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**Florida grasshopper sparrow**  
*(Ammodramus savannarum floridanus)*

**5-Year Review:**  
**Summary and Evaluation**

**U.S. Fish and Wildlife Service**  
**Southeast Region**  
**South Florida Ecological Services Office**  
**Vero Beach, Florida**

## 5-YEAR REVIEW

### Florida grasshopper sparrow/ *Ammodramus savannarum floridanus*

#### I. GENERAL INFORMATION

**A. Methodology used to complete the review:** This review is based on monitoring reports, surveys, and other scientific and management information, augmented by conversations and comments from biologists familiar with the species. The review was conducted by a biologist with the South Florida Ecological Services Office. Literature and documents on file at the South Florida Ecological Services Office were used for this review. All recommendations resulting from this review are a result of thoroughly reviewing all available information on the Florida grasshopper sparrow (FGSP). Comments and suggestions regarding the review were received from South Florida Ecological Services Office supervisors and peer reviews from outside the Service (see attachment). No part of the review was contracted to an outside party. The public notice was published on April 26, 2007, with a 60-day public comment period.

#### **B. Reviewers**

**Lead Region:** Southeast Regional Office, Kelly Bibb, (404) 679-7132  
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**Lead Field Office:** South Florida Ecological Services Office, Sandra Sneckenberger, (772) 562-3909

#### **C. Background**

- 1. FR Notice citation announcing initiation of this review:** 72 FR 20866. April 26, 2007.
- 2. Species status:** Declining (Recovery Data Call 2007). Despite intensive management of most remaining occupied habitat, few increases in FGSP populations have been recorded in recent years and there has been no evidence to suggest that populations are recovering.
- 3. Recovery achieved:** 2 (26-50% recovery objectives achieved) (Recovery Data Call 2007).
- 4. Listing history**  
Original Listing  
FR notice: 51 FR 27492  
Date listed: July 31, 1986  
Entity listed: Subspecies  
Classification: Endangered
- 5. Associated rulemakings:** None.

**6. Review History:** Five-year review, November 6, 1991 (56 FR 56882): In this review, different species were simultaneously evaluated with no species-specific, in-depth assessment of the five factors, threats, etc., as they pertained to the different species' recovery. The notices summarily listed these species and stated that no changes in the designation of these species were warranted at that time. In particular, no changes were proposed for the status of the FGSP.

Recovery Plan: 1999

Recovery Data Calls: 2000 (stable), 2001 (stable), 2002 (stable), 2003 (declining), 2004 (declining), 2005 (declining), 2006 (declining), 2007 (declining).

**7. Species' Recovery Priority Number at start of review:** 3C. The FGSP is assigned a recovery priority of 3C because the degree of threat to its persistence is high, and its potential for recovery is great if threats can be eliminated or minimized.

**8. Recovery Plan or Outline**

Name of plan: South Florida Multi-Species Recovery Plan (MSRP)

Date issued: May 18, 1999

Dates of previous revisions: May 19, 1988 (Recovery Plan for the Florida Grasshopper Sparrow)

**II. REVIEW ANALYSIS**

**A. Application of the 1996 Distinct Population Segment (DPS) policy**

1. **Is the species under review listed as a DPS?** No.
2. **Is there relevant new information that would lead you to consider listing this species as a DPS in accordance with the 1996 policy?** No.

**B. Recovery Criteria**

1. **Does the species have a final, approved recovery plan containing objective, measurable criteria?** No. The criteria in the recovery plan (Service 1999) to reclassify the FGSP from endangered to threatened provide constructive qualitative goals, but contain elements that are neither objective nor measurable. Revision of the recovery plan and recovery criteria is recommended.

**C. Updated Information and Current Species Status**

**1. Biology and Habitat**

Information regarding FGSP biology and habitat can be found within the recovery plan (Service 1999). A summary, with the addition of updated information, is provided below.

