Recovery Plan for the Endangered Everglade Snail Kite
(Rostrhamus sociabilis plumbeus)
https://www.fws.gov/verobeach/MSRPPDFs/EvergladeSnailKite.pdf

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DRAFT AMENDMENT 1

We have identified the need to amend recovery criteria for the Everglade snail kite (*Rostrahamus sociabilis plumbeus;* SNKI) with the best available information discovered 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 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; Service 1999) by adding delisting criteria for the SNKI 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 4-317 – 4-323 of the MSRP.

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

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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 species. Primary sources of information included the most recent 5-year review (USFWS 2007) and the current recovery plan (USFWS 1999). This information was prepared by U.S. Fish and Wildlife Service (Service) biologists and managers in the South Florida Ecological Services Field Office in order to develop the recovery criteria for the SNKI.

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 SNKI, found on page 4-317 – 4-323 of the document (https://www.fws.gov/verobeach/MSRPPDFs/EvergladeSnailKite.pdf).

Synthesis

New information, attained after the MSRP was finalized, is detailed in the SNKI 5-Year Status Review (Service 2007) and synthesized below. The assessment of threats, suggested recovery actions, and life history information included in the MSRP largely remain applicable and relevant. Issues related to habitat (i.e., loss, fragmentation, need for management or restoration; Factor A), predation (Factor C), incidental disturbance by humans (e.g., recreational boating in littoral zone and aquatic plant management during the breeding season) (Factor E), and invasive species (Factor E) are still directly pertinent to the SNKI's recovery.

The SNKI was first listed as an endangered species on March 11, 1967, pursuant to the Endangered Species Preservation Act of 1966 (32 FR 4001) and that protection was continued under the Endangered Species Conservation Act of 1969, and the Endangered Species Act of 1973, as amended (87 Stat 884; 16 U.S.C 1531 *et seq*.). The SNKI was listed because of its limited distribution and threats to its habitat posed by the drainage of nearly half the Everglades for agriculture and urban development. Critical habitat for the SNKI was designated on August 22, 1977 (42 FR 47840). About 841,635 acres of critical habitat are located within nine critical habitat units that include the littoral zone of Lake Okeechobee, portions of the Water Conservation Areas (WCA; 1,350 square miles of area developed to regulate water in the open areas of the Everglades and help alleviate flooding from Lake Okeechobee in order to better manage water flows and usage), and Everglades National Park. Although SNKI were utilizing several lakes within the Kissimmee Basin, at the time of designation of critical habitat, there was limited use of those lake habitats by SNKI.

In Florida, the historical range of the snail kite was larger than its current range, and snail kites were known to occur from the southern tip of the Florida peninsula to as far north as Crescent Lake and Lake Panasoffke in north-central Florida and as far west as the Wakulla River (Howell 1932; Sykes 1984). The current distribution of the snail kite in Florida is limited to six large freshwater ecosystems (Upper St. Johns marshes, Kissimmee River Basin, Lake Okeechobee, Loxahatchee Slough, the Everglades [i.e., areas south of Lake Okeechobee], and the Big Cypress basin) within the central and southern portions of the State. In recent years, use of the originally designated critical habitat units by snail kites has decreased significantly. Snail kites have been documented to use areas not originally designated as critical habitat, such as the Kissimmee Chain of Lakes (KCOL; i.e., Lake Tohopekaliga, East Lake Tohopekaliga, Lake Kissimmee, Lake Hatchineha, Lake Istokpoga, and Lake Jackson), the Kissimmee River Basin in central Florida, Stormwater Treatment Areas (living wetland treatment areas used to remove nutrients from stormwater runoff), and other various wetlands in the Upper St. Johns marshes.

The principal threat to the snail kite is the loss, fragmentation, and degradation of wetlands (Factor A). Hydrologic conditions, both natural and unnatural (i.e., water management), may adversely affect snail kite nest success and juvenile survival both directly (e.g., increased predation) and indirectly (e.g., decreased foraging opportunities) (Factor E). For example, rapid recession rates during the dry (breeding) season and associated low water levels can allow nests to become accessible to land-based predators, resulting in decreased nest success. Extremely low water levels and rapid recession rates can limit foraging opportunities for juvenile and nesting adult snail kites, both of which require a sufficient forage base in the vicinity of the nest.

