Hewett Ragheb et al. 2017). Although nearly all predators are native animals with which the FGSP has evolved (Fletcher et al. 2010, Hewett Ragheb et al. 2017), one non-native predator, the red-imported fire ant (RIFA; *Solenopsis invicta*), has been especially problematic for nestlings on grazed lands at the Ranch (Hewett Ragheb 2016, Bowman and Windsor 2018). Nest predation by RIFAs appears to be very rare at TLWMA, which supports the largest known FGSP population, with only one confirmed predation record (Hewett Ragheb et al. 2017). It is unknown if RIFAs are a significant source of nest failure at KPPSP or APAFR, but Fletcher et al. (2010) determined that they may be the most prevalent potential nest predator in FGSP habitat. RIFAs are associated with habitat disturbance (Tschinkel and King 2013) and habitat changes due to cattle grazing or altered hydrology may influence the role of RIFAs as significant nest predators in disturbed landscapes.

As FGSP are ground-nesters, flooded nesting areas during the breeding season reduce or prohibit reproductive efforts and success (Pranty 2000, Perkings et al. 2003, Hewett Ragheb et al. 2017; Factor E), and can alter vegetative composition (Orzel and Bridges 2006; Factor A). Flooding was the most common known cause of nest failure for 41 nests monitored at KPPSP over four breeding seasons (2005-2008; Noss et al. 2008), albeit the cause of failure for most nests was unknown and probably was due to predation (Factor C). Historic rainfall at the start of the breeding season in 2016, and three major storm events in 2017, caused widespread flooding that significantly reduced annual productivity at all known FGSP breeding sites. In response to the devastating flooding, the Service and the FWC implemented several emergency actions that included collecting eggs, nestlings, and fledglings from endangered nest sites to be transported to captive breeding facilities; "lifting" nests prior to rain events to reduce risk of flooding; and removing nestlings from flood-prone nests, caring for them inside overnight, and then returning them to the natal nest the following morning (Hewett Ragheb et al. 2017, Bowman and Windsor 2018). The Service also installed several groundwater monitoring wells near breeding sites so that field crews could monitor the water table and respond to possible imminent flooding events.

Currently, the second largest known FGSP population occurs at the Ranch. We also recently received information about FGSP occurring on a second private ranch. The FGSP at the two state-managed properties (TLWMA and KPPSP) and the one federally-managed property (APAFR) are sufficiently protected under existing state and Federal regulations (Factor D). However, the FGSPs on the private ranches are vulnerable to threats of habitat loss or degradation (Factor A) through lack of management practices that maintain FGSP habitat, predation from non-native RIFAs (Factor C), or through conversion to other land uses (Factor A). Some land-use changes will require consultation with the Service under section 7 or section 10 of the Endangered Species Act, but other land-use changes could be implemented without any regulatory input from the Service (*e.g.,* converting pastures to row crops or citrus; Factors A and D).

## AMENDED RECOVERY CRITERIA

Recovery criteria serve as objective, measurable guidelines to assist in determining when an endangered species has recovered to the point that it may be downlisted to threatened, or that the

protections afforded by the Act are no longer necessary and the FGSP may be delisted. Delisting is the removal of a species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Downlisting is the reclassification of a species from an endangered species to a threatened species. The term "endangered species" means any species (species, subspecies, or DPS) which is in danger of extinction throughout all or a significant portion of its range. The term "threatened species" means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Revisions to the Lists, including delisting or downlisting a species, must reflect determinations made in accordance with sections 4(a)(1) and 4(b) of the Act. Section 4(a)(1) requires that the Secretary determine whether a species is an endangered species or threatened species (or not) because of threats to the species. Section 4(b) of the Act requires that the determination be made "solely on the basis of the best scientific and commercial data available." Thus, while recovery plans provide important guidance to the Service, States, and other partners on methods of minimizing threats to listed species and measurable objectives against which to measure progress towards recovery, they are guidance and not regulatory documents.

