DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R4–ES–2022–0099; FXES11130900000FEDR–267–FF09E22000]

RIN 1018–BF53

Endangered and Threatened Wildlife and Plants; Removal of the Southeast U.S. Distinct Population Segment of the Wood Stork From the List of Endangered and Threatened Wildlife

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), are removing the Southeast U.S. distinct population segment (DPS) of the wood stork (*Mycteria americana*) from the Federal List of Endangered and Threatened Wildlife. After a review of the best scientific and commercial data available, we find that delisting the species is warranted. Our review indicates that the threats to the Southeast U.S. DPS of the wood stork have been eliminated or reduced to the point that the species no longer meets the definition of an endangered species or threatened species under the Endangered Species Act of 1973, as amended (Act). Accordingly, the prohibitions and conservation measures provided by the Act, particularly through sections 4 and 7, will no longer apply to the Southeast U.S. DPS of the wood stork.

DATES: This rule is effective March 12, 2026.

ADDRESSES: This final rule is available on the internet at *https://www.regulations.gov.* Comments and materials we received are available for public inspection at *https://www.regulations.gov* at Docket No. FWS–R4–ES–2022–0099.

Availability of supporting materials: This rule and supporting documents, including the Recovery Plan, post-delisting monitoring plan, and the species status assessment (SSA) report, are available at *https://www.regulations.gov* under Docket No. FWS–R4–ES–2022–0099.

FOR FURTHER INFORMATION CONTACT: Nikki Colangelo, Supervisor, Division of Classification and Recovery, U.S. Fish and Wildlife Service, Florida Ecological Services Office; telephone: 772–226–8138; *Nikki_Colangelo@fws.gov.* Individuals in the United States who are deaf, deafblind, hard of hearing, or have a speech disability may dial 711 (TTY, TDD, or TeleBraille) to access telecommunications relay services. Individuals outside the United States should use the relay services offered within their country to make international calls to the point-of-contact in the United States.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, a species warrants delisting if it no longer meets the definition of an endangered species (in danger of extinction throughout all or a significant portion of its range) or a threatened species (likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range). The Southeast U.S. DPS of the wood stork is listed as threatened, and we are delisting it. Delisting a species can be completed only by issuing a rule through the Administrative Procedure Act rulemaking process (5 U.S.C. 551 *et seq.*).

What this document does. This final rule delists the Southeast U.S. DPS of the wood stork based on its recovery.

The basis for our action. Under the Act, we may determine that a species is an endangered species or a threatened species because of any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. The determination to delist a species must be based on an analysis of the same factors.

Under the Act, we must review the status of all listed species at least once every five years. We must delist a species if we determine, on the basis of the best scientific and commercial data available, that the species is neither a threatened species nor an endangered species. Our regulations at 50 CFR 424.11(e) identify four reasons why we might determine a species shall be delisted: (1) The species is extinct; (2) the species has recovered to the point at which it no longer meets the definition of an endangered species or a threatened species; (3) new information that has become available since the original listing decision shows the listed entity does not meet the definition of an endangered species or a threatened species; or (4) new information that has become available since the original listing decision shows the listed entity does not meet the definition of a species. Here, we have determined that the Southeast U.S. DPS of the wood stork has recovered to the point at which it no longer meets the definition of an endangered species or a threatened species; therefore, we are delisting it.

Previous Federal Actions

On February 28, 1984, we listed the U.S. breeding population of the wood stork as an endangered species under the Act because it had declined by more than 75 percent over a 50-year time period starting in the 1930s (49 FR 7332). On June 30, 2014, we finalized a rule downlisting the U.S. breeding population of the wood stork from endangered to threatened and establishing the Southeast U.S. breeding population in Alabama, Florida, Georgia, North Carolina, Mississippi, and South Carolina as a distinct population segment (DPS) (79 FR 37078). On February 15, 2023 (88 FR 9830), we published a proposed rule to delist the Southeast U.S. DPS of the wood stork based on recovery.

Please refer to the February 15, 2023 (88 FR 9830), proposed rule for a detailed description of the previous Federal actions concerning this species. In the interest of conciseness, throughout the rest of this document we will refer to the Southeast U.S. DPS of wood stork simply as ‘‘wood stork’’ or ‘‘DPS.’’

Peer Review

A species status assessment (SSA) team prepared an SSA report for the wood stork, which has been updated with recent data and analyses (Service 2024, entire). The SSA team was composed of Service biologists, in consultation with other species experts. The SSA report represents a compilation of the best scientific and commercial data available concerning the status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the species.

In accordance with our joint policy on peer review published in the **Federal Register** on July 1, 1994 (59 FR 34270), and our August 22, 2016, memorandum updating and clarifying the role of peer review of listing and recovery actions under the Act (*https://www.fws.gov/sites/default/files/documents/peer-review-policy-directors-memo-2016-08-22.pdf*), we solicited independent scientific review of the information contained in the wood stork SSA report. As discussed in the proposed rule, we sent the SSA report to six independent peer reviewers and received two responses. The peer reviews can be found at *https://www.regulations.gov* under Docket No. FWS–R4–ES–2022–

0099. The SSA report was also submitted to multiple Federal, State, municipal, and conservation partners for technical review. In preparing the proposed rule, we incorporated the results of these reviews, as appropriate, into the SSA report, which was the foundation for the proposed rule and this final rule. A summary of the peer review comments and our responses can be found in the proposed rule (88 FR 9830 at 9832, February 15, 2023).

Summary of Changes From the Proposed Rule

We made several changes in this final rule in response to public comments we received on the February 15, 2023, proposed rule (88 FR 9830). In incorporating the primary changes resulting from public input:

- We updated our discussion of the future effects of sea level rise to wood stork habitat, which includes an analysis of the latest sea level rise projections (Sweet et al. 2022, entire).
- We updated our future condition discussion both in this final rule and in the updated (version 1.1 of the) SSA (Service 2024, chapter 6) to include an analysis of suitable habitat availability for future expansion of wood storks within their breeding range, population growth projections based upon current trends and peak counts, and other additional relevant information.
- We added new demographic data, including total number of nesting pairs (from 2022), and productivity rates (for 2020, 2021, and 2022).
- We added information regarding nesting colony turnover in wood storks and colony location records.
- We made minor, nonsubstantive changes and corrections, and minor editorial changes throughout the preamble of our final rule to improve readability.

The information we received during the comment period for the proposed rule did not change our previous analysis of the magnitude or severity of threats facing the wood stork or our determination that the wood stork is no longer a threatened or endangered species.

Summary of Comments and Recommendations

In the proposed rule published on February 15, 2023 (88 FR 9830), we requested that all interested parties submit written comments on the proposal by April 17, 2023. We also contacted appropriate Federal and State agencies, scientific experts and organizations, and other interested parties and invited them to comment on the proposal. We did not receive any requests for a public hearing. In preparing this final rule, we reviewed all comments we received for substantive issues and new information regarding the information contained in the proposed rule. We made minor, nonsubstantive changes and clarifications to this document in response to comments we received, as appropriate. All substantive information provided during comment periods has either been incorporated directly into this final determination or is addressed below.

Public Comments

(1) *Comment:* Multiple commenters stated that the wood stork should not be delisted because not all of the recovery criteria from the recovery plan have been met.

Our Response: Recovery plans provide roadmaps to species recovery, but meeting recovery criteria and accomplishing recovery actions are not required to achieve recovery of a species or to evaluate it for delisting. In addition, recovery plans are nonbinding documents that may rely on voluntary participation from landowners, land managers, and other recovery partners, but are not regulatory documents and do not substitute for the determinations and promulgation of regulations required under section 4(a)(1) of the Act. Recovery of a species is a dynamic process that is not limited to the guidance recommended in a recovery plan.

A determination of whether a species should be delisted is made solely on an analysis of the best scientific and commercial data available to determine whether the species meets the Act's definitions of ''endangered'' or ''threatened,'' regardless of metrics outlined in the recovery plan. For example, we may determine that due to positive demographic, ecological, or conservation gains, the species' viability is robust enough that it no longer meets the definition of an endangered species or a threatened species. In this case, although one of the recovery targets outlined in the wood stork recovery plan has not been fully achieved as specifically described in the recovery plan, we have determined that the current and projected future viability of the wood stork reflected by range expansion, demonstrated adaptive capacity, breeding population trends, total breeding population number, and productivity, indicates the species has recovered to the point that listing under the Act is not warranted (see *Recovery Criteria* and *Determination of the Southeast U.S. DPS of the Wood Stork's Status* for details).

(2) *Comment:* Several commenters stated that wood storks should not be delisted until Everglades restoration goals have been achieved.

Our Response: As stated above, a determination of whether a species meets the Act's definitions of ''endangered'' or ''threatened'' is made solely on an analysis of the best scientific and commercial data available. The wood stork's wide distribution, expanded breeding range, breeding population numbers, and productivity indicate that the population has recovered, irrespective of Everglades restoration goals. Regardless, delisting the wood stork will not reduce the Service's focus and involvement in Everglades' restoration. For example, the Service is committed and invested in the Comprehensive Everglades Restoration Plan (CERP), which is a Federal, State, Tribal, and local partnership. One of the CERP's goals is restoring a robust and successful wood stork breeding population in the Greater Everglades (Everglades National Park, Water Conservation Areas, Big Cypress, Fakahatchee Strand, Picayune Strand, and Corkscrew Swamp). The CERP initiative was provided through guidance by Congress, which was authorized by the Water Resources Development Act of 2000 (33 U.S.C. 2201 *et seq.*), and continues to be a national conservation priority for the Service. This initiative will continue regardless of the wood stork's status under the Act.

(3) *Comment:* We received several comments suggesting that, without protections provided under the Act, State regulatory mechanisms and those related to Clean Water Act (CWA; 33 U.S.C. 1251 *et seq.*) section 404 permitting would be inadequate to protect wood stork foraging and nesting habitat. Specifically, one commenter stated that the State of Florida was unlawfully excluding certain waterways from CWA section 404 regulation by continuing to apply the Navigable Waters Protection Rule, which was vacated in August 2021. They also expressed concern that, due to the transfer of CWA authority to the State of Florida, National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*) analysis would not occur for individual project permits, and that the State may not be able to adequately fulfill the requirement under section 7 of the Act to ensure that permitted activities do not jeopardize listed species or adversely modify critical habitat.

Our Response: The comment regarding Florida's implementation of the CWA and NEPA is not relevant given the current regulatory landscape.

On February 15, 2024, a Federal court in the District of Columbia issued a ruling formally vacating the EPA's December 2020 decision to allow the State of Florida to assume permitting authority for section 404 of the CWA and the Service's biological opinion related to that decision. Accordingly, implementation of the CWA and NEPA again rests with the EPA and the U.S. Army Corps of Engineers. However, the United States is currently appealing the District Court's decision.

On September 8, 2023, a final rule (88 FR 61964) became effective that amended the ''Revised Definition of 'Waters of the United States' '' to conform key aspects of the CWA regulatory text to the U.S. Supreme Court's May 25, 2023, decision in the case of *Sackett* v. *EPA,* 598 U.S. 651 (2023). The revised definition means that some of the previously jurisdictional wetlands used by wood storks are now considered non-jurisdictional under the CWA and may not receive the same level of Federal oversight under the CWA than prior to the rule change. In addition, recent changes in North Carolina State regulations mirror those resulting from the *Sackett* decision, and mean that isolated wetlands in North Carolina are no longer State-regulated. However, many wetland types that support wood storks are still considered jurisdictional and will therefore continue to receive protections from the CWA after the species is delisted and protections of the Act are removed. In addition, the *Conservation Efforts and Regulatory Mechanisms* section below (see also Service 2024, chapter 5.3) describes multiple mechanisms that are in place that positively impact wood storks and the wetland habitats on which they depend, regardless of the wood stork's status under the Act. We evaluated the wood stork's status and found that the species has recovered, and that any forces acting on the species now or projected to do so in the future (including the effect of dynamic regulatory mechanisms) are not expected to negatively influence the wood stork's viability to such an extent that it would meet the definition of a threatened or endangered species. In summary, we expect that current conservation measures, which are unrelated to the Act and provided by Federal and State regulatory mechanisms, are adequate to maintain wood stork viability into the foreseeable future.

Further, the wood stork post-delisting monitoring plan includes a 10-year monitoring window with protocols to specifically monitor changes to wood stork nesting colony wetlands. Post-delisting monitoring will allow us to track the wood stork's status for at least 10 years to ensure its viability is maintained. Regardless, at any time the Service may decide to reevaluate the wood stork's status.

(4) *Comment:* Several commenters stated that the northern breeding range expansion may not be sustainable into the future. The commenters specifically had concerns that potential threats such as increased pollution and predation, sea level rise, and storm damage, and other factors such as prey availability, had not been adequately assessed in the northern part of the wood stork's current range.

Our Response: Concurrent with the population decline in the South Breeding Region (*i.e.,* southern Florida), the wood stork breeding range expanded northward into the Central, Northeast, and Northwest Breeding Regions (*i.e.,* central and northern Florida, Georgia, and South Carolina; see figure 1) from the 1960s through the 1980s, and then into North Carolina in 2005. This northward expansion has continued since, with increasing numbers of colony sites and nesting pairs becoming established in the Northeastern and Northwestern Breeding Regions annually (Service 2024, chapter 3.1). This northward expansion has been occurring increasingly since the 1960s, indicating that the establishment of these northern regions as part of the wood stork's breeding range is sustainable and will continue to positively contribute to the overall status of the species.

Many wading bird species similar to the wood stork have historically bred, and continue to successfully breed, within the northern extent of the wood stork's current range. As described under the *Distribution, Ecology, and Life History* section below, nest colony site turnover is a natural ecological phenomenon for wood storks, as it is for many other species of colonial nesting waterbirds. Wood storks have historically made use of new and different geographical locations to nest and forage to exploit optimal habitat conditions from year to year. The best scientific and commercial data available indicate that the northern part of the wood stork's breeding range supports a highly productive segment of the wood stork breeding population, and suitable habitat there is abundant. We have no evidence to indicate that the species responds differently in the northern part of the DPS, nor do we have any other reason why wood storks would not continue to exploit the northern part of the DPS for nesting and foraging habitat into the future.

