Everglade Snail Kite
(Rostrhamus sociabilis plumbeus)

5-Year Review:
Summary and Evaluation

Photo credit: Vince Lam.

June 2023

U.S. Fish and Wildlife Service
Southeast Region
Florida Ecological Services Field Office

5-YEAR REVIEW
Everglade Snail Kite *(Rostrhamus sociabilis plumbeus)*

GENERAL INFORMATION

Methodology used to complete the review

In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a status review is to assess each threatened species or endangered species to determine whether its status has changed and if it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants. The U.S. Fish and Wildlife Service (Service) evaluated the biology, habitat, and threats of the Everglade snail kite to inform this status review. In conducting this 5-year review, we relied on the best available information pertaining to historical and contemporary distributions, life histories, genetics, habitats, and threats of this species. We used a variety of information resources, including monitoring reports, surveys, and other scientific and management information. We announced initiation of this review and requested information in a published Federal Register notice with a 60-day comment period on April 11, 2019 (84 FR 14669 14672). We received no public comments during the open comment period. The draft review was prepared by the species recovery lead and reviewed and revised by field office and regional recovery staff.

Reviewers

Lead Regional or Headquarters Office -- Atlanta Regional Office, Carrie Straight (404) 679-7226.

Lead Field Office – Florida Ecological Services Field Office, Vicki Garcia, (772) 469-4249.

Background

Federal Register Notice citation announcing initiation of this review
April 11, 2019 (84 FR 14669)

Listing history

Original Listing
Federal Register Notice: 32 FR 4001
Federal Register Notice date: 3/11/1967
Effective listing date: 3/11/1967
Entity listed: *Rostrhamus sociabilis plumbeus*
Classification: Endangered

Associated rulemakings

Proposed Determination of Critical Habitat for Florida Everglade Snail Kite and Dusky Sea Sparrow (41 FR 53074; 12/03/1976)

Final Determination of Critical Habitat Listing (42 FR 40685; 08/11/1977)

Final Correction and Augmentation of Critical Habitat Reorganization: (42 FR 47840; 09/22/1977)

Review History

Recovery Outlines, Recovery Plans, Recovery Plan Amendments, Recovery Implementation Strategies, Previous 5-year Review/s:

May 21, 1979: Notice of 5-year status review (44 FR 29566)
July 7, 1987: Notice of completion (no change) (52 FR 25522) for the review initiated on July 22, 1985(50 FR 29901).
November 6, 1991: 5-year review (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 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 Everglade snail kite.
May 18, 1999: South Florida Multi-Species Recovery Plan. This plan summarized the current status and trends, down-listing recovery criteria, and established species-level recovery actions.
March 26, 2007: Notice of availability of a final implementation schedule for the South Florida Multi-Species Recovery Plan (72 FR 14132 14133).
September 27, 2007: Everglade snail kite (*Rostrhamus sociabilis plumbeus*) 5-Year Review: Summary and Evaluation. This review concluded that no change was needed to the recommended classification.
August 6, 2019: 21 Draft Recovery Plan Revisions for 43 Southeastern Species; Notice of Availability (84 FR 38291 38294).
November 26, 2019: Everglade Snail Kite Recovery Plan Amendment 1. This amendment establishes delisting recovery criteria.

Species Status Assessments/Reviews:
May 2023 – A Species Status Assessment Report for the Everglade Snail Kite (*Rostrhamus sociabilis plumbeus*) is in progress. Service and partners are working to include and assess information related to the subspecies in Cuba and Isla de la Juventud.

Species' Recovery Priority Number at start of review: 3c
A recovery priority number of "3c" reflects a subspecies with a high degree of imminent threat and high degree of recovery potential, and some degree of conflict between the species' recovery efforts and economic development.