- a. **Abundance, population trends (e.g., increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth**

**rate, age at mortality, mortality rate), or demographic trends:** Population estimates are calculated based on point-count surveys of singing male FGSP. Surveys performed between 1989 and 1993 resulted in a minimum population estimate of 424 adults at seven breeding sites (Delany 1996). Estimates from the 1997 breeding season yielded a total of less than 1,000 individuals (Delany et al. 1999). From 1998 to 2005, FGSP populations (except one site) declined by 58 to 96 percent (Delany et al. 2007b). A declining trend is likely continuing, and the subspecies remains in a vulnerable state. Furthermore, a population viability analysis demonstrated that the FGSP is vulnerable to extinction within the next 50 years (Perkins et al. 2008). During 2007, the overall population declined and there were no significant improvements in the size or status of any populations.

FGSP have low nesting success rates. Perkins et al. (2003) found that the overall success rate for breeding seasons from 1996-1998 ranged from 0.10 to 0.33 at Avon Park Air Force Range (APA FR), Three Lakes Wildlife Management Area (TLWMA), and Kissimmee Prairie Preserve State Park (KPPSP). Annual productivity estimates ranged between 1.46 and 4.09 fledglings per pair (Perkins et al. 2003). The major factor contributing to this low success rate is loss of eggs or nestlings from predation, primarily attributable to snakes and mammals (Vickery 1996; Perkins et al. 2003).

Annual survival rate estimates for male birds equal to or greater than 1 year old at APA FR and TLWMA were 0.482 and 0.533, respectively (Perkins and Vickery 2001). Information on the survival and life expectancy of females and juvenile birds is lacking. Using other demographic parameters, juvenile survival during 1995 to 1998 was estimated to be 35.1 percent (Perkins and Vickery 2001). A mean life expectancy of 2.95 years has been estimated (Delany et al. 1993), though individuals have been observed to live over 6 years (Delany et al. 1993; Dean et al. 1998; Miller 2005).

**b. Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding):** While not forming a distinct phylogenetic clade, FGSP were found to differ significantly from two other grasshopper sparrow subspecies (*A. s. pratensis* and *A. s. ammolegus*), though the divergence is believed to be too recent (less than 25,000 years ago) for substantial differences (Bulgin et al. 2003). No significant genetic differences were found among historic (i.e., collected before 1950) and current FGSP populations (Vickery et al. 2002). The high genetic diversity remaining among FGSP may illustrate that substantial gene flow between sites is maintained (Delany et al. 2000b) and/or isolation has occurred recently (Bulgin et al. 2003). Movement of birds between KPPSP and APA FR has been documented (Miller 2005).

**c. Taxonomic classification or changes in nomenclature:** Twelve subspecies of grasshopper sparrows have been described, including FGSP

(Paynter and Storer 1970; Wetmore et al. 1984). *Ammodramus savannarum floridanus* was first described by Mearns (1902) as *Coturniculus savannarum floridanus* on the basis of one male and two females that were collected in 1901 within the Kissimmee Prairie region in southern Osceola County, Florida. By 1931, this subspecies had been incorporated into the genus *Ammodramus* (American Ornithologists Union 1931) and remains the currently accepted taxonomic classification (Integrated Taxonomic Information System 2008).

**d. Spatial distribution, trends in spatial distribution (e.g., increasingly fragmented, increased numbers of corridors), or historic range (e.g., corrections to the historical range, change in distribution of the species' within its historic range):** Unlike the migratory Eastern grasshopper sparrow (*A. s. pratensis*) that overwinters in Florida, the FGSP is non-migratory, and is limited to the prairie region of south-central Florida. The historic distribution 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 (Delany and Cox 1985; see also Pranty and Tucker 2006). Over 80 percent of FGSP habitat has been converted to agriculture since the early 1900s (Shriver and Vickery 1999). Consequently, the subspecies' range has contracted considerably and is now known only from Highlands, Okeechobee, Osceola, and Polk counties (Pranty and Tucker 2006).

The range of the FGSP is currently restricted to three management units (Pranty and Tucker 2006; Perkins et al. 2008). These units are under public ownership and include several FGSP subpopulations – two to three on APAFR, two at TLWMA, and an undefined number at KPPSP. In addition, one site is located on private lands, and the KPPSP and TLWMA populations include sparrows that are on adjacent, high quality prairie on private land. (Note: Due to movements between “subpopulations,” the portion of each management unit surveyed, and the difficulty in detecting FGSP, a consistent method for delineating “subpopulations” has yet to be described and implemented.)