Further, the mere identification of factors that could impact a species negatively is not sufficient to compel a finding that listing (or maintaining a currently listed species on the Federal Lists of Endangered and Threatened Wildlife and Plants) is appropriate; we require evidence that these factors are operative threats that act on the species to the point that the species meets the definition of an endangered or threatened species under the Act. We examined the effects of multiple wood stork stressors including storms (hurricanes), predation, and contaminants (pollution) in our SSA report (Service 2024, chapter 5.2). However, the best scientific and commercial data available does not indicate that these stressors have negative population-level impacts on wood storks now or into the foreseeable future. We also assessed the threat of sea level rise and incorporated those impacts into our projections of future resiliency for the wood stork, and that assessment included the northern part of the species' range (see *Future Condition* below; and Service 2024, chapter 6).

(5) *Comment:* Several commenters expressed concern about the negative impacts of sea level rise on salt marsh habitat availability, the potential shift in the biotic community of salt marsh habitat, and the resulting impact to wood storks.

Our Response: As presented in our SSA report (Service 2024, chapter 6) and in this final rule, we evaluated the potential effects of sea level rise on the wood stork, including impacts on salt marsh habitat, and determined that the best scientific and commercial data available at this time does not indicate that sea level rise is negatively affecting or will negatively affect wood storks to the extent and magnitude that would result in an endangered or threatened status for the species. As a result of sea level rise, marsh habitat may be lost in some areas, and may migrate upslope in other areas (Kirwan et al. 2016a, p. 253), and marsh migration models that apply to the region where wood storks breed actually project an overall net gain in marsh habitat (Kirwan et al. 2016b, p. 4366). Further, habitat availability does not appear to be limiting wood stork resiliency currently, and ample suitable wood stork habitat will likely remain available even if high projections of sea level rise in the future prove accurate (Service 2024, chapter 6.2).

(6) *Comment:* Several commenters suggested that we overemphasized the

importance of urban wetlands to wood storks in our proposed delisting rule.

Our Response: Our discussion in the proposed rule was intended to acknowledge that wood storks use disturbed wetlands including those in urban and suburban areas as well as natural wetlands, rather than to overstate the importance of these wetlands to maintaining wood stork viability. While wood storks forage, breed, and roost in natural wetland habitats, they have also adapted to artificial and even highly disturbed wetlands, which can provide novel and supplementary breeding habitat and foraging opportunities (Evans et al. 2022, entire). Wood storks do not discriminate by wetland type for use in foraging, breeding, and sheltering, but they do discriminate in relation to available resources and overall habitat conditions. Urban and suburban habitats meet the wood storks' needs in many areas and tend to augment habitat opportunities for the species rather than detract.

(7) *Comment:* One commenter stated that while population numbers and range expansion confirm that delisting is the appropriate action, threats to the wood stork remain and necessitate the post-delisting monitoring of wood stork populations and their wetland habitats.

Our Response: A determination that the wood stork does not warrant listing under the Act does not mean that no threats remain; rather, it means that the threats are ameliorated such that the species is not in danger of extinction throughout all or a significant portion of its range or likely to become so within the foreseeable future. Additionally, under section 4(g)(1) of the Act, we are required to monitor all species that have been recovered and delisted for at least 5 years post-delisting; in the case of the wood stork there will be a 10-year monitoring period. The ten-year period was chosen because of the species' long life span (more than 22 years documented in the wild), long period of parental care (80 days), long age-to maturity (reaching reproductive age at 4 years), and a potential lag in time to detect changes in nesting population trends in response to changes in habitat or other threats. This period will allow us to monitor two generations of wood storks to detect any demographic trend changes related to any threats or conditions on the landscape. This will also allow us to assess any potential impacts of construction and implementation of hydrological infrastructure projects (*e.g.,* CERP projects in South Florida). On February 15, 2023, we published our proposed rule to delist the wood stork (88 FR 9830) and announced a public comment period for the proposed rule and the availability of a draft post-delisting monitoring (PDM) plan for public review and comment. The wood stork PDM plan includes population monitoring, as well as the monitoring of physical and environmental changes to colony sites with respect to regulatory protections and impacts. Following final delisting, we will meet with the Wood Stork Research and Monitoring Working Group to discuss implementation details of the PDM plan.

(8) *Comment:* Several commenters expressed concern over the extent to which climate change threatens the wood stork through increased evapotranspiration, hydrology alteration, and the consequent risk of predation.

Our Response: We reviewed the best scientific and commercial data available when analyzing the threat of climate impacts to wood storks. We summarize the effects of potential increased evapotranspiration, hydrology alteration, and subsequent nest predation on wood storks under *Threats,* below, as well as in our proposed rule (88 FR 9830, February 15, 2023). These factors will have negative effects on wood storks in some cases (*e.g.,* prolonged drought that decreases wood stork prey populations), and positive effects in others (*e.g.,* periods of drying that concentrate wood stork prey (Evans et al. 2023, entire)), but the best scientific and commercial data available do not indicate that they are drivers of wood stork viability. Further, we evaluated the current and future condition of the wood stork, including effects to the wood stork associated with the ecological dynamics of climate change, and determined that the wood stork does not meet the definition of a threatened or endangered species.

(9) *Comment:* One commenter stated the Service failed to adequately explain the delisting determination given expected declines in wood stork resiliency projected in our future scenarios analysis in the SSA report.

Our Response: As the commenter stated, in version 1.0 of our SSA report (Service 2021, entire), we projected declines in future resiliency for wood storks based on impacts to habitat within the current core foraging area (or CFA, which consists of the currently-occupied breeding colony sites and the immediately adjacent habitat where foraging by wood storks is most concentrated) resulting from sea level rise, development, and conservation mechanisms. However, we also acknowledged that our model did not account for important factors—such as the current and future availability of suitable occupied wood stork habitat outside of the current CFA, and the well-documented behavioral and ecological plasticity the species has demonstrated—that would likely lead to the establishment of new colonies and future population growth and expansion (Service 2021, table 48). As a result of considering both our projected declines related to habitat within the current CFA footprint, as well as other factors such as the wood stork's demonstrated behavioral plasticity evidenced by its ability to adapt to changing environmental conditions and exploit novel habitat types and food resources, the abundance of suitable habitat, and that habitat does not appear to be limiting wood stork resiliency, in our proposed rule we found the wood stork not to be in danger of extinction now nor likely to become so in the foreseeable future (88 FR 9830, February 15, 2023).

For this final rule, we have updated our future condition analysis in version 1.1 of the SSA report (Service 2024, chapter 6) by incorporating the latest sea level rise projections and the most recent wood stork breeding and abundance data, as well as additional analyses of habitat availability as affected by potential sea level rise, and demographic factors such as productivity requirements and colony site turnover. These additional evaluations further reinforce our assessment that, despite habitat impacts within the current footprint of the CFA, the wood stork's future viability will not significantly decline such that it would meet the definition of a threatened or endangered species (see further discussion under *Future Condition* and *Status Throughout All of Its Range,* below).

(10) *Comment:* One commenter expressed concern about our evaluation of wood stork viability throughout a significant portion of its range. The commenter stated, among other things, that the Service implied that the South Breeding Region may have a different status from the others but failed to present evidence that the region's status is more stable than implied by the unachieved recovery target.

Our Response: We have revised for clarity our discussion of the wood stork's status below, under *Status Throughout a Significant Portion of Its Range.* Specifically, we clarify that while the 5-year average productivity rate in the South Breeding Region is lower than in other regions, this difference does not indicate that the South Breeding Region is a portion of the range that is in danger of extinction now or in the foreseeable future.

(11) *Comment:* One commenter expressed concern over the threat of invasive Asian swamp eels to wood stork habitat in the Everglades.

Our Response: The Service agrees that Asian swamp eel is an emerging issue that could pose a future threat to the wood stork (Service 2018, entire) because Asian swamp eels have been observed to outcompete and reduce populations of forage fish species that wading birds, including wood storks, prey upon (Pintar et al. 2023, entire). Current data indicates that the Asian swamp eel's geographic distribution in the United States is limited by thermal tolerance (Service 2018, p. 4). Therefore, while the Asian swamp eel is currently present in some areas of Florida, it is not present in the other States that comprise most of the wood stork's range, and the long-term establishment of its invading populations may never extend north of Florida.

At this time, it is not clear whether an Asian swamp eel invasion would significantly impact prey resources of the wood stork to the extent that would result in wood stork population decline. Wood stork populations will be monitored for at least 10 years after the species is delisted, per the PDM plan. Accordingly, we will monitor the threat of Asian swamp eel invasion, and we are instructed by the Act to make prompt use of our emergency listing authority to prevent a significant risk to the well-being of any recovered species. However, at this time the best scientific and commercial data available do not indicate that Asian swamp eels pose a threat to wood storks at the scale and magnitude that would put the wood stork at risk of extinction now or in the foreseeable future.

Background

Below, we present a review of the taxonomy, life history, ecology, and overall status of the wood stork, referencing data where appropriate from the SSA report that was finalized for the species in April 2021 (Service 2021, entire), updates to those data since 2021 that were included in the proposed rule (88 FR 9830, February 15, 2023), and new data and analyses since 2021 that were incorporated into the updated SSA (Service 2024, entire).

Distribution, Ecology, and Life History

The historical range of the U.S. breeding population of the wood stork (*Mycteria americana*) encompasses the southeastern U.S. coastal plains of Alabama, Florida, Georgia, and South Carolina, and the current range has expanded to also include Mississippi and North Carolina. Genetic analyses indicate that these birds represent a single population that shows no evidence of discrete subpopulations (Lopes et al. 2011, p. 1911; Stangel et al. 1990, p. 618; Van Den Bussche et al.1999, p. 1083; Zimmerman 2023, p. 1). When the wood stork was listed, breeding primarily occurred in south and central Florida (19 colonies), with only limited breeding activity occurring in north Florida (5 colonies), coastal Georgia (2 colonies), and South Carolina (1 colony). Since listing (specifically, from 1984 to 2022), wood storks have nested at 332 different locations. Currently, at least 100 breeding colonies of various sizes are annually active (*e.g.,* in 2022 there were 51 in Florida, 22 in Georgia, 28 in South Carolina, and 5 in North Carolina). Breeding colonies are clustered into four regions, hereinafter referred to as the South, Central, Northwest, and Northeast Breeding Regions (Service 2024, chapter 3.2; figure 1).

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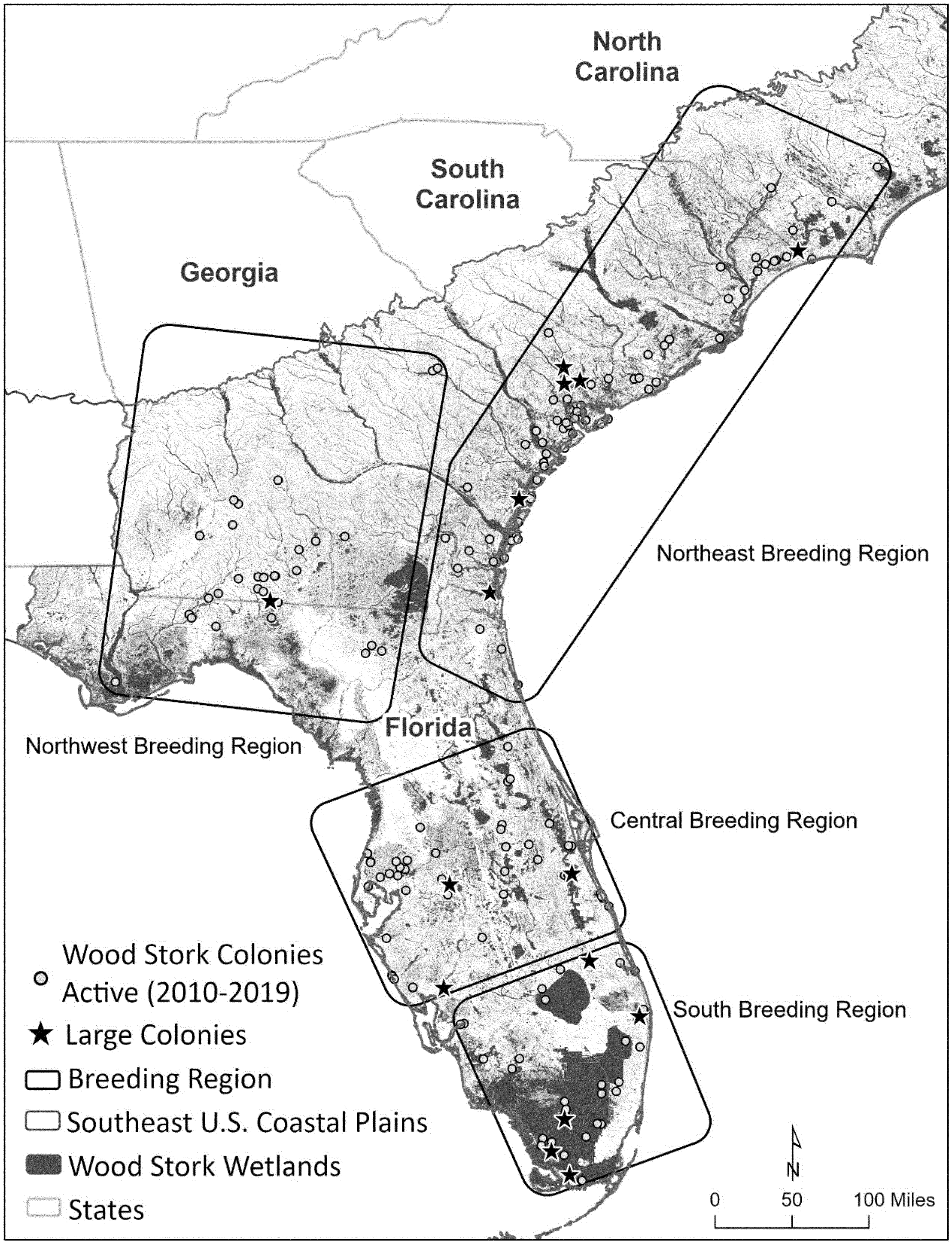

Figure 1. Wood stork breeding regions, active colony sites, large colony sites, and wetland habitat suitable for wood stork occupancy.