REVIEW ANALYSIS

Taxonomy

Prior to the Act, two statutes allowed listing of, and certain protections for, endangered species. In 1966, the Endangered Species Preservation Act ("Preservation Act"; Pub. L. No. 89–669, October 15, 1966) was enacted, and the Preservation Act was amended and

renamed the Endangered Species Conservation Act ("Conservation Act"; Pub. L. No. 91–135, December 5, 1969). The Preservation Act provided for the listing of species of native fish and wildlife found to be threatened with extinction (see section 1(c), 80 Stat. 926 (1966)). Under the Preservation Act, 36 birds were listed, which included *Rostrhamus sociabilis plumbeus* (32 FR 4001, March 11, 1967). Species listed under the Preservation Act were transferred to the protected species list under the Conservation Act. For species listed under Conservation Act, the entire species or subspecies was protected under the Conservation Act.

In an early description of species, the race or subspecies "*plumbeus*" was attributed to Everglade Kites (*Rostrhamus sociabilis*) that occurred in Southern Florida and the West Indies (Baird et al. 1874). Based on morphology, Friedman (1933, 1950) then separated the West Indies individuals into the "*levis*" subspecies (race). Therefore, at the time of the species listing under the Preservation Act, experts considered four subspecies 1) *R. s. levis* occurring in Cuba and Isle of Pines; 2) *R. s. plumbeus* in Florida; 3) *R. s. major* in Mexico and Central America; and 4) *R. s. sociabilis* in South America (Friedmann 1950).

In 1975, the species was reorganized by experts into three subspecies: 1) *R. s. sociabilis* in South and Central America north through Honduras; 2) *R. s. major* in Mexico, Guatemala, and Belize; and 3). *R. s. plumbeus* in Florida, Cuba, and Isle of Pines (currently called Isla de Juventud, off the coast of Cuba) (Amadon 1975). This reorganization combined the *levis* subspecies with the *plumbeus*. This was supported by lack of distinctive differences in color or size of individuals. Assessment of movements of kites in Florida and the geographic nearness of Cuba, well within dispersal and flying ability of kites, would support the inclusion of Cuba and the Isles of Pines in the subspecies range (Beissinger et al. 1983). However, currently there is no evidence that dispersal occurs between Florida and Cuba (Bennetts and Kitchens 1997, Reichert et al. 2020).

Currently, based on Reichert et. al. (2020), there are three recognized subspecies of snail kite:

1) *R. s. sociabilis* "locally in Central America from S Nicaragua through Costa Rica and Panama to South America, occurring in Colombia and Ecuador and, E of Andes, throughout Venezuela, the Guianas and Brazil to EC Argentina and Uruguay.";
2) *R. s. major* in "E Mexico (C Veracruz to Yucatán Peninsula), N Guatemala (Petén), Belize and NW Honduras"; and
3). *R. s. plumbeus* in Florida Everglades (SE USA), Cuba and Isle of Pines (currently recognized as Isla de la Juventud).

Based on this information, the subspecies *R. s. plumbeus* includes individuals in Florida, Cuba, and Isla de la Juventud.

Distinct Population Segment (DPS) policy

The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate wildlife. Because the species' listed range now includes Cuba and Isla de la Juventud, we will be assessing the species under the Service's 1996 DPS Policy, as part of a reassessment in the future after the biological information about the species in Cuba is made available in a Species Status Assessment Report or other biological report.

Recovery Criteria

The delisting criteria for the Everglade snail kite was defined in the 2019 Recovery Plan Amendment (Service 2019). 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 (Factors 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 (Factors 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 (Factors A-E).

These criteria have not been met.

Biology and Habitat Summary

The current range of the snail kite includes Florida, Cuba and Isla de la Juventud (formerly named Isle of Pines). The information related to Florida is subset below because of its more detailed availability. We will generalize information currently available from Cuba and Isla de la Juventud in a separate section.

Florida Distribution and Information. In the 1960s to the mid-1980s most snail kites were restricted to the Everglades. In the 2007 5-year review, the snail kite distribution was limited to central and southern portions of Florida (Service 2007). Since 2007, snail kite numbers have increased and snail kites have been observed nesting in new sites, such as

Paynes Prairie in northern Florida, though many of these new sites are not used regularly or only attract snail kites for one or two breeding seasons (Figure 1).