APAFR is located in Highlands and Polk counties, east of Avon Park, Florida. This site, which is owned and managed by the Department of Defense, supports three subpopulations of FGSP within approximately 4,200 hectares (ha) of dry prairie habitat. The APAFR FGSP subpopulations have declined sharply since 1997, and these once large subpopulations are currently vulnerable to extirpation (Pranty and Tucker 2006; Delany et al. 2007). The Bravo/Foxtrot site has had zero and near zero population estimates in the last five years.

TLWMA is located in Osceola County, Florida and contains about 4,000 ha of dry prairie habitat. This site is state-owned and has maintained relatively

stable numbers of FGSP within the last decade (Delany et al. 2007; Tucker and Bowman 2007).

The FGSP subpopulations at KPPSP vary widely, and have generally declined in the last five years (Miller 2007). This site is located in Okeechobee County and consists of approximately 19,000 ha of dry prairie habitat (Perkins et al. 2003).

With the historically contiguous distribution of dry prairie habitat in central Florida, FGSP may have evolved as interior habitat specialists (Perkins et al. 2003). Consequently, their tolerance of edge habitat appears to be low, as such habitat may represent a reproductive sink (Perkins et al. 2003). To that end, habitat fragmentation that has occurred over the last 100 or more years has affected the distribution, spatial dynamics, population viability, and recovery potential of FGSP. There is evidence of dispersal events between APAFR and KPPSP (Miller 2005).

**e. Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):** As FGSP are habitat specialists with a restricted, limited range, the subspecies is sensitive to environmental factors that change or degrade dry prairie habitat. Specific threats to FGSP habitat (i.e., fire and hydrologic management) are discussed in section II.C.2. Five-Factor Analysis.

FGSP inhabit dry prairie habitat characterized by clumped distribution of bluestem grasses (*Andropogon* spp.), St. John's wort (*Hypericum* spp.), and wiregrasses (*Aristida* spp.), as well as saw palmetto (*Serenoa repens*) and dwarf oaks (*Quercus minima*) ranging from 30 to 70 centimeters in height (Delany et al. 1985; Service 1988, 1999). FGSP habitat consists of large (greater than 50 ha), treeless, relatively poorly-drained grasslands that have a history of frequent fires (Service 1988).

FGSP do not tolerate tree densities as high as one tree per acre (Service 1999), and reproductive success of individuals nesting less than 400 m from forested edges is reduced (Perkins et al. 2003). Because FGSP are ground-dwelling birds, they usually require at least 20 percent bare ground for unrestricted movement and foraging, but need enough vegetation to provide nesting cover (Whitmore 1979; Vickery 1996; Shiver and Vickery 2001). In addition to bare ground, runways and runner oak (*Quercus minima*) are associated with FGSP occurrence (Tucker and Bowman 2005).

FGSP currently occupy approximately 20,000 ha (Delany et al. 2007). The importance of habitat to FGSP is reflected in the recovery goal for downlisting (10 protected and managed sites containing stable, self-sustaining populations of 50 to 100 breeding pairs of FGSP; Service 1999). Taking into account the current status of the FGSP, 8 additional sites with over 50 breeding pairs

would be necessary for long-term persistence of the subspecies. Large patches of prairie habitat (814-1348 ha to over 4,000 ha) are needed to maintain populations of 50 breeding pairs (Delany et al. 1995; Perkins et al. 2003, 2008). Large patches of dry prairie do not currently exist in such quantities (Shriver and Vickery 2001). Furthermore, due to habitat fragmentation, translocation programs may be required to start new subpopulations (Delany et al. 2007).

## **2. Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)**

### **a. Present or threatened destruction, modification or curtailment of its habitat or range:**

*Habitat loss, fragmentation, degradation - general.* Historically, areas where FGSP were extirpated would be recolonized as population densities increased and dispersal occurred from adjacent populated areas. As agriculture and improved pasture has fragmented the landscape, FGSP can no longer recolonize these areas as they did in the past. FGSP require a minimum habitat size for daily activities; barriers caused by habitat loss and fragmentation compromise their ability to disperse, obtain food and nest site resources, locate a mate, and carry out natural life history behaviors. The ease with which these resources can be attained is directly related to survival rates, fecundity, juvenile recruitment, and ultimately, to population growth.