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Wood storks are colonial breeders, typically nesting with conspecifics (other members of their own species) and other wading bird species in wetlands within the southeastern U.S. coastal plains landscape that contain sufficient wetland foraging habitats nearby. Suitable foraging wetlands generally contain aquatic prey that is concentrated by decreasing water levels (*e.g.,* tidal creeks at low tide, ephemeral ponds, edges of ponds and lakes, shallow wetlands, and forested flood plains during seasonal dry down). Primary prey species vary geographically and include fish (predominantly), crustaceans, amphibians, insects, snails, and reptiles (Coulter et al. 2020, unpaginated). Wood stork nesting colonies also occur in natural wetlands and within human-influenced areas, including impounded, managed, enhanced, reconfigured, and manmade wetlands; in water treatment wetlands; and on small islands (Coulter et al. 2020, unpaginated). A large proportion of the nesting colonies in Georgia and South Carolina occur in proximity to the expansive coastal salt marshes in these States, and foraging during the breeding and post-breeding season depend upon both freshwater wetlands as well as the highly productive estuarine and salt marsh wetland ecosystems (Coulter et al. 2020, unpaginated).

Wood stork nest colony sites are, as they are for most colonial waterbirds, ephemeral in nature, and colony site turnover (*i.e.,* the process by which old colony sites are abandoned and new colony sites are established) is a common trait in wading bird ecology (Frederick and Meyer 2008, entire). Colony site turnover occurs periodically, such that conditions becoming less favorable at one colony site often leads to the establishment of new colony sites (Clem and Duever 2019, p. 370; Hall et al. 2017, p. 52). However, some colony site transitions are gradual and may take years before completion (Frederick and Ogden 1997, pp. 320–321), and large colonies tend to have greater longevity (Frederick and Meyer 2008, p. 16; Tsai et al. 2016, p. 643). Wood stork nesting colony turnover has occurred historically, indicating that wood storks will continue to move to new colony locations when currently occupied colony sites become less optimal than suitable habitat in other potential colony sites (Service 2024, chapter 2.7.1).

Wood storks are a relatively long-lived species, with the maximum age of more than 22 years documented in the wild (Coulter et al. 2020, unpaginated). Wood storks generally breed annually (typically one brood per season) and exhibit extensive parental care, with nesting and brooding lasting approximately 4 months of the year. Typically, wood storks initiate breeding at 4 years of age (Coulter et al. 2020, unpaginated). Breeding seasonality varies regionally and is related to rainfall amounts and timing. Wood storks typically breed during periods when wetland water levels are decreasing and wetlands are thus drying down, which concentrates prey during the nesting period (Coulter et al. 2020, unpaginated). After the nesting period when wood storks are no longer associated with the foraging wetlands near their nesting colony site, they can exhibit intra-regional and regional movements in response to environmental conditions (*e.g.,* changes in the availability of shallow foraging habitat) (Coulter et al. 2020, unpaginated).

A thorough review of the taxonomy, life history, ecology, and overall viability of the wood stork is presented in the SSA report (Service 2024, entire; available at *https://ecos.fws.gov/ecp/species/8477* and at *https://www.regulations.gov* under Docket No. FWS–R4–ES–2022–0099).

Recovery Criteria

Section 4(f) of the Act directs us to develop and implement recovery plans for the conservation and survival of endangered and threatened species unless we determine that such a plan will not promote the conservation of the species. Under section 4(f)(1)(B)(ii), recovery plans must, to the maximum extent practicable, include objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of section 4 of the Act, that the species be removed from the Lists of Endangered and Threatened Wildlife and Plants.

Recovery plans provide a roadmap for us and our partners on methods of enhancing conservation and minimizing threats to listed species, as well as measurable criteria against which to evaluate progress towards recovery and assess the species' likely future condition. However, they are not regulatory documents and do not substitute for the determinations and promulgation of regulations required under section 4(a)(1) of the Act. A decision to revise the status of a species or to delist a species is ultimately based on an analysis of the best scientific and commercial data available to determine whether a species is no longer an endangered species or a threatened species, regardless of whether that information differs from the recovery plan.

There are many paths to accomplishing recovery of a species, and recovery may be achieved without all the criteria in a recovery plan being fully met. For example, one or more criteria may be exceeded while other criteria may not yet be accomplished. In that instance, we may determine that the threats are minimized sufficiently and that the species is robust enough that it no longer meets the definition of an endangered species or a threatened species. In other cases, we may discover new recovery opportunities after having finalized the recovery plan. Parties seeking to conserve the species may use these opportunities instead of methods identified in the recovery plan. Likewise, we may learn new information about the species after we finalize the recovery plan. The new information may change the extent to which existing criteria are appropriate for identifying recovery of the species. The recovery of a species is a dynamic process requiring adaptive management that may, or may not, follow all the guidance provided in a recovery plan.

The recovery plan for the wood stork outlines the following criteria that we estimated could, if met, result in a determination that the wood stork no longer warrants listing under the Act (Service 1997, p. 17):

- *Criterion 1:* An annual average calculated over 5 years (5-year average) of 10,000 nesting pairs (which constitutes 50 percent of the historical population).
- *Criterion 2:* A 5-year average regional productivity (in each of four breeding regions) of greater than 1.5 chicks per nest per year.
- *Criterion 3:* As a subset of the 10,000 nesting pairs, a 5-year average of 2,500 or more successful nesting pairs must occur in the Everglades and Big Cypress systems (*i.e.,* the South Breeding Region).

Criterion 1 for delisting, which is a 5-year average of 10,000 nesting pairs, has been met since 2016 (table 1).

TABLE 1—MOVING 5-YEAR AVERAGES OF NESTING PAIRS IN THE U.S. WOOD STORK BREEDING POPULATION (*i.e.,* ACROSS THE ENTIRE DPS)

[As indicated by nest counts from 2014 (year of reclassification) to 2022. Numbers in **bold** are those that meet the recovery criterion.]

2014	2015	2016	2017	2018	2019	2020	2021	2022
9,226	9,941	**10,171**	**10,650**	**11,012**	**10,582**	***10,713**	***11,139**	***11,224**

*2020 COVID protocols precluded a survey of all the nesting colonies in 2020. Thus, the averages in 2020, 2021, and 2022 are 4-year averages using the appropriate 5-year timeframe but lacking data from 2020.

We note that criterion 1 also implies that the wood stork should exhibit a positive population growth trend to reach a breeding population of 10,000 nesting pairs. The long-term trend (1974 to 2019) shows an increase in nesting pairs at a rate of 153 pairs per year. The current trend during the past 10 years (5-year averages from 2010 to 2019) shows an increase in nesting pairs at a rate of 344 pairs per year.

Criterion 2 for delisting is a 5-year average productivity of 1.5 chicks fledged per nest per year in each breeding region. This productivity metric has been achieved or exceeded in each region except for the South Breeding Region since 2018 or earlier (table 2).

TABLE 2—MOVING 5-YEAR AVERAGES OF WOOD STORK PRODUCTIVITY (CHICKS FLEDGED PER NEST PER YEAR) BY BREEDING REGION, 2014–2022

[Note: No productivity data was collected for the Northwest Breeding Region in 2022. Numbers in bold are those that meet the recovery criterion (1.5 chicks fledged/nest/year).]

Breeding region	2014	2015	2016	2017	2018	2019	2020	2021	2022
Northeast	**1.6**	**1.7**	**1.7**	**1.9**	**2.0**	**1.9**	***1.8**	***1.8**	***1.8**
Northwest	1.3	1.3	1.0	1.2	**1.5**	**1.7**	***1.6**	***1.6**	
Central	1.4	**1.5**	**1.5**	**1.7**	**1.7**	**1.8**	***1.8**	***1.8**	***1.6**
South	0.7	0.8	0.7	1.0	1.0	0.8	*0.8	*1.1	*0.8

*2020 COVID protocols precluded a survey of all the nesting colonies in 2020. Thus, the averages in 2020, 2021, and 2022 are based off incomplete data sets, but represent the best available information.

Criterion 3, which requires that a minimum of 2,500 pairs (5-year average) nest in the South Breeding Region, has been achieved in each of the past 6 years (2017–2022) (table 3).

TABLE 3—MOVING 5-YEAR AVERAGES OF WOOD STORK NESTING PAIRS IN THE SOUTH BREEDING REGION, 2012–2022

[Numbers in bold are those that meet the recovery criteria.]

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
2,116	**2,650**	2,021	2,048	1,941	**3,033**	**2,895**	**2,576**	**2,722**	**3,088**	**2,786**

Although criterion 2 has not been fully satisfied as specifically defined in the recovery plan, we conclude that the essential intent of this recovery goal has been achieved, mainly due to new information that has become available since the recovery criteria were established.

When the wood stork recovery criteria were originally defined, there was a focus on breeding success in the South Breeding Region, given its historical importance to the species as the core of the entire breeding population. However, since then, wood storks have adapted to use new wetland complexes and habitat types, and have expanded their breeding range north to include three new breeding regions. Coastal salt marsh and the adjacent freshwater wetlands of the coastal plain in Georgia, South Carolina, and North Carolina are now exploited by wood storks and support a large part of the breeding population (more than 5,000 pairs annually). Therefore, while productivity in the South Breeding Region is slightly below the target defined in the recovery plan, wood storks are now reproducing successfully and using a combination of wetland types in multiple regions additional to where they bred historically, which has led to consistently higher productivity throughout most of their range than that targeted by the recovery criterion (table 2).

The coastal wetlands of Georgia, South Carolina, and North Carolina provide year-round foraging for wood storks, as salt marsh prey concentrations are tidally dependent and less impacted by the environmental factors that dictate prey availability in the freshwater wetlands. Many South Breeding Region wood storks disperse north during the post-breeding season to the freshwater and coastal saltmarsh of Georgia and South Carolina and others to coastal plain wetlands of central Alabama and northeastern Mississippi (Service 2024, chapters 2.5.4, 2.6, and figure 5).

Wetlands do not appear to be limiting wood stork resiliency. The U.S. southeastern coastal plain's 48 million acres of wetlands are abundant and widespread from Florida north to Virginia and west to Mississippi and represent the largest concentration of estuarine and palustrine wetlands in the continental United States (Sucik and Marks 2015, p. 11). The combination of expansive freshwater wetlands and salt marshes in the Northeast Breeding Region provides previously (pre-1980) unexploited breeding season food resources and nesting habitat that result in higher productivity. Approximately one third of the number of wood stork colonies that exist today existed at the time that the recovery criteria were established in 1986, as multiple breeding colonies are now present in Georgia, North Carolina, and South Carolina, where few or none had existed historically (figure 1). The expansion of the wood stork's breeding range, and the species' novel exploitation of other abundant wetland habitat types for breeding, indicate that it is no longer as dependent on the Everglades system as once thought. Presently there are four breeding regions that contribute equally to its resiliency and viability. In addition, central and south Florida provide breeding and overwintering habitat for wood storks comparable to that which the Everglades provides in the South Breeding Region and are contributing equally to recovering a robust wood stork breeding population.

Wood stork productivity in the South Breeding Region is highly variable on an annual basis, and under the 5-year average target set originally as a recovery criterion; however, the target for this metric has been met or exceeded in all other breeding regions, and the wood stork is much less dependent on the South Breeding Region than it was historically. Further, the productivity rate of 1.5 chicks/pair was targeted in the original 1986 wood stork recovery plan to ensure sufficient population growth at a time when the population was at its lowest. This target was estimated based upon European white stork demographics because adequate wood stork demographic data were not available at the time. Conceptually, to maintain a population at a stable level, a productivity rate of 2.0 (two chicks fledged per nest) would be needed to keep a population stable, assuming two fledglings survive to breeding age and each pair of adults will reproduce only once in their lifetime. This scenario would result in one-to-one replacement of adults by the new generation. Wood storks are relatively long-lived and generally breed annually, and thus most individuals have multiple chances to replace themselves. As such, a wood stork productivity rate near or even below 1.0 should also lead to a stable or slow-growing population. For example, the 5-year average productivity that had been maintained at the time of recovery for both the bald eagle and the brown pelican, two species similar to the wood stork in diet, aquatic habitat, and longevity, did not exceed 0.9 (74 FR 59444, November 17, 2009; 72 FR 37346, July 9, 2007). Like the wood stork, not all the demographic metrics originally identified for the brown pelican and bald eagle were met as specifically defined in their recovery plans, and yet these species both have fully recovered and continue to thrive today.

In addition, the averaging metric for productivity can mask large annual reproductive gains, especially in areas like the South Breeding Region where wood stork productivity can naturally fluctuate greatly among years based on natural cycles and normal environmental stochasticity. It appears that productivity is sufficient for wood stork viability, as it continues to support a growing population across the wood stork's range. We consider the population's wide distribution, breeding population numbers, and productivity as indicators that the population is recovered and sustainable. Thus, although criterion 2 has not been fully realized in the manner specifically identified in the recovery plan, we conclude that the intent of the criterion that productivity is sufficient for the long-term viability of the wood stork has been satisfied. Due to the overall range and breeding range expansion; ability to move to new breeding locations when a colony site is no longer suitable; continued population growth; four equally important breeding regions that greatly increase redundancy, representation, and resiliency; and use of diverse and extensive wetland habitats throughout the coastal plain of the southeast U.S., it does not appear that foraging, overwintering, or breeding habitat is a limiting factor to the resiliency of the wood stork. As discussed, we consider the population's wide distribution, ability to utilize a mosaic of wetlands (for foraging, nesting, and roosting), population numbers, and productivity as indicators that the threats have been reduced such that the population is recovered and sustainable.

Regulatory and Analytical Framework

Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and the implementing regulations in title 50 of the Code of Federal Regulations set forth the procedures for determining whether a species is an endangered species or a threatened species, issuing protective regulations for threatened species, and designating critical habitat for endangered and threatened species. On April 5, 2024, jointly with the National Marine Fisheries Service, we issued a final rule that revised the regulations in 50 CFR part 424 regarding how we add, remove, and reclassify endangered and threatened species and what criteria we apply when designating listed species' critical habitat (89 FR 23919). This final rule is now in effect and is incorporated into the current regulations. Our analysis for this decision applied our current regulations. Given that we proposed delisting this species under our prior regulations (revised in 2019), we have also undertaken an analysis of whether the decision would be different if we had continued to apply the 2019 regulations and we concluded that the decision would be the same. The analyses under both the regulations currently in effect and the 2019 regulations are available on *https://www.regulations.gov*.