Based on population estimates produced from surveys, researchers documented a dramatic decrease in the snail kite population between 1999 and 2002, dropping from approximately 3,400 to 1,700 adults (Fletcher et al. 2022). Another dramatic decrease occurred between 2007 and 2009, at which point the population estimate dropped to 700–800 adults (Fletcher et al. 2022). These two decreases, during which the population was effectively halved each time, were associated with severe droughts across the species' range. Since 2010, the population size has increased, reaching a high of 3,171 adults (95% confidence interval = 2,740–3,234) based on the 2021 population estimate (Fletcher et al. 2022). Increases were observed between 2014 and 2017 and coincided with the expansion and proliferation of the kite's main food source, *P. maculata*. Although annual estimates of population size and growth rate have oscillated in recent years, the 3-year average growth rate has been ≥ 1.0 since 2009 (Fletcher et al. 2022). The following summarizes conditions in the various discrete geographic areas, termed analysis units (AUs), throughout the Florida snail kite range to organize information (Figure 1). The AUs are Paynes Prairie, Kissimmee River Valley, St. Johns Marsh), Lake Okeechobee, Southeastern Florida, and Everglades. Populations are increasing in the Kissimmee River Valley and St. Johns Marsh analysis units, which are in the northern range. However, populations are decreasing in the Lake Okeechobee and Everglades analysis units. Moreover, no snail kite nesting has been documented in some of the above areas in recent years including Corkscrew Swamp, Okaloacoochee Slough, and Fakahatchee Strand. Juvenile survival has declined steadily since 2015, with more research needed to fully understand the cause(s). In places where monitoring has been conducted, such as the Everglades, Florida apple snail densities remain low (Meyer and Darby 2021).

Overall, the species in Florida has had variable population growth rates (Table 1; Figure 2; Fletcher et al. 2022). The overall 2020 population estimate for Florida is 2,559 (CI = 2,425–3,178) (Fletcher et al. 2022).

Cuba and Isla de la Juventud Distribution and Information. We have limited access to data related to the species in these locations. It is unknown how the distribution of the species has changed in this portion of its range. However, there is some historical information about the species distribution detailed in Beissinger et al. (1983). Currently, it is considered a rare to common resident in Cuba (Reichert et. al. 2020). Some areas within Cuba indicate a generally higher relative abundance (similar to what is seen in Florida) (Fink et al. 2022). However, this information does not provide details on relative changes in abundance, changes in habitats, and nesting success.