Isolation of small populations also reduces or precludes gene flow between populations and can result in the loss of genetic diversity. Demographic factors such as predation, diseases, and competition are intensified in small, isolated populations which may be rapidly extirpated by these pressures. Especially when coupled with events such as flooding, reduced food availability, and/or reduced reproductive success, isolated populations may experience severe declines or extirpation (Caughley and Gunn 1996).

Less than 45,000 ha of potential FGSP habitat exists (Delany et al. 2007). This estimate represents a nearly 20,000-ha decrease in potential habitat in 10 years (Shriver and Vickery 1999). Maintenance and enhancement of the remaining dry prairie habitat is crucial to the recovery of the FGSP. A population viability analysis demonstrated that removal of pine plantations and dry prairie restoration greatly reduced the probability of extinction (Perkins et al. 2008). The scope and severity of this threat are high. This threat also increases the severity of all other threats addressed subsequently.

*Fire suppression and management.* Frequent fire is necessary to maintain an open vegetative community and to prohibit the invasion of pines and hardwoods into dry prairie habitat. FGSP densities decline two or more years following a burn event (Delany and Cox 1986; Vickery and Shriver 1995; Dean 2001; Shriver and Vickery 2001).

Spring and even early summer fires appear to trigger flowering in grasses and forbs and extend the breeding season of FGSP (Shiver et al. 1996, 1999; Perkins et al. 1998; Pranty and Tucker 2007). Prescribed fires at this time mimic what would occur naturally and is the regime in which this species has evolved.

Habitat on public lands is frequently managed using prescribed fire, but with large tracts of land such frequent fire regimes can be difficult to sustain. The scope and severity of this threat are high. As fire is so crucial to maintain dry prairie habitat suitable to FGSP, this threat (i.e., fire suppression) also increases the severity of all other threats addressed.

*Cattle grazing.* The effect of cattle grazing on dry prairie habitat and FGSP populations is not known. As evidenced by relatively stable populations at KPPSP and TLWMA (not grazed), in contrast to populations at APAFR (grazed), grazing may not be a compatible component of land use and management with respect to FGSP. Some specific aspects of cattle management do not appear to be congruent with maintaining dry prairie habitat suitable for FGSP. Fence posts, timing of prescribed burns, and disturbance or trampling of nests have been identified as factors affecting sparrow survival and reproductive success (Perkins and Vickery 2001; Nack and Ribic 2005; Sutter and Ritchison 2005; Pranty and Tucker 2006). In an exclosure study, FGSP occupancy was significantly greater in an area where cattle were excluded (Tucker and Bowman 2006). The scope of this threat is high, while the severity of this threat is moderate. Further research may lessen or elevate the severity of this threat.

*Hydrologic management.* As FGSP are ground-nesters, flooded nesting areas during the breeding season reduce or prohibit reproductive efforts and success. Water levels at KPPSP and TLWMA severely affected nesting in the mid-1990s (Service 1999). Perkins and Vickery (2005) found no reproduction at an Audubon Preserve (now part of KPPSP) which was wetter than APAFR and TLWMA, which had successful reproduction. The Army Corps of Engineers developed a settlement agreement with adjacent private landowners to address water management issues, however, future water management may result in high water levels in FGSP habitat. In addition, Kissimmee River restoration projects should continue to carefully consider FGSP in the planning and post-construction phases. Taken together, these hydrologic management issues pose a substantial threat to FGSP. The scope and severity of this threat are extremely high.

*Loss of habitat on private lands.* With over 80 percent of original dry prairie habitat lost (Shriver and Vickery 1999), perpetual protection of remaining habitat on private lands is considered a high priority (Pranty and Tucker 2006; Perkins et al. 2008). In a population viability analysis, the loss of habitat on private lands tripled the probability of extinction estimated within 50 years



(Perkins et al. 2008). Conservation easements are in place for two large ranches, but several other ranches with dry prairie habitat remain unprotected (Pranty and Tucker 2006). The scope and severity of this threat are high.