The Act defines an ''endangered species'' as a species that is in danger of extinction throughout all or a significant portion of its range, and a ''threatened species'' as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether any species is an endangered species or a threatened species because of any of the following factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species' continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects. The determination to delist a species must be based on an analysis of the same five factors.

We use the term ''threat'' to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term ''threat'' includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or required resources (stressors). The term ''threat'' may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an ''endangered species'' or a ''threatened species.'' In determining whether a species meets either definition, we must evaluate all identified threats by considering the species' expected response and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species—such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an ''endangered species'' or a ''threatened species'' only after conducting this cumulative analysis and describing the expected effect on the species.

The Act does not define the term ''foreseeable future,'' which appears in the statutory definition of ''threatened species.'' Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis, which is further described in the 2009 Memorandum Opinion on the foreseeable future from the Department of the Interior, Office of the Solicitor (M–37021, January 16, 2009; ''M-Opinion,'' available online at *https://www.doi.gov/sites/doi.opengov.ibmcloud.com/files/uploads/M-37021.pdf*). The foreseeable future extends as far into the future as the Service can make reasonably reliable predictions about the threats to the species and the species' responses to those threats. We need not identify the foreseeable future in terms of a specific period of time. We will describe the foreseeable future on a case-by-case basis, using the best scientific and commercial data available and taking into account considerations such as the species' life-history characteristics, threat-projection timeframes, and environmental variability. In other words, the foreseeable future is the period of time over which we can make reasonably reliable predictions. ''Reliable'' does not mean ''certain''; it means sufficient to provide a reasonable degree of confidence in the prediction, in light of the conservation purposes of the Act.

Analytical Framework

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data available regarding the status of the species, including an assessment of the potential threats to the species. The SSA report does not represent our decision on whether the species should be delisted. However, it does provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies.

To assess wood stork viability, we used the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency is the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years); redundancy is the ability of the species to withstand catastrophic events (for example, droughts, large pollution events), and representation is the ability of the species to adapt to both near-term and long-term changes in its physical and biological environment (for example, climate conditions, pathogens). In general, species viability will increase with increases in resiliency, redundancy, and representation (Smith et al. 2018, p. 306). Using these principles, we identified the species' ecological requirements for survival and reproduction at the individual, population, and species levels, and described the beneficial and risk factors influencing the species' viability.

The SSA process can be categorized into three sequential stages. During the first stage, we evaluated individual species' life-history needs. The next stage involved an assessment of the historical and current condition of the species' demographics and habitat characteristics, including an explanation of how the species arrived at its current condition. The final stage of the SSA involved making predictions about the species' future condition, including responses to positive and negative environmental and anthropogenic influences. Throughout all of these stages, we used the best scientific and commercial data available to characterize viability as the ability of a species to sustain populations in the wild over time, which we then used to inform our regulatory decision.

The following is a summary of the key results and conclusions from the SSA report; the full SSA report can be found at Docket No. FWS–R4–ES–2022–0099 on *https://www.regulations.gov.*

Summary of Biological Status and Threats

In this discussion, we review the biological condition of the species and its resources, and the threats that influence the species' current and future condition, in order to assess the species' overall viability and the risks to that viability. In addition, the SSA report (Service 2024, entire) documents our comprehensive biological status review for the species, including an assessment of the potential threats to the species.

The following is a summary of this status review and the best scientific and commercial data available gathered since that time, both of which have informed this decision.

Species Needs

Wood storks are a wetland-dependent species that use a wide variety of freshwater, brackish, and estuarine wetlands for nesting, feeding, and roosting throughout their range (Coulter et al. 2020, unpaginated). Wood storks feed on many aquatic animal species, but primarily fish such as sunfish (Coulter et al. 2020, unpaginated). They forage most efficiently in shallow wetlands where prey is concentrated, and as such their intra-regional movements during the breeding and non-breeding seasons are typically in response to the availability of shallow wetlands (Coulter et al. 2020, unpaginated). Local hydrologic conditions also correlate to annual nesting effort (Klassen et al. 2016, pp. 1450–1460) and breeding success.

Wood storks are colonial breeders, and nest in trees over or surrounded by water in natural and human-influenced freshwater, brackish, and estuarine habitats (Rodgers et al. 1996, pp. 18–19). Breeding colonies occur within landscapes containing sufficient shallow wetlands for foraging, in proximity to wetlands with suitable emergent or island tree and shrub species for breeding (nest substrate) as well as for roosting outside of the breeding season. Wood storks use both native and nonnative trees for nesting substrate (Rodgers et al. 1996, pp. 2–17).

Wood storks feed in natural, managed, created, and human-altered wetlands, both freshwater and estuarine, where water depths are appropriately shallow and the habitat is not densely vegetated (Coulter et al. 2020, unpaginated). The presence of wood storks in human-influenced landscapes and wetlands has become common (Evans and Gawlik 2020, p. 1), and wood storks will make use of any wetland (natural or anthropogenic) that produces good foraging opportunities.

Threats

Threats to wood storks are described in detail in the SSA report (Service 2024, chapter 5). The threats that affect the species at the population level are habitat loss, conversion, and degradation (acting on populations currently and into the future), and the effects of warming temperatures, drought, precipitation changes, and sea level rise (which act on populations primarily in the future).

Habitat Loss, Conversion, and Degradation

Land change and conversion due to urban and suburban development, agriculture, silviculture, and mining impact wood storks through habitat fragmentation, loss, degradation, and conversion (Coulter et al. 2020, unpaginated; Service 2024, chapter 5). This threat directly reduces the availability and quality of breeding and roosting habitat, and indirectly impacts foraging habitats and food resources (Coulter et al. 2020, unpaginated). One of the primary reasons for the historical decline of the wood stork was the dredging of canals and draining of wetlands to accommodate the settlement of south Florida, promote agriculture, and provide means of flood control, which altered the hydrologic regimes of the Everglades and Big Cypress ecosystems (Ogden and Nesbitt 1979, p. 512; Ogden and Patty 1981, pp. 99–100; Service 1997, p. 10). Human-caused changes to wetland hydrology (annual cycle and water table levels) and drainage of wetlands throughout the wood stork's range resulted in degradation, fragmentation, and loss of habitat available to wood storks. The rate of wetland conversion has slowed from that which occurred historically (Lang et al. 2024, pp. 6–7), likely due primarily to laws and regulations designed to avoid and minimize impacts to wetlands; however, wetland loss continues today, including an increase during the past decade when compared to the previous decade (Lang et al., 2024, p. 9).

Other factors that contribute to degradation of wood stork habitat include increased water consumption; construction of stormwater management ponds, lakes, and flow-ways; changes in hydrological regimes that alter the water table; and reduced fire frequency that creates drier wetland conditions and can exacerbate the encroachment of woody vegetation into wetlands. However, the best scientific and commercial data available do not indicate that these factors are occurring at such a magnitude to cause an overall population decline for wood storks.

Despite the historical and ongoing threats to wetland habitats, natural wetlands of the southeastern U.S. coastal plains are extensive (Service 2024, chapter 6.2; Lang et al. 2024, p. 10). In addition, wetland restoration efforts are established and underway throughout the wood stork's range, and loss of natural wetlands is avoided, minimized, and mitigated through existing wetland laws and regulations (Service 2024, chapter 5.3). Further, wood storks use habitat opportunistically and exploit natural and human-influenced urban, suburban, rural, and agricultural environments, and even use human-created wetlands for foraging, roosting, and nesting (Evans and Gawlik 2020, p. 1). Wood storks target specific wetland environmental conditions that afford advantageous foraging, roosting, or breeding opportunities, regardless of whether a wetland is natural or manmade. The abundance and distribution of human-influenced wetlands has increased, and wood storks can be found foraging and nesting in these wetland types throughout their range. Though the body condition of chicks produced in natural wetlands were found to be slightly healthier than those produced in urban environments, that of nesting adults does not differ, and overall urban wetlands appear to help boost wood stork productivity during periods of suboptimal conditions in nearby natural wetlands (Evans and Gawlik 2020, pp. 1–2, 5).

Climate

The Intergovernmental Panel on Climate Change (IPCC) has devised a system to project plausible future greenhouse gas concentrations in various scenarios (termed ''representative concentration pathways'' or RCPs). Climate predictions suggest overall warming temperatures under all greenhouse gas emission scenarios throughout North America, including throughout the range of the wood stork (IPCC 2022, pp. 4–19). An increase of 3.6 degrees Farhenheit (2 degrees Celsius) compared to pre-industrial levels (IPCC 2019, pp. 23–24) is more likely than not to be exceeded by the year 2100 under the RCP4.5 climate scenario, and likely to be exceeded under the RCP6.0 and RCP8.5 scenarios. Some habitat and ecological changes, such as sea level rise, increased intensity of storm events, and range expansion northward beyond the historical breeding range, have already been observed.

Warming temperatures are likely one of the factors that is leading to the expansion of the wood stork's breeding range beyond its historical boundaries (including breeding in North Carolina), as has been documented for many other bird species in Florida, North America, and other parts of the world (Hitch and Leberg 2007, p. 534).

Climate effects are causing a variety of changes to the various ecosystems and wetland habitats that wood storks depend upon throughout their life cycle, thereby having the potential to affect the wood stork's demographic rates (nest success, and juvenile and adult survival) and resulting viability. Warming may contribute to changes in nesting phenology (timing) and the extension of the breeding season, as evidenced by asynchronous nesting that is being now documented throughout the wood stork's breeding range. For example, wood storks may have more opportunity to renest after previously failed attempts, or to nest later in the season in order to take advantage of optimal habitat conditions in other areas of the range. Warming temperatures may also affect hurricane and tropical storm intensity, precipitation changes (annual and large rain events), drought, and sea level rise, all of which are factors that may impact wood stork habitat and, in turn, wood stork resiliency. However, effects of climate may have both negative and positive influences on wood stork resiliency.

Changes in hurricane patterns—The warmer climate is projected to decrease the frequency of tropical cyclones but increase the intensity of these events when they occur in the Atlantic Basin (Collins et al. 2017, p. 610). Direct mortality of wood storks due to tropical storm events is not common, and although damage to nesting vegetation at colony sites has been documented to occur, the large amount of rain generally benefits colony site vegetation, and nesting generally continues in following years (Cook and Baranski 2019, p. 1). In many cases, wood storks will have a very productive breeding season in the year following a hurricane because the additional precipitation improved wetland hydrologic conditions and led to larger prey base for the following breeding season (Cook and Baranski 2019, p. 1). Hurricanes also commonly act as an erosional agent and deliver significant volumes of sediment to the marsh surface, which could aid wood stork resiliency by increasing vertical accretion of salt marsh habitat (Staro et al. 2021, p. 1). The best scientific and commercial data available do not indicate that hurricane impacts are limiting wood stork resiliency, nor do we expect that they will in the future.

Changes in precipitation—An overall increase in rainfall is expected throughout much of the wood stork's range. Relative to 1981–2010, the 50th percentile (median) for annual mean precipitation under RCP4.5 and RCP8.5 is expected to increase in the South Atlantic–Gulf Region in 2050–2074 by a relatively small amount (0.2 to 0.3 in (5.1 to 7.6 millimeters (mm)) per month) (Alder and Hostetler 2013, entire). However, scaled-down models indicate that precipitation increases will vary across the region. The timing and amount of precipitation in wood stork habitat has always had a strong influence on wood stork prey development, availability, and dispersion. Adequate precipitation can help maintain good hydrologic conditions and offset drought conditions, which can help bolster wood stork survival and productivity. However, excessive rainfall can have a negative impact by dispersing prey and effectively inhibiting wood stork nutrient consumption, and this phenomenon is magnified during the breeding season in the South Breeding Region when it can result in nest abandonment and/or reduced chick survival caused by inadequate provisioning of chicks by adults (Cook and Baranski 2021, p. 5). Excessive rainfall deficit on the other hand, especially in combination with warming temperatures, could contribute to drying and drought conditions, which are discussed below. While precipitation is likely one of the primary drivers that cause segments of the wood stork population to shift or migrate depending upon local and regional habitat conditions, the best scientific and commercial data available do not indicate that precipitation impacts are limiting wood stork resiliency, nor do we expect them to in the future.

Drought/Drying—Rising temperatures are expected to increase evaporation, meaning that wood storks could face increased drought-like conditions (Alder and Hostetler 2013, entire; IPCC 2023, p. 5). Prolonged drought conditions generally lead to poor nesting success and productivity (Borkhataria et al. 2012, p. 524; Gaines et al. 2000, p. 64). In addition, drought conditions can increase wood stork colony predation by making it easier for terrestrial predators to access nests and chicks (Coulter et al. 2020, unpaginated; Gabel et al. 2021, pp. 1–2). However, initially drought periods can consolidate and increase the availability of prey and can therefore be beneficial to wood storks (Service 2024, chapter 6.3). Dry conditions may concentrate prey and lead to increased wood stork productivity in a given year, but a multiyear drought could lead to lower wood stork productivity if prolonged low-water conditions inhibit the regeneration of prey species. This type of hydrological regime can lead to a boom or bust nesting dynamic, where years with poor hydrologic conditions result in many unsuccessful nesting efforts, while other years with optimal hydrologic conditions lead to large nesting events and high productivity (Frederick and Ogden 2001, pp. 484–485; Frederick et al. 2009, p. 85). Dry conditions can result in both positive and negative outcomes for wood storks, and the best scientific and commercial data available do not indicate that drought is limiting wood stork population resiliency, nor do we expect it to in the future.

In summary, changes in hurricane and precipitation patterns, hydroperiod, and drying conditions may influence habitat availability and associated wetland forage resources for wood storks, but that influence will vary considerably relative to local landscape conditions. For example, the type, abundance, underlying topography, and connectivity of the wetlands associated with each breeding colony will influence how these changes in conditions will affect wood stork resiliency. In addition, wood stork ecology has evolved to respond to short- and long-term habitat change, and nesting colony turnover is a common trait for wading birds including wood storks, which means that individuals will shift among colony sites with changing environmental conditions to optimize breeding and foraging opportunities. In general, projected changes in precipitation and drying will vary among breeding regions, and even among colonies in a single breeding region, and could result in either positive or negative effects on wood stork breeding success from year to year.

We have limited our predictions of future wood stork resiliency related to climate to those associated with sea level rise, because the long-term negative effects from sea level rise to suitable wood stork habitat and the wood stork's response to these effects can be projected with reasonable certainty. See *Future Conditions Methodology* below for further discussion.