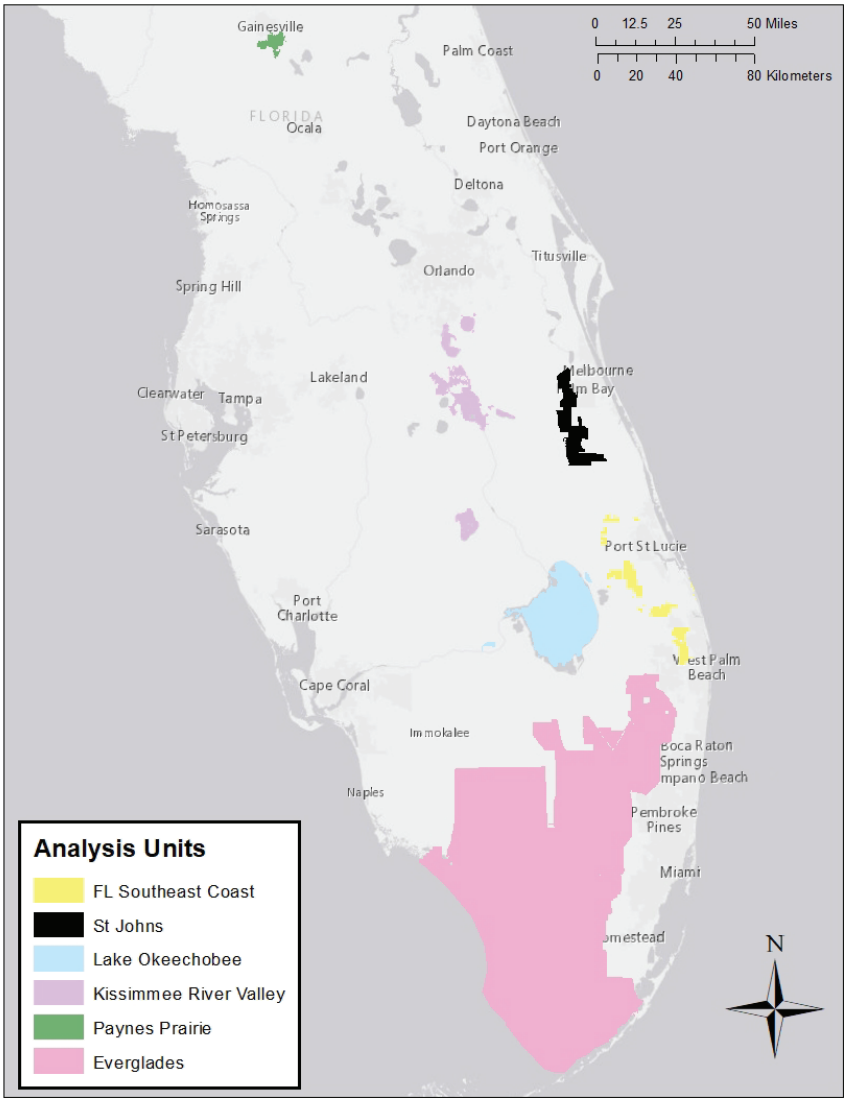

Figure 1. Analysis units used for assessing snail kite in Florida.

Table 1. Average 3-year growth rate (λ) for each Florida Analysis Unit.

Analysis Unit	2020 λ (3 Year Avg)
Paynes Prairie	11.455[a]
Kissimmee River Valley	1.118
St. Johns Marsh	1.219
Lake Okeechobee	0.408
Everglades	0.371
Southeastern Florida	1.010

[a] In Paynes Prairie, snail kite nesting was first documented in 2018 with only 3 nests, and exponentially increased to 74 nests in 2019. This lambda was based on growth rates from 2019 (i.e., 21.57) and 2020 (i.e., 1.34). Therefore, this estimate is skewed, and future estimates should allow better comparisons with other Analysis Units.

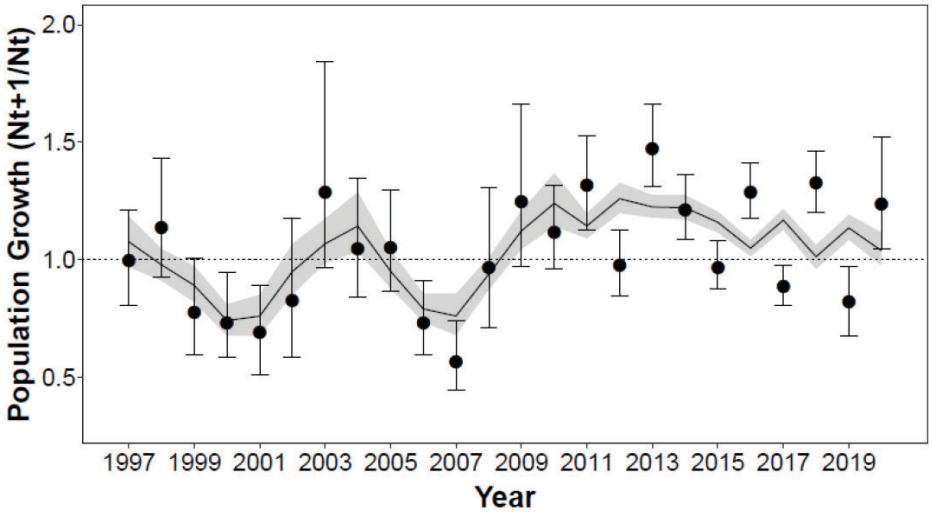

Figure 2. Florida population growth rates from 1997 to 2020, derived from estimates of superpopulation size. The black line shows the 3-year running average and the gray shaded region is the 95% confidence intervals. Graph is Figure 17 in Fletcher et al. (2022).