*Sea level rise.* Sea level rise may potentially result in the loss of suitable FGSP habitat through inundation or vegetative species composition changes. The general effects of sea level rise within the range of the FGSP will depend upon the rate of rise and landform topography. However, the specific effects across the landscape will be affected by complex interactions between geomorphology, tides, and fluctuations in energy and matter. These effects have yet to be simulated and projected for the range of the FGSP. The imminence of this threat is low, but the severity remains unknown.

*Invasive exotic plants (IEP).* Significant resources have been directed to IEP control on public lands inhabited by FGSP. IEP currently do not appear to be a significant threat to FGSP habitat, and the severity of this threat is low.

**b. Overutilization for commercial, recreational, scientific, or educational purposes:** Not known as a threat. Although scientific research does involve mist-netting, banding, radio-harnessing, and taking genetic samples, only two FGSP have died as a result of scientific research.

**c. Disease or predation:**

*Predation.* Predators known to take eggs or nestlings include the striped skunk (*Mephitis mephitis*), spotted skunk (*Spilogale putorius*), raccoon (*Procyon lotor*), longtailed weasel (*Mustela frenata*), foxes, cats (*Felis* spp.), feral hogs (*Sus scrofa*), snakes, and possibly armadillos (*Dasypus novemcinctus*) (Vickery 1996). Predators of adult birds include various hawk species as well as loggerhead shrikes (*Lanius ludovicianus*). Red imported fire ants (*Solenopsis invicta*) appear to have a slight negative influence on FGSP abundance (Allen et al. 1999). Nest predation is the cause of most nest failures (Perkins et al. 2003), however, nearly all predators are native animals with which the sparrow has evolved. FGSP have lower nest success than other grasshopper sparrows, but their breeding season is substantially longer. The Service has funded research, commencing in the 2009 breeding season, to investigate predator management strategies to reduce predation pressures on FGSP. In light of the direct relation of this threat to fecundity and mortality, the severity and scope of this threat are moderate to high.

*Brood parasitism.* Brood parasitism by brown-headed cowbirds (*Molothrus ater*) has not been documented for FGSP, but has been observed in other grasshopper sparrow subspecies (Vickery 1996).

*Parasites.* Ticks (*Haemaphysalis* spp.), feather mites, and helminthes are documented parasites of FGSP, but do not appear to pose serious threats (Delany and Forrester 1997; Forrester and Spaulding 2003).

**d. Inadequacy of existing regulatory mechanisms:** Guidelines, conservation measures, and regulatory mechanisms are in place to minimize impacts to FGSP on military, state, federal, and privately owned lands. These guidelines offer recommendations aimed to minimize impacts pre-construction, as well as operation and management following construction. Such measures include maintaining habitat connectivity and implementing an appropriate fire regime.

The FGSP is listed by the Florida Fish and Wildlife Conservation Commission (FWC) as endangered (Chapter 39-27, Florida Administrative Code). This legislation prohibits take, except under a permit, but does not provide any direct habitat protection. Wildlife habitat is protected on FWC wildlife management areas and wildlife environmental areas according to Florida Administrative Code 68A-15.004. Florida Park Service regulations prohibit take of specimens and destruction of vegetation (i.e., habitat) on park property without a permit.

Conversion of dry prairie habitat to agriculture and improved pasture continues. However, development is subject to regulatory oversight by respective county authorities, the State, and the Service (e.g., species guidelines, ESA consultation). Minimizing impacts to FGSP habitat on private lands is crucial to the persistence of the species (Perkins et al. 2008). The severity of this threat is high, while the scope remains moderate.

**e. Other natural or manmade factors affecting its continued existence:**  
None known as a threat at the time of listing or at present.

#### **D. Synthesis**

No change is recommended to the classification or recovery priority number of the endangered FGSP. The degree of threat to its persistence remains high, but the subspecies' potential for recovery is considerable if threats can be eliminated or minimized. Recovery of the FGSP is in conflict with some economic activities, such as agriculture and urbanization.