Sea level rise—Warming temperatures, coupled with other factors such as the melting of continental ice, will cause sea levels to rise (Vermeer and Rahmstorf 2009, entire; Sweet et al. 2022, entire). Because wood storks mainly forage in water less than 20 in (50 cm) deep, projected sea level rise would make portions of the currently occupied coastal habitat unusable. As such, sea level rise and the associated flooding of coastal wetlands may result in upslope successional change of wetland habitats from freshwater, to brackish, to estuarine wetlands, which may lead to some loss and degradation of both foraging and coastal nesting habitats (Service 2024, chapter 6.2). Sea level rise is also likely to increase the impacts of storm surge potential along major coastlines (Collins et al. 2017, p. 611).

While sea level rise is expected to cause the degradation and loss of existing coastal wetland habitats in some areas, marsh migration models also project that new salt marsh habitat will be created as coastal marshes migrate upslope along the coastal upland and water interface (Kirwan et al. 2016a, p. 253), resulting in a net expansion of salt marsh habitat in response to sea level rise in some areas (Kirwan et al. 2016b, p. 4366). In some areas, coastal marsh habitat may remain stable or transgress upslope, and freshwater marshes may be converted into brackish or salt marsh depending upon whether the rate of horizontal erosion of the salt marsh from the ocean side (trailing edge) due to rising water is compensated or exceeded by the rate at which material accumulates vertically (*e.g.,* trapping of sediment carried by flood tides, accumulation of root material in marsh soils), which causes its landward expansion upslope (Colombano et al. 2021, p. 1639). As such, in some areas, wetland habitat will shift and elevate rather than be lost, as sea level rise causes wetland migration landward, with seaward erosion and upslope transgression shifting the location and extent of each coastal wetland habitat type (Colombano et al. 2021, p. 1639). Therefore, although we can project through modeling where wood stork habitat within the core foraging area (CFA) are likely to be inundated by sea level rise, it is less clear where and how much brackish and saltmarsh habitat suitable for wood stork use will be created in the future as coastal estuarine marshes migrate upslope in response to sea level rise (Fagherazzi, et al. 2020, entire). Regardless, a salt marsh ecosystem will continue to exist along the coastline, and the negative impacts to wood stork resiliency caused by habitat loss or degradation due to wetland habitat inundation by sea level rise is likely to be mitigated at least in part by newly created salt marsh and landward salt marsh migration (Kirwan et al. 2016a, pp. 258–259; Kirwan et al. 2016b, p. 4366). Other mitigating factors include wood storks' use of all coastal marshes (fresh or estuarine), available suitable habitat outside the current footprint of the CFA, and the ecological trait of moving to other or new nesting locations when a colony site is no longer suitable. In summary, sea level rise will result in the loss of some currently occupied wood stork habitat, even as new habitat is created.

Wetland habitat throughout the Southeast U.S. DPS of the wood stork's breeding range is widely available and is not considered to be a limiting factor. The Southeastern United States has nearly 48 million acres of wetlands, which account for more than 43 percent of the Nation's palustrine and estuarine wetlands (Sucik and Marks 2015, p. 11). The CFA that supports currently active wood stork nesting colonies includes over 10.8 million acres of suitable wetland habitat, and an additional 15.4 million acres of suitable wood stork habitat is available outside of the current CFA associated with active nest colonies but within the range of the wood stork (Service 2024, table 31). Wetland habitat loss or degradation due to draining or changing the hydrology was the main historical driver of wood stork population decline, primarily in south Florida, which supported nearly the entire breeding population. Human activity during the decades prior to listing of the species in 1984 had reduced wetland areas in this region by 35 percent, and construction of canals and ditches changed the hydrology of ecosystems like the Everglades, Lake Okeechobee, Kissimmee River, and Big Cypress Swamp. However, since that time, Everglades restoration efforts have been underway, and the species now has additional breeding strongholds in north Florida, Georgia, South Carolina, and North Carolina, where it exploits new habitat types such as coastal saltmarsh in combination with extensive adjacent freshwater, and even human-influenced and managed wetlands. Suitable breeding and foraging habitat is widely available across the species' current range. Further, individual regional peak annual nest numbers are often significantly higher than the corresponding 5-year averages, indicating that each region can support a larger nesting population than evident by the average alone. In summary, though conditions that lead to the degradation and conversion of wetland habitat used by wood storks for nesting and foraging may increase, habitat availability does not currently appear to be limiting wood stork resiliency.

Conservation Efforts and Regulatory Mechanisms

Wetland conservation efforts, both voluntary and regulatory, are a key element in the recovery of the wood stork. The long-term survival and recovery of the wood stork requires the presence of a mosaic of wetland habitats for breeding, foraging, and roosting scattered throughout its range during varying climatic and seasonal conditions. Current and ongoing management actions that address stressors to foraging and breeding habitats include maintenance, management and protection of existing wetlands, enhancement and creation of new wetland habitats, and restoration of previously impacted habitats. Details of conservation efforts can be found in the SSA report (Service 2024, chapter 5.3), but are summarized with updated information below:

• Lands with natural and manmade wetlands that contribute to wood stork recovery have and continue to be targeted for acquisition and easements for conservation through Federal, State, and private acquisition and private lands programs (figure 2). For example, the Everglades Headwaters National Wildlife Refuge and Conservation Area initiated in 2012 includes 2.6 million acres of grassland savannah with wet and dry prairie that encompasses the Kissimmee River Valley in Florida. Conservation easements and acquisition purchases for the 150,000-acre approved acquisition boundary are underway, and will provide additional conservation benefits to wood storks. Florida's Wildlife Corridor also facilitates partnerships that result in conservation land acquisitions (Florida Wildlife Corridor 2022 and Florida's State Wildlife Action Plan (FSWAP) 2019, entire). Land acquisition for conservation most often includes property with wetlands, and of the 10 million acres (31 percent) in Florida managed as conservation land, 2.6 million acres have been purchased through land acquisition programs such as the Florida Forever and P2000 programs. Georgia, South Carolina, North Carolina, Alabama, and Mississippi also have their own unique initiatives to preserve wildlife and natural resources including wetlands and are described within their State Wildlife Action Plans (Georgia's State Wildlife Action Plan (GSWAP) 2015, South Carolina State Wildlife Action Plan (SCSWAP) 2015, North Carolina Wildlife Resources Commission (NCWRC) 2015, Arkansas Wildlife Action Plan (ASWAP) 2015, and Mississippi State Wildlife Action Plan (MSWAP) 2015, entire).

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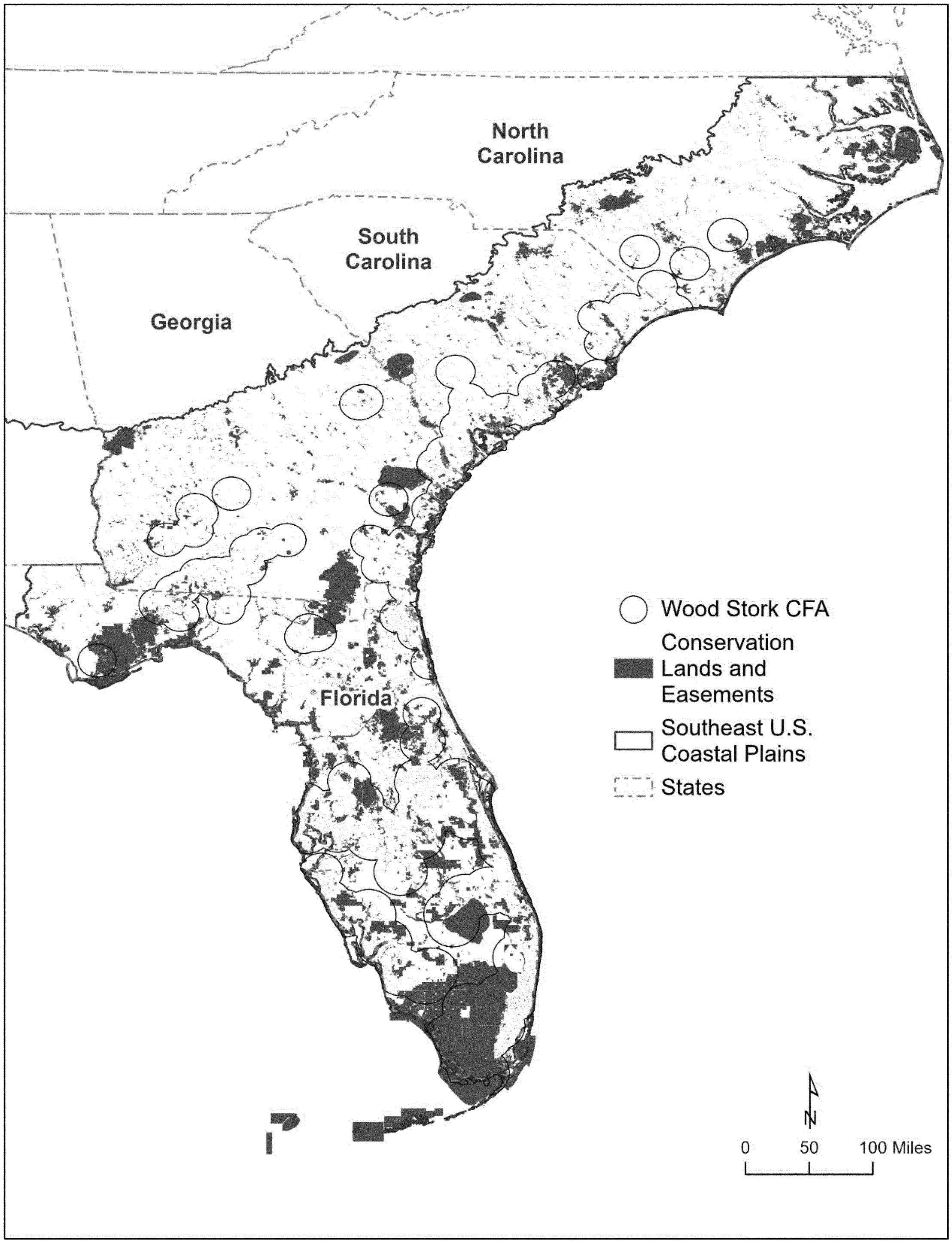

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Figure 2. Conservation lands and easements within the breeding range of the wood stork, which includes the current core foraging area (CFA), occupy 17.4 million acres including 9.2 million acres of wetlands.

• Large-scale watershed and wetland ecosystem restoration and protection initiatives with regionwide impacts have helped and continue to help restore wetland ecosystems throughout the Southeastern United States, including the Everglades via the Comprehensive Everglades Restoration Plan (CERP). Under the CERP, the 6,500-acre Everglades Agricultural Area Reservoir was created to store and clean water from Lake Okeechobee. The water will go south to restore natural freshwater flow through the Florida Everglades, Picayune Strand (50 percent hydraulic restoration achieved through road removal, plugging canals, and pump stations), Southern Corkscrew Watershed (4,000 acres of willow-infested wetlands treated thus far), Kissimmee River (restoration has been completed with more than 40 miles of river floodplain ecosystem and 20,000 acres of wetlands restored), Upper St. Johns River Basin (166,000 acres of the headwaters already restored), Everglades Headwaters (lands and conservation easements being actively acquired), Tampa Bay Estuary, Lake

Apopka (15,000 acres of wetlands restored on former farms), Altamaha River Watershed, Lower Savannah River Watershed, and Ashepoo-Combahee-Edisto Basin (over 160,000 acres of upland and wetland habitat protected). Since the initiation of the CERP in 2000, wood stork demographic measures have continued to improve under its water management guidance.

One goal of the CERP is to restore a robust and successful breeding population of wood storks within the greater Everglades, including the Big Cypress and Corkscrew Swamp, and the CERP's target of supporting 1,500–2,500 nesting pairs of wood storks in the mainland Everglades (water conservation areas and Everglades National Park) is frequently achieved (Cook and Barnanski 2023. p. 27). This reflects the favorable hydrologic conditions of those years and the continued improvement of water management practices in supporting nesting wading birds like the wood stork and the overall health of the Everglades ecosystem. CERP conservation initiatives are independent of the wood stork's status under the Act, and, therefore, will continue as conservation goals after delisting.