Threats (Five-Factor Analysis) Summary

The status of a species is determined from an assessment of factors specified in section 4 (a)(1) of the Act, including: Factor A: the present or threatened destruction, modification, or curtailment of its habitat or range; Factor B: overutilization for commercial, recreational, scientific, or educational purposes; Factor C: disease or predation; Factor D: the inadequacy of existing regulatory mechanisms; Factor E: other natural or manmade factors affecting its continued existence. Threats to the snail kites' native food resources, Florida apple snails, include water levels, hydroperiods, vegetation structure, non-native apple snails, and the presence of contaminants in Florida waters. These threats also impact the snail kite through impacts to their habitat (Factor A) and food sources (Factor E). Additionally, in places where monitoring has been conducted, such as the Everglades, Florida apple snail densities are low (Meyer and Darby 2021).

Control of non-native and invasive plants, as well as treatments within dense native emergent vegetation, has proven to be a valuable tool to improve and maintain suitable habitat for nesting and foraging snail kites. Tailored management of emergent vegetation in lake littoral zones has also been shown as having benefits to kites (e.g., isolating dense patches of nesting habitat to reduce connection with shorelines and thus potential for predation by land-based animals). Lack of management may lead to habitat loss or degradation (Factor A). Some lakes are not available for nesting due to lack of aquatic plant management (overcrowding of non-native vegetation). However, vegetation management may include both chemical (spraying herbicides) and mechanical (harvesting, prescribed burning) methods, all of which must be conducted following best management practices to avoid inadvertent adverse impacts to snail kites. For example, vegetation management such as spraying should use targeted options to avoid damage to non-target plant species, and certain treatments may need to be restricted in timing and

proximity to snail kite nests to avoid disturbance or inadvertent impacts to the nesting substrate or the surrounding foraging habitat. In addition, in some years, areas may not be available or have reduced availability for nesting due to incompatible water level management.

Nests closer to open water during periods of low water expose snail kites to potentially greater levels of human disturbance, resulting in disruption of nesting activities (Rodgers 2003) (Factor E). Moreover, the high degree of vegetation management that is needed in Florida lakes requires ongoing close coordination to avoid human disturbance to snail kite nests. Predation of snail kite nests increases with low water levels as terrestrial predators have increased access to nest sites, and nest failure due to predation can be high in some years (e.g., Lake Okeechobee in 2021, East Lake Toho in 2022; Factor C). Nest failure rates overall are high in some years, although the cause of nest failures cannot always be determined.

Although no snail kites have been documented exhibiting symptoms of avian vacuolar myelinopathy or other diseases (Factor C), there are various other threats to snail kite populations including potential future changes in precipitation related to climate change, effects of sea level rise in nesting and foraging areas, increasing demand for water, increasing urbanization around waterbodies, and water quality issues that reduce habitat suitability for nesting and foraging, including the ability of snail kites to forage for apple snails (Factors A and E).

Although we do not have details about specific threats to the species in Cuba and Isla de la Juventud, the subspecies is likely impacted by the same threats as seen for the subspecies in Florida. Beissinger et al. (1983) noted that habitat did experience fluctuations in water levels, and their descriptions also noted infrastructure (canals, man-made islands, non-native tree species) and proximity to tourism attractions that could impact species habitat, nesting success, and behavior. Threats to the subspecies outside of Florida in addition to those described above could include pesticides, toxins, and environmental contaminants that may be more strictly controlled or banned in the United States (see Conservation and Management/Effects of Human Activities in Reichert et. al. 2020 for additional details). It is unknown if these are a threat at this time. Cuba and Isla de la Juventud will also show impacts from climate change, losing some portions of coastal areas and experiencing salt water intrusion of freshwater habitats resulting from sea level rise (Planos Gutiérrez and Gutiérrez Pérez 2020). Variation in temperatures, showing general increases, could impact the species' habitat and food resources.