The approved recovery plan for the FGSP (Service 1999) does contain recovery criteria, though they are not up-to-date in regard to the subspecies' status and threats. Through several years of research and continuous monitoring, researchers have identified a suite of possible causes for the continuous decline in the FGSP population, including habitat loss and fragmentation, fire suppression, hydrologic management, and cattle grazing. While suitable habitat on public lands is actively managed for FGSP, over 80 percent of original dry prairie, the subspecies' preferred habitat, has been lost to agriculture (Shriver and Vickery 1999).

Regulatory mechanisms are in place to track impacts to FGSP habitat and aid in minimizing impacts from development on public lands. However, the subspecies' minimum requirements for habitat connectivity, food and nest site resources, and other factors may

already be underprovided. Without proper habitat management, even habitat within protected areas can easily be lost or degraded. At present, the metapopulation may be too small to ensure against extinction, and currently protected areas are not enough to meet recovery goals. Habitat enhancement and expansion and demographic improvements at existing locations may restore some FGSP populations (Delany et al. 2007). Land acquisition, habitat restoration, translocations, and further research focused on management strategies are warranted future tasks to conserve this declining subspecies.

### III. RESULTS

#### A. Recommended Classification

  X   No change is needed

### IV. RECOMMENDATIONS FOR FUTURE ACTIONS

- Short-term and long-term priorities for management and recovery need to be quantitatively identified.
- Evaluate the feasibility of restoring improved pastures to dry prairie habitat. Consider the removal of pine plantations to improve the connectivity of subpopulations.
- Pursue conservation agreements and/or acquire land that includes remnant dry prairie habitat. Consider the shape of grasslands (perimeter to area ratio) with respect to planning and prioritizing land acquisition, restoration, and management.
- Determine reproductive success of FGSP in improved pastures and evaluate if such habitats can sustain FGSP in the long-term.
- Examine connectivity and dispersal within and among subpopulations.
- Continue to actively manage and expand core dry prairie habitat. Work towards providing connectivity between subpopulations. Monitor response of populations to these actions.
- Continue to survey potential habitat and periodically contact landowners for permission to conduct sparrow surveys on private lands. Expand search efforts to include pastures with some remaining native vegetation that may provide breeding habitat.
- Revisit previous data to allow for fine-resolution analysis of population declines.
- The 1999 recovery plan should be revised and updated to reflect the current status and threats to the FGSP, and recovery criteria, objectives, and tasks should be developed or revised.
- Identify reintroduction sites and evaluate the efficacy of experimental translocations. Implement population augmentations where appropriate and document methods and results of translocations.

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**U.S. FISH AND WILDLIFE SERVICE**  
**5-YEAR REVIEW of the**  
**Florida grasshopper sparrow (*Ammodramus savannarum floridanus*)**

Current Classification Endangered  
Recommendation resulting from the 5-Year Review

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change is needed

Appropriate Listing/Reclassification Priority Number, if applicable \_\_\_\_\_

Review Conducted By Sandra Sneckenberger

**FIELD OFFICE APPROVAL:**

Lead Field Supervisor, Fish and Wildlife Service

Approve [Signature] Date 9-8-08

*The lead Field Office must ensure that other offices within the range of the species have been provided adequate opportunity to review and comment prior to the review's completion. The lead field office should document this coordination in the agency record.*

**REGIONAL OFFICE APPROVAL:**

*The Regional Director or the Assistant Regional Director, if authority has been delegated to the Assistant Regional Director, must sign all 5-year reviews.*

**Lead Regional Director, Fish and Wildlife Service**

Approve [Signature] Date 9/30/08  
*Acting Assistant Regional Director - Ecological Services*

*The Lead Region must ensure that other regions within the range of the species have been provided adequate opportunity to review and comment prior to the review's completion. If a change in classification is recommended, written concurrence from other regions is required.*

**Cooperating Regional Director, Fish and Wildlife Service**

Concur  Do Not Concur

Signature \_\_\_\_\_ Date \_\_\_\_\_



**Summary of peer review for the 5-year review of Florida grasshopper sparrow  
(*Ammodramus savannarum floridanus*)**

**A. Peer Review Method:** Recommendations for peer reviewers were solicited from the Florida Park Service, University of Florida, and National Park Service. Three peer reviewers were asked to participate in this review. Individual responses were requested and received from all three peer reviewers.