The recent large increase in the exotic apple snail population throughout the snail kite's range is noteworthy. Snail kites are exploiting this population, but the long-term sustainability of this is unclear. The abundance of native apple snails seems to be too low to support large numbers of nesting snail kites throughout the breeding range (Wright et al. 2013, LG2 2016, Bernatis pers. comm. 2017). In addition to concerns regarding low abundances of native Florida apple snails, the introduction of exotic apple snails (*Pomacea* spp.) may adversely affect the survival of the snail kite, most notably through decreased juvenile recruitment (Fletcher pers. comm. 2018).

From 2010 to present, juvenile survival has been trending down (Fletcher et al. 2017). The observed variability in juvenile survival is related to variation in environmental conditions, including those hydrologic conditions that directly affect the survival and productivity of the apple snail, as discussed above (Factor E). Additionally, these hydrologic conditions have significant effects on snail kite nest success. Because apple snails are the primary food source for the snail kite, changes in hydrology that affect the survival and productivity of the apple snail and their availability to snail kites have a direct effect on the survival and productivity of the snail kite (Mooij et al. 2002). The abundance of apple snails is also linked to water regimes (Kushlan 1975; Sykes 1979, 1983; Darby et al. 2005). Within a given year and at a given location, the availability of apple snails is also dependent on hydrologic conditions (Darby et al. 2006), including water levels and recession rates, and thus water management actions.

Beginning in 1997, population estimates for the SNKI were generated using a mark-recapture method that incorporated detection probabilities (Drietz et al. 2002). These new population estimates, which incorporate detection probability (less than 1.0), are higher than those resulting from the previous counts. For instance, population size estimates generated from mark-recapture techniques for 1997 to 2000 are approximately 2 to 3 times higher than previous count-based estimates (e.g., 800 to 1,000 estimated snail kites based on count-based surveys in 1993 and 1995, compared to an estimated 2,700 to 3,500 snail kites based on mark-recapture analyses from 1997 to 2000) (Bennetts and Kitchens 1997, Dreitz et al. 2002). With the new method of estimating populations, the overall SNKI population exhibited steep declines from 1999 to 2002 and from 2006 to 2008, but rebounded slightly starting in 2010. In 2014, the population estimate was significantly higher (1,754 birds). From 2011 to 2014, conditions improved in Lake Okeechobee and the number of fledglings generally increased. Across all sites monitored in 2013, Lake Okeechobee was the most productive water body in terms of overall SNKI production (Cattau et al. 2008, Cattau et al. 2012, Fletcher et al. 2017).

Lake Okeechobee is of particular importance since it serves as a critical stopover point as SNKI traverse the network of wetlands within their range. A loss of suitable habitat and refugia, especially during droughts in the lake, may have significant demographic consequences (Takekawa and Beissinger 1989, Kitchens et al. 2002, Martin et al. 2006a). Lake Okeechobee will be critical to the snail kite's long-term population persistence, especially given the susceptibility of juvenile SNKI in the Kissimmee River Valley to an increased frequency of local disturbance events due to cold weather and the treatment of hydrilla (*Hydrilla verticillata*) (Reichert et al. 2011) (Factor E). As discussed for Lake Okeechobee, current water management practices in the WCAs are also thought to have degraded habitat quality for the snail kite. Although the overall trend in WCA-3A has been down, recent upticks in successful nesting attempts in 2011, 2013, and 2014 may indicate a positive change in suitable habitat.

Another potential threat to snail kites is avian vacuolar myelinopathy (AVM) (Factor C). AVM is a neurological disease that comes from direct or indirect consumption of neurotoxins produced by blue-green algae (cyanobacteria) that can grow on the leaves of submersed plants, especially hydrilla. When herbivores consume hydrilla while the cyanobacteria and the neurotoxin are present, they can display loss of muscle control resulting in difficulty flying, swimming, and eventual death. AVM has been found to affect many species that consume infested hydrilla or prey on species that do. Apple snails (Wilde and Netherland 2015) can accumulate the toxin, though not all show clinical signs of the disease. Several studies on the KCOL have confirmed that at least some portions of hydrilla populations in lakes East Tohopekaliga, Tohopekaliga, Cypress, Hatchineha, and Kissimmee have the cyanobacteria present. These studies have also verified through a feeding trial with chickens that hydrilla collected from Lake Tohopekaliga can pass AVM to consumers (Wilde and Netherland 2015). To date, no sightings of eagles or snail kites displaying signs of AVM have been reported.

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 SNKI 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, sub-species, or distinct population segment) 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 SNKI 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 – 317 of the MSRP).