- On March 11, 2024, the Department of the Interior and the Service announced the newest large-scale initiative, the Everglades to Gulf Conservation Area (EGCA), which will help to facilitate conservation within 4,045,268 acres of Southwest Florida using tools like voluntary conservation easements. ''Conservation Areas'' consist primarily or entirely of conservation easements on private lands in cooperation with landowners. The EGCA is expansive and spans 12 southwest and central Florida counties west of Lake Okeechobee from Lakeland south to Naples. It borders the Everglades Headwaters National Wildlife Refuge Conservation Area and Florida Panther National Wildlife Refuge and primarily includes rural ranches, farms, and other large plots of land that are primarily privately owned by constituents willing to protect the wildlife in and around their properties. This Conservation Area will enhance and support the conservation objectives of the Everglades Restoration program, including wetland protection, enhancement, and restoration.
- State Wildlife Action Plans (SWAPs) receive Federal funding through the State and Tribal Wildlife Grants program and include plans for the recovery of threatened and endangered species and the habitat upon which they depend. A primary theme in each SWAP throughout the wood stork's range is wetland conservation (ASWAP 2015, FSWAP 2019, GSWAP 2015, MSWAP 2015, NCWRC 2015, and SCSWAP 2015, entire). Colony sites have been and continue to be managed, enhanced, restored, and created, resulting in improved wood stork nesting conditions, recolonization, and establishment of new colony sites (*e.g.,* Woody Pond colony in Georgia; Dugannon Plantation and Green Pond colonies in South Carolina; Duck Lake, Orlando Wetlands, Se7en Wetlands, and Wakadohatchee Wetlands colonies in Florida), many of which are included in SWAPs.
- Wetland conservation strategies are also developed for each State through Wetland Program Plans (EPA 2025, unpaginated). These plans summarize the status of wetlands in each State and include information on how wetlands are regulated and efforts developed to restore and/or mitigate wetland loss.
- In addition to being regulated through the Clean Water Act (CWA) and section 404 permitting through the U.S. Army Corps of Engineers, Florida also has independent authority over wetlands under its Florida Water Resources Act (chapter 373 Florida Statutes (F.S.)) and through its State-owned submerged lands program (Chapter 18–21 Florida Administrative Code (F.A.C.)): Sovereignty Submerged Lands Management; 253.03(7) F.S.) which is analogous to the CWA's section 404 program. Florida's jurisdiction encompasses a broader definition of wetlands than that of the CWA by recognizing and regulating a larger variety of wetlands than does the CWA section 404 program. For example, Florida jurisdictional wetlands include any lands that are ''inundated or saturated by surface water or ground water at a frequency and a duration sufficient to support . . . a prevalence of vegetation typically adapted for life in saturated soils'' (chapter 62–340.200(19) F.A.C.). For such wetlands, Florida regulates dredging and filling, as well as the construction, alteration, operation, maintenance, repair, abandonment, and removal of storm water management systems, dams, impoundments, reservoirs, and their associated structures. The wood stork is also listed by the State of Florida as a State threatened species (chapter 68A–27 F.A.C.). This status provides conservation measures and permitting guidance related to protecting and minimizing impacts to State-listed species and their habitat, such as some wading bird species and the hydrology and vegetation of their foraging and nesting wetland habitat. Moreover, the Florida Imperiled Wading Bird Action Plan (Florida Fish and Wildlife Conservation Commission 2013, entire) includes conservation actions for high-priority nesting colonies that are subject to disturbance, establishes management recommendations to protect and manage nesting colonies, and prioritizes the top nesting colonies and associated foraging habitat based on each species' needs for protection and management.
- Smaller scale, more localized wetland restoration projects on individual public, private, industrial, and agriculture properties within the range of the wood stork have and continue to improve wood stork habitat, through various programs and regulations including: National Coastal Wetlands Program, Wetland Reserves Program (restored over 325,000 acres across several States, with one site now supporting a nesting colony), Partners for Wildlife, Forest Stewardship Program, North American Waterfowl Management Plan, and North American Wetlands Conservation Act (77 projects across several States affecting 250,000 acres of wetlands), and the Food Security Act. On private agricultural lands, wetlands are protected through the Food Security Act by removal of incentives for farmers to convert wetlands to crop fields.
- Colonies and 9.2 million acres of wetlands occurring on State and Federal lands (*e.g.,* the Service's National Wildlife Refuges, National Park Service lands, National Forests, Department of Defense lands, National Aeronautics and Space Administration lands, State Parks, State Wildlife Management Areas, and State Forests) within the breeding range are and will continue to be afforded some protection from development and other large-scale habitat disturbance through State and Federal regulations. These regulations include the Coastal Zone Management Act, Rivers and Harbors Act, NEPA, National Forest Management Act, the National Wildlife Refuge System Improvement Act, the Sikes Act, and others. Mitigation and wetland restoration may also be regulated through the National Wetlands Mitigation Action Plan, and the Executive Order (E.O.) 11990 Protection of Wetlands.
- Suitable foraging wetlands have been and continue to be created within diked ''impoundments,'' through modifications of existing impoundments, restoration of impacted wetlands, creation of impoundments, and water storage areas, often creating seasonal shallow wetlands through hydrologic management (Service 2024, chapter 5.3).

• Tidal impoundments (*e.g.,* former rice fields) in South Carolina (40,000 acres with dike and water management infrastructure for management, and 190,000 acres reverted tidal marsh bottom lands, hardwoods, and forests) and Georgia are now managed to provide winter habitat for waterfowl and foraging for wood storks year-round. By staggering drawdowns in managed impoundments and by tides in former impoundments, concentrated prey is being made available to wood storks throughout the breeding and post-breeding seasons (Service 2024, chapter 5.3).

• Wastewater treatment flow through marshes and other manmade wetland features are increasing within the Southeastern United States and are used by wood storks as both foraging and breeding habitats. For example, in Florida, management for wastewater treatment now supports 200 acres of wetlands at Viera Wetlands and 125 acres of wetlands at Sweetwater Wetlands Park; and wastewater treatment wetlands now support a wood stork nesting colony each at Wakodahatchee Wetlands (50 acres of wetlands), Orlando Wetlands (1,200 acres of wetlands), and at Se7en Wetlands (1,600 acres of wetlands). Each of these managed wetland systems have been documented to support a large variety of wetland-dependent species including wood storks (with nesting now occurring at three sites). As noted above, the 6,500-acre Everglades Agricultural Area Reservoir will store and clean water from Lake Okeechobee, will provide wood stork foraging habitat along the reservoir's edges and in shallow areas during periods of drawdown, and will improve conditions of wetlands with appropriately timed water releases in the Everglades (Service 2024, chapter 5.3).

• Wetlands negatively impacted by encroaching woody plants (*e.g.,* willows) have been and continue to be restored by combining herbicide and mechanical methods; these projects have opened up impacted wetlands and made them available for wood stork use as colonies and foraging sites (Service 2024, chapter 5.3). Wetland restoration initiatives to restore thousands of acres of wetlands afflicted by woody and willow encroachment during the past 15 years have been implemented at: Blue Cypress Marsh, Blue Spring State Park, Corkscrew Regional Ecosystem Watershed, Emeralda Marsh, Fort Drum Marsh, Jonathan Dickinson State Park, Lake Apopka North Shore, Moccasin Island Marsh, Ocklawaha Prairie, Paynes Prairie, River Lakes, St. Johns Marsh, Sunnyhill, Sweetwater, Three Forks Marsh, Upper Ocklawaha River Basin, Upper St. Johns River Basin, Water Conservation Area 3A, Frances Taylor Wildlife Management Area, and Everglades National Park.

• Wood stork colonies are protected through the Migratory Bird Treaty Act, which aims to ensure the sustainability of populations through prohibition of take including killing, capturing, selling, trading, and transport of protected migratory bird species without prior authorization by the Service.

• Partnerships developed through conservation easements, wetland restoration projects, and other conservation means, occurring throughout the southeast U.S. coastal plains, have and will continue to minimize potential loss of colony sites.

Cumulative Effects

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have analyzed the cumulative effects of identified threats and conservation actions on the species. To assess the current and future condition of the species, we evaluate the effects of all the relevant factors that may be influencing the species, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire species, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative-effects analysis.

Current Condition

The U.S. breeding population of wood storks has been categorized as a single population by genetic analyses to date, which have been corroborated by documented intra-regional movements of breeding-aged individuals and shifts in nesting throughout the range (Stangel et al. 1990, p. 618; Van Den Bussche et al. 1999, p. 1083; Zimmerman 2023, entire). As 'partial migrants,' some individuals remain relatively permanent residents to an area or region, while others are seasonal migrants, and still others move between regions based upon environmental and habitat conditions (*i.e.,* ''facultative migration'') (Picardi et al. 2020, p. 1). Within the breeding range, wood stork colonies cluster into the South, Central, Northwest, and Northeast breeding regions (figure 1), which do not function as discrete populations but rather as geographical concentrations of breeding activity. These clusters vary by climate, geography, and landscape features such as wetlands, as well as their influences on wood stork ecology, habitat, and behavior.

Current Resiliency

Demographic factors such as abundance, adult survival, reproductive success, juvenile recruitment, and population growth influence wood stork resiliency. To assess the current condition of the wood stork, we focused on those factors that contribute to resiliency, including nesting population size (number of pairs/nests), population growth trend, number of large, persistent nesting colonies (colonies that consistently support more than 200 pairs) and productivity (fledged chicks per nest), which are all described in greater detail in the SSA report (Service 2024, chapter 4). We categorically assigned a condition of high, moderate, or low to each of these factors for each breeding region and for the DPS as a whole (table 4).

TABLE 4—WOOD STORK POPULATION CONDITION CATEGORIES BASED ON POPULATION METRICS

Population metric	Low condition	Moderate condition	High condition
Population size (nests/pair)	<1,500	1,500–2,499	>2,500.
Large persistent colonies	0–1	2–4	5 or more.
Productivity	<1.3	1.3–1.7	>1.7.
Population trend	Declining	Stable	Increasing.

As described above under *Recovery Criteria,* the productivity targets we used to categorize condition were likely overly conservative, as our estimates of the productivity rates adequate to maintain stable or growing populations of wood stork were overestimated. As evidence, the productivity rate of less than one has led to population growth adequate to recover similar species such as the bald eagle and brown pelican (which are both long-lived fish-eating bird species like the wood stork, and fully recovered with productivity rates below wood stork productivity rates) (74 FR 59444, November 17, 2009; 72 FR 37346, July 9, 2007; Service 1989, p. 7).

We assessed the current overall resiliency of each breeding region based on the average condition of each category of the demographic factors, resulting in the overall current condition of each breeding region ranging from high to moderate (table 5).

TABLE 5—CURRENT CONDITION OF EACH WOOD STORK BREEDING REGION

Breeding region	Population size	Population trend	Large persistent colonies	Productivity	Overall demographic condition
Northeast	High	High	High	High	High.
Northwest	Low	Moderate	Low	High	Moderate.
Central	Moderate	Low	Very Low	Moderate	Moderate-Low.
South	High	Moderate	High	Low	High-Moderate.
Southeast U.S. DPS	High-Moderate	Moderate	Moderate	High-Moderate	High-Moderate.

Because suitable wetland habitat throughout the wood stork's breeding range is widely available, and habitat does not appear to be limiting wood stork resiliency, we did not include a measure for habitat resiliency factors in the analysis of current condition. The Southeastern United States has nearly 48 million acres of wetlands, which account for more than 43 percent of the Nation's palustrine and estuarine wetlands (Sucik and Marks 2015, p. 11). Currently, 10.8 million acres of suitable wood stork wetland habitat within the CFA (Service 2024, table 31) supports an annual breeding population of 10,000 to 14,000 pairs (Service 2024, figure 18). There are an additional 15.4 million acres of suitable wetland habitat within the breeding range but outside the current footprint of the CFA (Service 2024, table 31). Further, the peak annual counts of nesting pairs during the past 15 years indicate that wood stork habitat within the CFA could, during years with favorable conditions, support a significantly greater number of nesting pairs than is evident from the 5-year averages (table 6), which is another indicator that habitat is not limiting to the wood stork population.

TABLE 6—5-YEAR AVERAGE AND MAXIMUM NESTING PAIR COUNTS 2008–2022 BY BREEDING REGION

Breeding region	5-Year average	Maximum count
Northeast	4,187	4,700
Northwest	1,510	2,100
Central	2,690	4,800
South	2,106	6,300
Southeast U.S	(10,493)	(17,900)

Current Redundancy and Representation

As previously described, the Southeast U.S. DPS of the wood stork is a wide-ranging, single population, with all breeding occurring in Florida, Georgia, South Carolina, and North Carolina. However, to assess redundancy in our analysis of current and future condition, we identified four breeding regions (figure 1) as defined by the clustering of nesting colonies and nesting numbers (within and across the geographic borders) among the four States, even though there is no biological or ecological distinction among individuals in these four areas. Wood stork nest numbers often fluctuate among breeding regions within and between years, due to environmental conditions (*e.g.,* rainfall amounts and timing). When conditions at a colony site become less favorable for nesting, wood storks tend to establish new colony sites or move to other established colony sites that offer more favorable conditions at that time. In contrast to historical trends, 40–50 percent of wood stork nesting now occurs in the Northeast Breeding Region. The wide spatial extent covered by the Southeast U.S. DPS of the wood stork across the four breeding regions reduces the risk to the wood stork, because it is unlikely that a single catastrophic event would impact all four breeding regions. Furthermore, the impacts of stressors in one region may be mitigated by the fluid nature of breeding throughout the range. In addition, having several large, persistent colonies as anchors within each breeding region provides resiliency within a region and represents a form of redundancy for the Southeast U.S. DPS of the wood stork.

Maintaining representation in the form of genetic or ecological diversity is important to sustain the capacity to adapt to future environmental changes. As previously discussed, there is little genetic diversity among the Southeast U.S. DPS of the wood stork. However, ecological diversity within the range of the species is extensive. Wood storks use a mosaic of wetland habitats for nesting, roosting, and foraging. These include shallow and persistent (*i.e.,* short and long hydroperiod) wetlands, marshes, and shallow open water habitats (including freshwater, brackish water, and saltwater habitat associated with natural and anthropogenic landforms). Negative impacts to the wetlands of the Everglades and other wetlands in south Florida from development and agriculture (during the early and mid-1900s) was a major contributor to the population decline that led to the listing of the U.S. breeding population of the wood stork, but these anthropogenic environmental changes to south Florida also may have influenced the regional shift in abundance of nesting storks northward (1980s to present).

Although wood storks have always had the ability to nest in other parts of their range, they historically concentrated in south Florida because the reproductive rewards there were higher for less cost, resulting in greater reproductive success. However, as conditions deteriorated and dried in south Florida, the extensive salt marshes, coastal brackish and freshwater wetlands, and old rice impoundments in Georgia and South Carolina offered greater stability, and an option for foraging to support reproduction during the breeding season; the result was that the wood stork population center shifted north. A second shift in wood stork nesting occurred in southwest Florida and is likely related to degradation of the hydrology of the Corskscrew Swamp watershed due to adjacent agricultural practices and intensive adjacent development (Clem and Duever 2019, p. 370). These anthropogenic changes appear to have led to a local shift in abundance of nesting away from Corkscrew Swamp and simultaneous colonization of new nesting sites nearby and north into the Caloosahatchee River, Peace River, Myaka River, and Sarasota Bay basins.

The wood stork now consistently breeds in four distinctive regions of the coastal plains within its range: Southern Florida Coastal Plain (South Breeding Region), Southern Coastal Plain (Central and Northeast Breeding Regions), Middle Atlantic Coastal Plain (Northeast Breeding Region), and Southeastern Coastal Plain (Northwest Breeding Region). Hereinafter we will refer to these four regions collectively as the southeast U.S. coastal plains. Further, current wood stork nesting in North Carolina appears to indicate range expansion that is likely a response related to changes in climate, as has been documented in multiple other bird species worldwide (Hitch and Leberg 2007, p. 534). Thus, the wood stork's colony turnover trait, its shift of breeding colonies in response to habitat conditions, and the expansion northward of its historical range, may demonstrate an innate behavioral and adaptive response to deteriorating or long-term changes in habitat conditions and climate, which ultimately indicates a certain degree of adaptive capacity and adequate representation in wood storks.