**B. Peer Review Charge:** See attached guidance.

**C. Summary of Peer Review Comments/Report:** One reviewer provided information concerning the evidence of FGSP movements between APAFR and KPPSP. One reviewer noted that the first description of FGSP occurred in the Kissimmee Prairie region, not necessarily in KPPSP. Two reviewers expressed concern as to how “populations,” “sites,” “subpopulations,” and other terms are used without a consistent meaning, particularly between sites. One review noted that this has been a chronic problem that the working group may need to address.

Two reviewers provided comments on the fire suppression and management section, suggesting that the emphasis be placed on the appropriate time to burn – mimicking a natural fire regime. Two reviewers provided comments to clarify the extent of cattle grazing at KPPSP. One reviewer suggested a discussion on the occurrence of disease in FGSP. One reviewer felt that the effect of fire ants should be addressed in more detail.

One reviewer suggested that while currently valid and adequate, population survey data should be revisited to address finer-scale hypotheses and determine if indices should be adjusted to better estimate population size. One reviewer warned against basing management decisions on limited data. One reviewer suggested that sampling protocols need to be refined. One reviewer suggested that management and recovery priorities should be quantitatively identified.

One reviewer noted that there are inherent limitations in studying FGSP due to the elusive nature of the species. One reviewer noted that singing male surveys is the most reliable and precise method and should be the standard for counting FGSP. One reviewer suggested additional references for the review. One reviewer stressed the need to note the importance of private lands to the persistence of FGSP. One reviewer warned against pursuing a translocation effort without an abundance of careful thought and post-monitoring.

One reviewer suggested language concerning hydrologic management issues. One reviewer felt that nest predation is a natural event and that investigating predator management strategies should be a low priority. One review felt that removing all fence posts at APAFR, acquiring habitat, providing habitat connectivity, restoring and enhancing habitat, and studying the potential of translocations should be the focus of future FGSP work.

**D. Response to Peer Review:** Information regarding FGSP movements between management units, the importance of private lands, hydrologic management, as well as additional references, was added to the body of the status review.

Portions of the review were reworded to clarify the first description of FGSP and the extent of cattle grazing at KPPSP. In regards to the use of “populations,” “sites,” and “subpopulations,” efforts have been made to clarify this issue; however, this is a larger issue that perhaps the FGSP working group would address in the future.

The fire suppression and management section was modified, placing greater emphasis on the appropriate time to burn FGSP habitat.

Several comments consisted of recommendations for future actions or the priorities of these future actions. These comments have been incorporated into the appropriate section.

**Guidance for Peer Reviewers of Five-Year Status Reviews**  
U.S. Fish and Wildlife Service, South Florida Ecological Services Office

February 20, 2007

As a peer reviewer, you are asked to adhere to the following guidance to ensure your review complies with U.S. Fish and Wildlife Service (Service) policy.

Peer reviewers should:

1. Review all materials provided by the Service.
2. Identify, review, and provide other relevant data apparently not used by the Service.
3. Not provide recommendations on the Endangered Species Act classification (e.g., endangered, threatened) of the species.
4. Provide written comments on:
  - Validity of any models, data, or analyses used or relied on in the review.
  - Adequacy of the data (e.g., are the data sufficient to support the biological conclusions reached). If data are inadequate, identify additional data or studies that are needed to adequately justify biological conclusions.
  - Oversights, omissions, and inconsistencies.
  - Reasonableness of judgments made from the scientific evidence.
  - Scientific uncertainties by ensuring that they are clearly identified and characterized, and that potential implications of uncertainties for the technical conclusions drawn are clear.
  - Strengths and limitation of the overall product.
5. Keep in mind the requirement that the Service must use the best available scientific data in determining the species' status. This does not mean the Service must have statistically significant data on population trends or data from all known populations.

All peer reviews and comments will be public documents and portions may be incorporated verbatim into the Service's final decision document with appropriate credit given to the author of the review.

Questions regarding this guidance, the peer review process, or other aspects of the Service's recovery planning process should be referred to Cindy Schulz, Endangered Species Supervisor, South Florida Ecological Services Office, at 772-562-3909, extension 305, email: [Cindy\\_Schulz@fws.gov](mailto:Cindy_Schulz@fws.gov).