Delisting Recovery Criteria

The snail kite will be considered for delisting when all the following criteria have been met:

1. Populations inhabiting the following three (3) areas exhibit a stable or increasing trend as evidenced by natural recruitment and multiple age classes.
    a. Northern range: St. Johns Marsh, Kissimmee Chain of Lakes, Kissimmee River Basin, and three (3) additional water bodies;
    b. Central range: Lake Okeechobee; and
    c. Southern range: Nine (9) water bodies, which include Loxahatchee Slough, Loxahatchee National Wildlife Refuge, Water Conservation Areas 2 and 3, Everglades National Park, Big Cypress National Preserve, Fakahatchee Strand, Okaloacoochee Slough, and marshes surrounding Corkscrew Swamp (Factor A and E).

2. Threats to the snail kite's native prey, the Florida apple snail (*Pomacea paludosa*), are reduced or eliminated to a degree that the snail kite is viable for the foreseeable future (Factor E).

3. Habitat loss associated with water and aquatic plant management is reduced such that enough suitable nesting and foraging habitat remains for the snail kite to remain viable for the foreseeable future (Factor A).

4. Human disturbance and predation of snail kite nests is minimized such that the species is viable for the foreseeable future (Factor A and E).

5. Any additional threats (e.g., avian vacuolar myelinopathy) are minimized throughout the populations such that the species is viable for the foreseeable future (Factor A-E).

Justification

The proposed delisting criteria reflect the best available and most up-to-date information of the SNKI, while incorporating information still relevant from the MSRP. Furthermore, the delisting criteria developed reflect the species' 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 by:

Criterion 1. Providing redundancy through populations in multiple important areas throughout the historical range (i.e., northern, central, and southern areas) and sufficient habitat and demographic parameters that allow for resilient and stable populations. Snail kite persistence depends on maintaining hydrologic conditions that support apple snails, sparsely distributed emergent vegetation, and suitable nesting substrate in wetlands across the region each year (Martin et al. 2008).

A balanced approach to water level management, which includes preserving and/or restoring natural, unregulated systems, can maintain favorable habitat conditions for SNKI and is important for the redundancy and resiliency of the SNKI. For example, habitat management and restoration activities have made Paynes Prairie State Park, an unregulated natural area, suitable for SNKI, and as a result, SNKI nesting occurred there starting in 2018. Under favorable environmental conditions, snail kites have the ability to achieve high reproductive rates, and similarly, juvenile survivability rates are generally higher under more favorable conditions.

Criterion 2. Providing a long-term solution to significantly reduce or eliminate the threat of non-native species. Prolonged periods of high and low water have impacted the native apple snail populations that the snail kites rely upon for food. Native snail abundance throughout the range of the snail kite is below that associated with use by foraging kites (Darby et al. 2006). The close tie between the snail kite and the native apple snail require consideration of both species when developing management strategies and addressing potential impacts. Water regimes that are unfavorable for the SNKI can result in the temporary or permanent loss of apple snail habitat with a concomitant reduction in apple snail numbers. Furthermore, water management practices that maintain higher water levels for extended periods of time can result in the death of emergent vegetation required by apple snails for successful feeding and reproduction.

Criterion 3. Ensuring sufficient habitat is expected to remain for long-term persistence, despite habitat changes and habitat loss due to climate change. Short-term natural disturbances and long-term habitat degradations (e.g., the conversion of wet prairies to sloughs in WCA 3A) may alter both prey density and habitat conditions for foraging and successful reproduction for snail kites. Proper water management is important for successful nest survival in SNKI. Providing natural, functional connectivity is critical to counteract fragmentation and degradation in order to allow for natural gene flow. Snail kite persistence depends on maintaining hydrologic conditions that support apple snails, sparsely distributed emergent vegetation, and suitable nesting substrate in wetlands across the region each year (Martin et al. 2008).

Criterion 4. Providing a long-term solution to significantly reduce or eliminate the threat of human disturbance and predation. Resource management activities, and aquatic plant management in particular has resulted in incidental disturbance of nesting SNKI and even destruction of nests. Furthermore, nest predation is a common cause of SNKI nest failure. The occurrence of nest predation is largely a result of hydrologic management in areas where SNKI nests.

Criterion 5. Providing a long-term solution to significantly reduce or eliminate any potential new threats, such as diseases like AVM, caused by a cyanobacteria that has been confirmed in portions of the SNKI's range.

Rationale for Amended Recovery Criteria

The existing criteria for SNKI on page 4-291 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 SNKI 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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