Some wood storks are ''residents'' (remain in one area all year), some exhibit seasonal migratory movements among breeding regions and other areas in Alabama and Mississippi, and others employ both strategies depending upon habitat conditions (*i.e.,* facultative migration; Picardi et al. 2020, p. 9). In response to cooler temperature conditions in the fall and winter, many wood storks migrate south into Florida, especially towards South Florida, or to coastal habitats if residing in South Carolina, Georgia, or north Florida (Coulter et al. 2020, unpaginated). These patterns also indicate plasticity that allows individuals to respond to current environmental conditions and to move (or not) depending on local resource availability.

Wood storks also use anthropogenic wetlands such as canals, ditches, impounded ponds and lakes, and other urban and suburban habitats rangewide, which they were not known to use historically. Wood storks were once thought to be intolerant of human disturbance (Burleigh 1958, p. 119). However, with the increase in use of urban and suburban wetland habitats, wood storks appear more tolerant of human activity, to the extent that they will forage and nest in human-populated areas like stormwater management lakes and ponds within housing developments, commercial shopping areas, and adjacent to busy roads (Evans and Gawlik 2020, p. 1; Tsai et al. 2016, p. 644). Thus, wood storks will use suitable foraging wetlands and nesting habitats found in a variety of natural and human-influenced and human-created habitats.

As mentioned previously, representation is the ability of a species to adapt to both near-term and long-term changes in its physical and biological environment. Species adapt to novel changes in their environment by either: (1) moving to new, suitable environments or (2) altering their physical or behavioral traits (phenotypes) to match the new environmental conditions through either plasticity or genetic change (Beever et al. 2016, p. 132; Nicotra et al. 2015, p. 1270). Thus, representation reflects the ability of the species to respond and adapt to changing conditions (adaptive capacity), either by changing themselves, or by responding to changes around them. Representation is often measured in the genetic, morphological, ecological, behavioral, or other types of diversity present among populations, but, as noted previously, there is little evidence of these types of differences among populations of wood stork. However, the wood stork's innate behavioral capacity to respond to changing and deteriorating wetland conditions on a daily, seasonal, annual, and long-term basis, and to exploit novel habitat types such as human-influenced and -created wetlands, indicates adaptive capacity. Wood storks in the Southeast U.S. DPS have gradually shifted and expanded their breeding range (*e.g.,* northward into three new States) and increased their habitat use (*e.g.,* to include urban and suburban wetlands, managed wetlands, impounded wetlands, restored wetlands, and also exploit the coastal salt marshes in combination with the adjacent freshwater wetlands of Georgia and South Carolina) in response to changing conditions. Ultimately, these responses demonstrate a degree of adaptive capacity despite a lack of evidence showing genetic diversity within the wood stork.

Future Condition Methodology

To analyze the wood stork's viability, we used population demographics to measure the current condition of each breeding region, and we used habitat condition as a proxy for population resiliency in order to project the future condition of each breeding region based on the primary threats to wood stork into the future.

As mentioned previously, climatic variables such as periodicity and amounts of rainfall, drought, and hurricane frequency and intensity will vary annually in the future and impacts to individual colony sites and foraging habitats for wood storks will be dependent on an extensive range of local conditions. Thus, impacts of these climatic variables to habitat are less predictable, as is the species' response to these impacts. In general, temperature and precipitation increases are projected in each of the wood stork breeding regions. An increase in evaporative deficit can lead to drought conditions that would impact wetland habitats and foraging resources. Overall, this change will affect the long-term trend in wood stork resiliency. Projected drought and stronger hurricanes will directly impact wetlands and individual colony sites across the wood stork's range. This change could affect nesting both negatively and positively and will contribute to variability in annual nesting success. If available in the future, downscaled climate models for each of the breeding regions could be helpful in predicting localized impacts and developing future management options to support wood stork breeding ecology in each region. However, at this time we do not have information that would allow us to reliably predict these impacts and their effects on the wood stork.

To project the future condition of each breeding region, we considered potential future impacts to the current footprint of the CFA habitat that support nesting colonies, and developed three future scenarios based on projections for development/urbanization, sea level rise, and the continuation or discontinuation of ongoing beneficial conservation actions. We assessed habitat condition based on the percentage of acres remaining after projected urbanization impacts on the CFA; percentage of the wetlands, nesting colonies, and large persistent colonies remaining within the CFA after sea level rise; and varying degrees of conservation implementation.

We considered a 30- and 60-year timeframe into the future (2050 and 2080) for the future analysis. These time elements are within the predictive range of the model used to project future development, and within the recently updated climate change forecasts (Sweet et al. 2022, entire) that cover the Southeastern United States. Biologically, the 30- and 60-year timeframes cover 7 and 15 wood stork generations, respectively, assuming a generation time of 4 years (Coulter et al. 2020, unpaginated). These multi-generational timeframes allow for adequate time to detect a downward population trend, and to subsequently formulate responses with appropriate conservation actions.

Potential future impacts associated with changing climatic conditions (*i.e.,* estimates for precipitation, drought, temperature, and sea level rise) were based on climate model projections downscaled for Florida, Georgia, and South Carolina. However, as discussed above under *Threats,* climate metrics such as precipitation, temperature, and drying will likely be variable on regional and local scales and could result in positive or negative impacts on the wood stork's breeding success. As such, we cannot reliably project effects to wood storks from these climate metrics. Therefore, we have focused our future climatic impact scenarios on varying degrees of sea level rise because modeling of sea level rise impacts to suitable habitat is available throughout the range of the wood stork, and the effects on habitat are reasonably predictable, although we acknowledge potential effects to wood storks due to other climatic variables as well. To model sea level rise, we used the National Oceanic and Atmospheric Administration (NOAA) sea level rise projections (Sweet et al. 2022, entire).

To forecast future urbanization/development, we considered future scenarios that incorporate the SLEUTH (Slope, Land use, Excluded area, Urban area, Transportation, Hillside area) model, which simulates patterns of urban expansion that are consistent with spatial observations of past urban growth and transportation networks (Terando et al. 2014, entire).

The future scenarios we assessed include varying timeframes and magnitude of stressors that relate primarily to climate change and land conversion, but also to ongoing conservation actions that help to mitigate stressors. All are based on the best scientific and commercial information available at this time. Details on future scenarios can be found in the SSA report (Service 2024, chapter 6.1). We considered three plausible future scenarios, with variations in the future influence of the primary threats, over a 30-year (to 2050) and 60-year (to 2080) projection (table 7).

TABLE 7—THREE POTENTIAL FUTURE SCENARIOS FOR THE SOUTHEAST U.S. DPS OF THE WOOD STORK BASED ON CLIMATE CHANGE, LAND USE, AND CONSERVATION EFFORTS

Climate change	Land use change/ development	Conservation actions
Scenario 1—Intermediate sea level rise; no change in conservation		
Sea-level rise: NOAA "intermediate" projection.	SLEUTH 2050 & 2080 Nesting colony core foraging area habitat impacted by development (70 percent probability or greater) by 2050 and 2080.	Wetland habitat protections, conservation, management, acquisitions, and restoration efforts at least at current levels.
Scenario 2—High sea level rise; no change in conservation		
Sea-level rise: NOAA "high" projection.	SLEUTH 2050 & 2080 Nesting colony core foraging area habitat impacted by development (70 percent probability or greater) by 2050 and 2080.	Wetland habitat protections, conservation, management, acquisitions, and restoration efforts at least at current levels.
Scenario 3—High sea level rise; reduced conservation		
Sea-level rise: NOAA "high" projection.	SLEUTH 2050 & 2080 Nesting colony core foraging area habitat impacted by development (70 percent probability or greater) by 2050 and 2080.	Wetland habitat regulatory protections, conservation management, and acquisitions decreased due to changes in regulatory mechanisms and lower funding levels Restoration: No longer targeting benefits for wood storks.

The projections of future CFA habitat condition described above are based upon habitat within the current footprint of the CFA, and how the major threats may reduce or degrade that habitat. However, the analysis of future threats to habitat within the current CFA does not account for the response of wood storks to changing habitat conditions, such as relocation of nesting colonies into other suitable occupied habitat acres outside the current footprint of the CFA. The expansion of wood stork breeding regions and the overall breeding range, and the establishment of new colonies in response to wood stork population growth and changing habitat, is a phenomenon that has been underway since the 1980s. Historical evidence from wood stork response to the ditching and draining of wetlands in the Everglades and south Florida indicates that some storks will continue to nest in areas with declining habitat conditions, and other wood storks will move and seek more favorable habitat conditions and either locate other active colony sites or pioneer new colony sites. Based on recent and current trends, we expect that the Southeast U.S. DPS of the wood stork will continue to grow, shift, and respond to changing environmental and habitat conditions, and to anthropogenic degradation, conversion, restoration, or creation of wetland habitats on small and large scales as they have in recent history.

In addition, our analysis of threats to habitat within the current footprint of the CFA does not account for the availability of suitable habitat that is currently occupied by wood storks but outside the current footprint of the CFA. We know that suitable habitat that is occupied by wood storks but outside the current footprint of the CFA is extensive (Service 2024, table 31), and that marsh migration models actually predict upslope migration and a net increase in salt marsh habitat in some areas in response to rising sea levels (Kirwan et al. 2016b, p. 4366). As such, projections of wood stork resiliency based solely upon impacts to habitat witin the current CFA underestimate wood stork future condition.

Therefore, for this final rule we also considered ecological and demographic characteristics that influence how the wood stork will respond to the modeled changes in habitat. For example, we incorporate into our analysis the behavioral trait of partial migration, the ecological record of the species' response to short- and long-term changes to habitat condition, wood stork population projections based upon current trends, breeding region peak counts, and the availability of suitable wood stork wetland habitat projected to occur in the future given updated sea level rise projections in 2050 and 2080 (Sweet et al. 2022; Service 2024, chapter 6.2). More detail on how we assessed each of these metrics can be found in the SSA report (Service 2024, chapter 6).

This updated analysis replicates the habitat-based approach we used to project the future condition of the current CFAs in each breeding region by employing the condition of required wood stork habitat as a proxy for the condition of the wood stork breeding region, or its resiliency. CFAs are suitable foraging wetlands within a set distance from each colony site that is based on the documented regional daily distance that wood storks travel from their colony sites during the breeding season: 30 kilometers (km) (19 miles (mi)) in south Florida, 25 km (16 mi) in central Florida, and 20 km (12 mi) in all other regions/States (Borkhataria et al. 2013, pp. 8–9; Bryan et al. 2012, p. 293; Cox et al. 1994, p. 134).

Future Condition

As previously described, we measured the current condition of each breeding region by demographic metrics (population size, population trend, the number of large persistent colonies, and productivity). We then used the current condition as a proxy for the baseline habitat condition for the future condition analysis; the underlying assumption is that habitat condition reflects demographic conditions and vice versa. We considered the future under 30- and 60-year timeframes (to 2050, and to 2080). A more detailed account of how we assessed the projected effects of each of the primary influence factors on habitat in the future to determine the future condition of each breeding region can be found in the SSA report (Service 2024, chapter 6). We have also updated sea level rise projections (Sweet et al 2022, entire) and added a future projection of available suitable foraging habitat (both inside and outside the CFA) given sea level rise, and future population projections based on current population trends and recent peak nesting counts within each breeding region (Service 2024, chapter 6).

All future scenarios we considered in each breeding region project some impact to breeding season colony CFA wetlands and colonies from sea level rise, and a reduction in acres within the current footprint of the CFA. However, the analysis does not account for suitable habitat created by the same sea level rise conditions that result in the loss of some of the suitable habitat in the CFA (*i.e.,* marsh migration; Kirwan et al. 2016a, p. 253). Further, these scenarios do not account for how wood storks respond to the changing habitat conditions. For example, we expect that in some cases individuals displaced by lost habitat will pioneer new colony sites in occupied habitat outside the current CFA, either within the same or another breeding region; however, the quantification of acres within the current footprint of the CFA inundated due to sea level rise does not reflect these outcomes (see *Suitable Breeding Habitat, Population and Colony Turnover Trends,* and *Future Resiliency Considerations,* below). As such, future projections of wood stork resiliency which are based solely upon the amount of current CFA habitat inundated by sea level rise understimate wood stork future condition, because the true future resiliency of the wood stork will depend just as much upon suitable occupied acres available to wood storks to use as CFA habitat and the faculty of the species to exploit those available acres.

South Breeding Region—Currently, there are 3,840,486 acres of wetland habitat within the South Breeding Region CFA that support 36 colonies, of which 5 are designated as large, persistent colonies.

Under Scenario 1, sea level rise is projected to impact 17 and 21 percent of the wetlands within the current footprint of the CFA by 2050 and 2080, respectively; and that area impacted by (and potentially lost to) sea level rise will include 12 (33 percent) of the 36 colony sites by 2050 and 2080. Two of the current five (40 percent) large, persistent colonies will be impacted by sea level rise in both the 2050 and 2080 timeframes. Land conversion will increase from 18 percent to 24 and 30 percent of the CFA under the 2050 and 2080 timeframe projections, respectively; however, as stated previously, habitat does not appear to be a limiting factor for wood stork resiliency. Conservation efforts, such as wetland conservation easements and regulatory mechanisms to avoid, minimize, and mitigate impacts to wetlands, remain at least at current levels under Scenario 1, making Scenario 1 similar to Scenario 2, and better than Scenario 3 in terms of conservation efforts and regulatory mechanisms.

Under Scenarios 2 and 3, sea level rise is projected to result in loss of 21 and 25 percent of wetlands within the current footprint of the CFA by 2050 and 2080, respectively. Of the current 36 active colony sites, 12 and 13 (33 and 36 percent) will be impacted by (and potentially lost to) sea level rise in both the 2050 and 2080 timeframe projections. Two of the current five large, persistent colonies (40 percent) will be impacted by sea level rise in either timeframe. Land conversion in the CFA will increase from 18 percent to 24 percent and 30 percent by 2050 and 2080, respectively. Conservation efforts are maintained under Scenario 2 and reduced under Scenario 3. However, in this breeding region the conservation efforts under Scenario 2 would not likely counteract the other negative influence factors considered (*e.g.,* habitat loss within the current CFA due to sea level rise and development trends) and therefore are not likely to have a significant influence over the difference in overall future condition between Scenarios 2 and 3 in the South Breeding Region.