Synthesis

The Everglade snail kite is a subspecies of snail kite found in Florida, Cuba, and Isla de la Juventud (formerly named Isle of Pines). It is a medium-sized raptor that feeds almost exclusively on freshwater apple snails of the genus *Pomacea*. Snail kite populations in Florida have increased somewhat since the last 5-year review in 2007, largely due to the invasion of the non-native Island apple snail (*Pomacea maculata*). Whether non-native apple snails will continue to expand or even continue to be available to snail kites is unknown. Moreover, in Florida, the subspecies still remains at or below the low levels it was at in the late 1990's, and there is some evidence that the population growth rate has

levelled out or declined in recent years. We have little to no information about the status of the subspecies outside of Florida. Threats to the subspecies, their habitats, and food resources include water management; invasive plants; habitat loss, fragmentation, and degradation of wetlands; decline in native apple snails and uncertainty in the reliability of non-native apple snails as a food source; water quality issues; increasing precipitation; and others. Because of on-going threats and uncertainty in the populations, we believe the subspecies continues to meet the definition of endangered under the Act.

RECOMMENDATIONS FOR FUTURE ACTIVITIES

- Focus on increasing reproductive effort, nest success, and juvenile survival.
- Focus on increasing carrying capacity of wetlands across the range.
- Continue to refine the research on how water levels affect nest initiation, nest success, and juvenile survival. Site-specific water management targets need to be established range-wide, with specific commitments to maintain these targets throughout the pre-breeding and primary nesting seasons.
- Research how to improve suitable nesting substrates and prey availability and manage for these factors to enhance demographic rates.
- Research the potential benefits and costs to snail kites of using novel nesting areas created by impoundments. Specifically, does the temporarily increased reproductive output from novel sites observed to date result in increased population growth in the long term, or do these areas act as a sink, producing fewer fledglings or lower first year survival rates than more permanent habitat? Do young fledged from these areas have similar body condition to those from non-novel sites? Does fledging from a novel site affect future individual fitness and adult survival? Also, why are some sites used and others not, and why do these sites become less suitable over time? What explains the establishment of invasive apple snails at some sites and not others? While the presence of invasive apple snails explains some of the observed variation in snail kite use, that factor does not explain all the variation.
- Expand monitoring to better understand kites' use of smaller wetlands and restored areas, in both the breeding and non-breeding seasons.
- Research habitat use during the non-breeding season, why snail kites use certain areas and avoid others, and if habitat use during the non-breeding season affects the condition of breeding birds and their ability to successfully raise young.
- Research how freshwater flow regimes will change because of sea-level rise and how this may impact our ability to manage water to meet targets in the future.
- Conduct actions outlined in the MSRP (Service 1999).
- More research is needed on the long-term impacts of herbicide use and the most effective plant management techniques for controlling invasive plant species while minimizing potential adverse effects to apple snails.
- Implement a more extensive apple snail monitoring program to include all of the areas where snail kite surveys are being conducted. This program should be conducted annually for a minimum of 10 years in order to encompass long-term climate cycles.

- Monitor and expand data collection of the non-native apple snails and their effect on the native snail population and snail kite food availability.
- Coordinate with researchers to analyze the data obtained from the Comprehensive Everglades Restoration Plan Monitoring and Assessment Plan that pertain to Greater Everglades landscape pattern vegetation mapping. Vegetation mapping will track the spatial extent, pattern, and proportion of plant communities within major landscape regions of the Greater Everglades wetlands.

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RESULTS / SIGNATURES

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of Everglade Snail Kite (*Rostrhamus sociabilis plumbeus*)

Current Classification: Endangered.

Recommendation resulting from the 5-Year Review:

_____ Downlist to Threatened
_____ Delist
_X_ No change needed

Review Conducted By: Victoria Garcia, Florida Ecological Services Field Office.

FIELD OFFICE APPROVAL:

Division Manager, Classification and Recovery, Florida Ecological Services Field Office, Fish and Wildlife Service

Approve LOURDES MENA Digitally signed by LOURDES MENA Date: 2023.07.10 13:29:26 -04'00' Adobe Acrobat version: 2023.003.20215

** Since 2014, in the Florida Ecological Services Field Office, the Classification and Recovery Division Manager has delegated authority to approve 5-year reviews that do not recommend a status change.*

LEAD REGIONAL OFFICE APPROVAL:
Assistant Regional Director – Ecological Services, Fish and Wildlife Service

Approve JOHN TIRPAK Digitally signed by JOHN TIRPAK Date: 2023.06.21 22:06:51 -04'00'