Recovery criteria should help indicate when we would anticipate that an analysis of the species' status under section 4(a)(1) would result in a determination that the species is no longer an endangered species or threatened species. A decision to revise the status of or remove a species from the Federal Lists of Endangered and Threatened Wildlife and Plants, however, is ultimately based on an analysis of the best scientific and commercial data then available, regardless of whether that information differs from the recovery plan, which triggers rulemaking. When changing the status of a species, we first propose the action in the *Federal Register* to seek public comment and peer review, followed by a final decision announced in the *Federal Register*.

Herein, we provide delisting criteria for the FGSP as the MSRP only developed downlisting criteria as discussed above.

**Downlisting Recovery Criteria**

We are not amending the existing downlisting criteria (please refer to page 4-387 of the MSRP).

**Delisting Recovery Criteria**

The FGSP will be considered for delisting when the following criteria are met:

1. Twelve (12) FGSP populations are maintained, established, or discovered, that exhibit a stable or increasing trend evidenced by natural recruitment and a stable age distribution. At least six (6) of those populations must be on lands protected via a conservation mechanism. (Factor A)
2. Populations are connected to the extent that genetic diversity can be maintained without the need for captive breeding or translocation. (Factor E)
3. Predation has been reduced to a level such that nest protection is not necessary. (Factor C)
4. When, in addition to the above criteria, it can be demonstrated that loss of dry prairie habitat associated development, fire suppression, lack of natural disturbance, and woody vegetation

encroachment are diminished or reversed such that enough habitat of suitable quality is protected for the species to remain viable for the foreseeable future. (Factor A, D, and E)

**Justification**

The proposed delisting recovery criteria reflect the best available and most up-to-date information for the FGSP, while incorporating information still relevant from the MSRP. Furthermore, the delisting criteria were developed to reflect the subspecies' overarching recovery strategy, and are consistent with current goals, objectives, and known risk levels. Specifically, each delisting criterion ensures that the underlying causes of decline and impediments to recovery will be addressed and mitigated.

Criterion 1. Restoring populations on public lands and having multiple populations and sufficient habitat distributed across the current and historical range of the subspecies will provide the representation and redundancy necessary to assure the subspecies as a whole is resilient to predation, shifts in habitat suitability, disease, stochastic events, and other biological or environmental stressors. The populations needs to be large enough and robust enough to be ecologically and demographically functional across the geographic range of the subspecies.

Criterion 2. Having connected populations will allow for gene flow between populations, reduce the frequency of genetic drift, and protect the genetic diversity of the subspecies. Having a genetically robust population will maximize the fitness of the subspecies such that it is healthy, resilient, adaptive, and able to respond to biological and environmental stressors affecting the population across the geographic range of the subspecies.

Criterion 3. Providing a long-term solution to significantly reduce the threat of predation of nesting FGSP by native and non-native species.

Criterion 4. Ensuring sufficient habitat is protected in the foreseeable future to provide for a resilient and viable FGSP population across the geographic range of the subspecies. Maintaining appropriate fire regimes is necessary to restore, expand, and maintain suitable habitat for the FGSP. Fires of appropriate intensity and frequency are necessary to maintain suitable vegetation composition and structure, prevent encroachment of woody vegetation, and maintain large expanses of open prairie habitat necessary to recover the subspecies. Removing trees and woody vegetation from dry prairie habitat will increase both the suitability and extent of suitable habitat available for FGSP.

Together, these recovery criteria cover threats related to functional and actual habitat loss, genetic diversity, and nesting success; all of which are likely drivers of the FGSP's population demographics, size, and the subspecies' long-term persistence.

**Rationale for Amended Recovery Criteria**

The existing criteria for the FGSP on page 4-387 in the MSRP (Service 1999) (https://ecos.fws.gov/docs/recovery_plan/sfl_msrp/SFL_MSRP_Species.pdf ) included only downlisting criteria. With these proposed amendments, delisting has been clearly defined with

measurable, objective criteria in keeping with the recovery strategy and goals outlined in the MSRP. These criteria address what is necessary to ensure resiliency, redundancy, and representation by addressing factors that threaten the species. In achieving these criteria, we expect the FGSP to have a low probability of extinction for the foreseeable future and have stable populations needed for long-term recovery. We will work together with our partners to strategically and efficiently implement the new criteria.

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