As such, the future condition of habitat in the South Breeding Region would be similar under Scenarios 2 and 3, and slightly better under Scenario 1. Overall, we expect resiliency in this breeding region to decline to some degree under all three future scenarios, but to be offset by positive metrics described below under *Suitable Breeding Habitat* and *Population and Colony Turnover Trends.*

Central Breeding Region—Currently, there are 2,302,543 acres of wetlands in the Central Breeding Region CFA that support 48 colonies, of which 3 are designated as large, persistent colonies.

Under Scenario 1, sea level rise is projected to impact 8 and 11 percent of the wetlands within the current boundary of the CFA by the 2050 and 2080 future timeframe projections, respectively; the area impacted by (and therefore potentially lost to) sea level rise will include 14 of the 48 currently active colony sites in the 2050 projection (29 percent), and 15 of the 48 current colony sites in the 2080 projection (31 percent). One of the current three large, persistent colonies (33 percent) will be impacted by (and potentially lost to) sea level rise in both future timeframe projections. Land conversion will increase from 25 percent to 32 and 39 percent of the CFA under the 2050 and 2080 timeframe projections, respectively. Conservation efforts are maintained at least at current levels under Scenario 1, making the future condition in terms of conservation under Scenario 1 similar to that under Scenario 2 and better than that under Scenario 3.

Under Scenarios 2 and 3, sea level rise is projected to result in losses of 11 and 13 percent of wetlands within the current footprint of the CFA by 2050 and 2080, respectively. Of the 48 currently active colony sites, 15 (31 percent) and 16 (33 percent) are projected to be impacted by (and potentially lost to) sea level rise by 2050 and 2080, respectively. One of the current three large, persistent colonies will be impacted by (and potentially lost to) sea level rise in both future timeframe projections. Land conversion in the CFA will increase from 25 percent to 32 percent and 39 percent by 2050 and 2080, respectively. Conservation efforts are maintained under Scenario 2 and reduced under Scenario 3. In the Central Breeding Region, conservation efforts under Scenario 2 would partially mitigate negative influence factors, resulting in a slightly better future condition in terms of conservation and regulatory mechanisms under Scenario 2 when compared with Scenario 3.

Overall, we expect resiliency in this breeding region to decline to some degree under future Scenarios 1 and 2, and slightly more so under future Scenario 3. However, we expect some of that decline in resiliency to be offset by positive metrics described below under *Suitable Breeding Habitat* and *Population and Colony Turnover Trends.*

Northwest Breeding Region—Currently, there are 1,286,773 acres of wetlands within the Northwest Breeding Region CFA that support 30 colonies, of which one is designated a large, persistent colony.

Under Scenario 1, sea level rise is projected to impact 3 and 6 percent of the wetlands within the current footprint of the CFA by 2050 and 2080, respectively; the area impacted by sea level rise will not include any of the 30 currently active colony sites in either future timeframe projection. The one currently active large, persistent colony in this region will not be impacted by sea level rise in either future timeframe projection. Land conversion will increase from 8 percent to 15 and 22 percent of the CFA under the 2050 and 2080 timeframe projections, respectively. Conservation efforts are at least at current levels under Scenario 1, making the future outlook in terms of conservation and regulatory mechanisms under Scenario 1 similar to that under Scenario 2, and better than that under Scenario 3.

Under Scenarios 2 and 3, sea level rise is projected to result in the loss of 3 and 7 percent of wetlands within the current footprint of the CFA in the 2050 and 2080 time projections. Of the 30 currently active colony sites, none are projected to be impacted by sea level rise by 2050, and one is projected to be impacted by (and potentially lost to) sea level rise by 2080. The one currently active large, persistent colony will not be impacted by sea level rise in either future timeframe projection. Land conversion in the CFA will increase from 8 percent to 15 percent and 22 percent by 2050 and 2080, respectively; though suitable habitat is widely available, and it does not appear that habitat is a limiting factor for wood stork resiliency. Conservation efforts are maintained at least at current levels under Scenario 1 and Scenario 2 and reduced under Scenario 3. However, in this breeding region, conservation efforts would not likely counteract the other negative influence factors considered (*e.g.,* habitat loss within the current CFA due to sea level rise and development trends), and therefore are not likely to have a significant influence over the difference in overall future condition between Scenarios 2 and 3 in the Northwest Breeding Region.

Overall, we expect resiliency in this breeding region to remain stable under future Scenario 1, and to decline to a minor degree under future Scenarios 2 and 3. However, we expect some of that decline in resiliency to be offset by positive metrics described below under *Suitable Breeding Habitat* and *Population and Colony Turnover Trends.*

Northeast Breeding Region—Currently, there are 3,607,715 acres of wetlands within the Northeast Breeding Region CFA that support 76 colonies, of which 6 are designated large, persistent colonies.

Under Scenario 1, sea level rise is projected to impact 32 and 37 percent of the wetlands within the current footprint of the CFA by 2050 and 2080, respectively; the area impacted by (and potentially lost to) sea level rise will include 2 of the 76 currently active colony sites in the 2050 projection (3 percent), and 11 of the 76 current colony sites in the 2080 projection (14 percent). None of the currently active large, persistent colonies in this region will be impacted by sea level rise in either future timeframe projection. Land conversion will increase from 11 percent to 16 and 21 percent of the CFA under the 2050 and 2080 timeframe projections, respectively. Conservation efforts are maintained at least at current levels under Scenario 1, making the future outlook in terms of conservation and regulatory mechanisms under Scenario 1 similar to that under Scenario 2 and better than that under Scenario 3.

Under Scenarios 2 and 3, sea level rise is projected to result in losses of 35 and 40 percent of wetlands within the current footprint of the CFA by 2050 and 2080, respectively; the area impacted by (and therefore potentially lost to) sea level rise will include 4 of the 76 currently active colony sites in the 2050 projection (5 percent), and 27 of the 76 current colony sites in the 2080 projection (36 percent). None of the currently active large, persistent colonies will be impacted by sea level rise by 2050 or 2080, and land conversion in the CFA will increase from 11 percent to 16 percent and 21 percent by 2050 and 2080, respectively. Conservation efforts are maintained under Scenario 2 and reduced under Scenario 3. However, in this breeding region, the conservation efforts under Scenario 2 would not likely counteract the other negative influence factors considered (*e.g.,* habitat loss within the current CFA due to sea level rise and development trends), and therefore are not likely to have a significant influence over the difference in overall future condition between Scenarios 2 and 3 in the Northeast Breeding Region.

Overall, we expect resiliency to decline to some degree in this breeding region under future Scenario 1, and more so under future Scenarios 2 and 3. However, we expect some of that decline in resiliency to be offset by positive metrics described below under *Suitable Breeding Habitat* and *Population and Colony Turnover Trends.*

Suitable Breeding Habitat—Currently, there are 26.2 million acres of wetland habitat suitable for wood storks within the breeding range of the coastal plains of Florida, Georgia, South Carolina, and North Carolina (Service 2024, chapter 6.2; table 8; figure 3). Forty-two percent (10.8 million acres) is within the CFA and supports an annual breeding effort of 10,000–14,000 breeding pairs at more than 100 colony sites. There are an additional 15.4 million acres of wetland habitat in the coastal plains that are suitable as breeding and foraging habitat for wood storks. Even under the highest projections of sea level rise (4 feet in 2080), approximately 7.3 million of the 10.8 million acres of breeding habitat within the CFA will remain intact. Another 13.3 million additional acres of wetland habitat currently occupied by wood storks but outside the current CFA will remain unimpacted by sea level rise and suitable for breeding and foraging (table 8; figure 3).

TABLE 8—WOOD STORK BREEDING HABITAT IN THE SOUTHEAST U.S. COASTAL PLAIN BY 2080 UNDER HIGH SEA LEVEL RISE (SLR) PROJECTIONS: TOTAL SUITABLE WETLAND HABITAT AND HABITAT EITHER IMPACTED OR UNIMPACTED BY SLR

Southeast U.S. coastal plain wetlands	Total suitable wetland acres	Suitable acres impacted by SLR	Unimpacted suitable acres
Breeding range total	26,245,187	5,715,903	20,529,284
Total within current core foraging area (CFA)	10,808,704	3,531,743	7,276,961
Total outside current CFA	15,436,483	2,184,170	13,252,323

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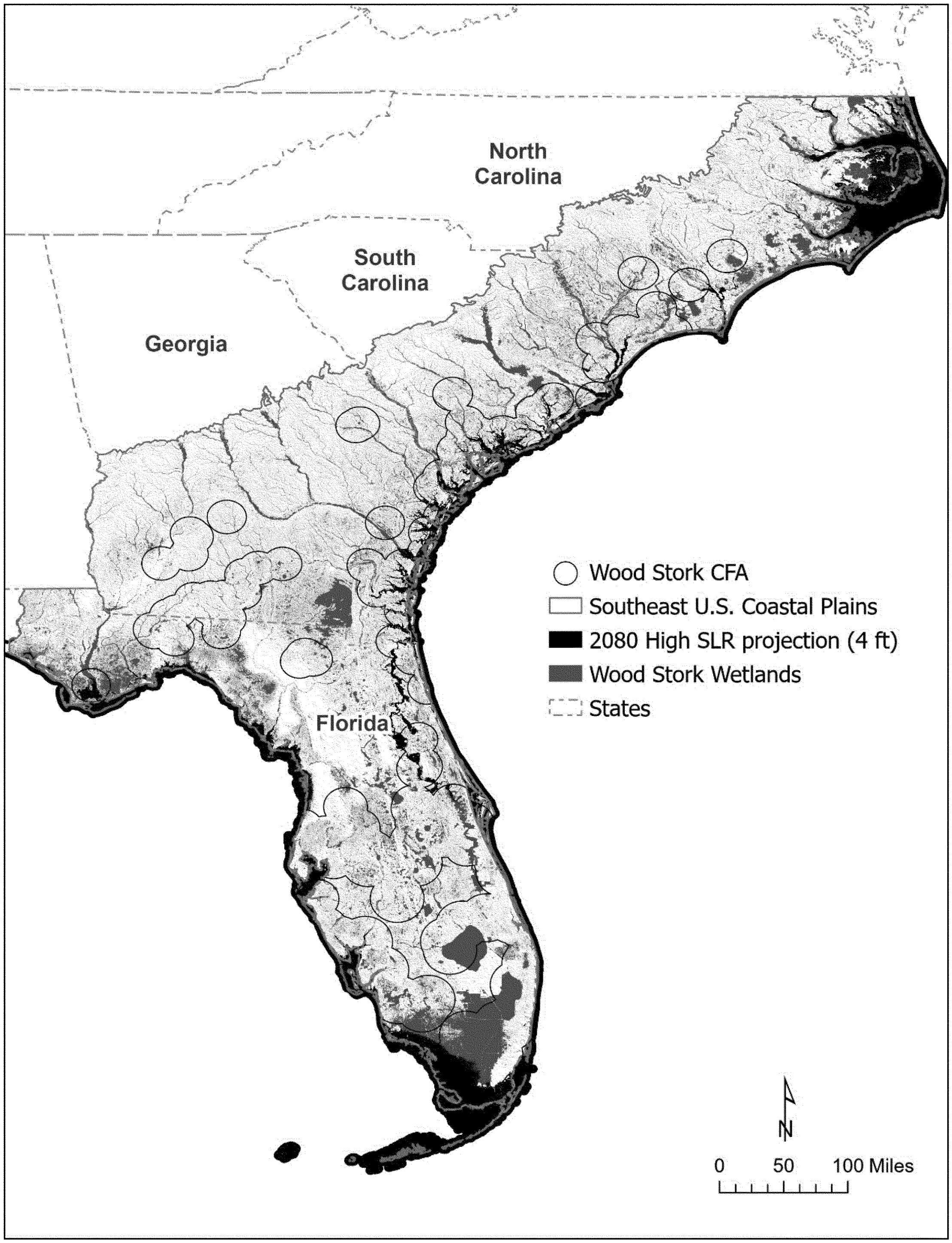

Figure 3. Suitable wetland habitat, including that within the current core foraging area (CFA), available for wood storks in 2080 given high (4 feet) sea level rise (SLR) projections across the wood stork's breeding range in the southeast U.S. coastal plain.

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In summary, while we project in our future condition analysis that sea level rise will result in the loss of some of the occupied habitat within the current footprint of the CFA, as illustrated above, a substantial amount of suitable habitat remains in the CFA. Further, we also estimate that even under the highest projections of sea level rise that there will remain approximately 13 million acres of occupied suitable breeding and foraging habitat outside the current CFA available for wood storks to use (table 8). Thus, habitat loss due to sea level rise is not likely to limit the resiliency of wood storks in the foreseeable future.

Population and Colony Turnover Trends—The ecological record shows that wood storks respond to environmental change. The wood stork's nesting colony site record shows that they will abandon a colony site when it is no longer suitable, or when other suitable potential colony sites provide more advantageous conditions than do currently occupied sites, as evidenced by their use of over 300 different colony locations since listing (Service 2024, chapter 2.7.1). There are a limited number of wood stork colony losses that have been documented, primarily due to anthropogenic factors (*e.g.,* draining). It appears that these colony losses did not result in losses of individual storks, but rather in individuals not breeding in a given year and/or shifting to nearby sites for breeding in that same or in following years (Service 2024, chapter 6.2). Wood storks may shift their habitat use in response to future inundation of coastal colonies from sea level rise; therefore, the projected loss of existing colony sites in the following future condition discussion may not result in an equivalent reduction in the number of actual colony sites in the future, or in a reduction in the number of breeding pairs present rangewide, but rather a shift in location of individuals from current to new colony sites in some cases. We expect that this phenomenon will continue to occur and that the wood stork population and breeding range will continue to grow, shift, and expand into the amply available suitable habitat that is currently occupied by wood storks but outside the current footprint of the CFA.

We project that the wood stork's current long-term trend of positive population growth will continue into the foreseeable future, as habitat does not appear to be a limiting factor. Though the current rangewide population of wood storks is estimated at approximately 11,000 individuals (table 1), peak nest counts from each region sum to nearly 18,000 nesting pairs, demonstrating the potential occupancy that the current habitat can support (table 6). Without limiting factors, a linear regression based upon the trend from the past 10 years projects that the future population would surpass 15,000 nesting pairs by mid-century and 20,000 pairs by the end of the century (figure 4).

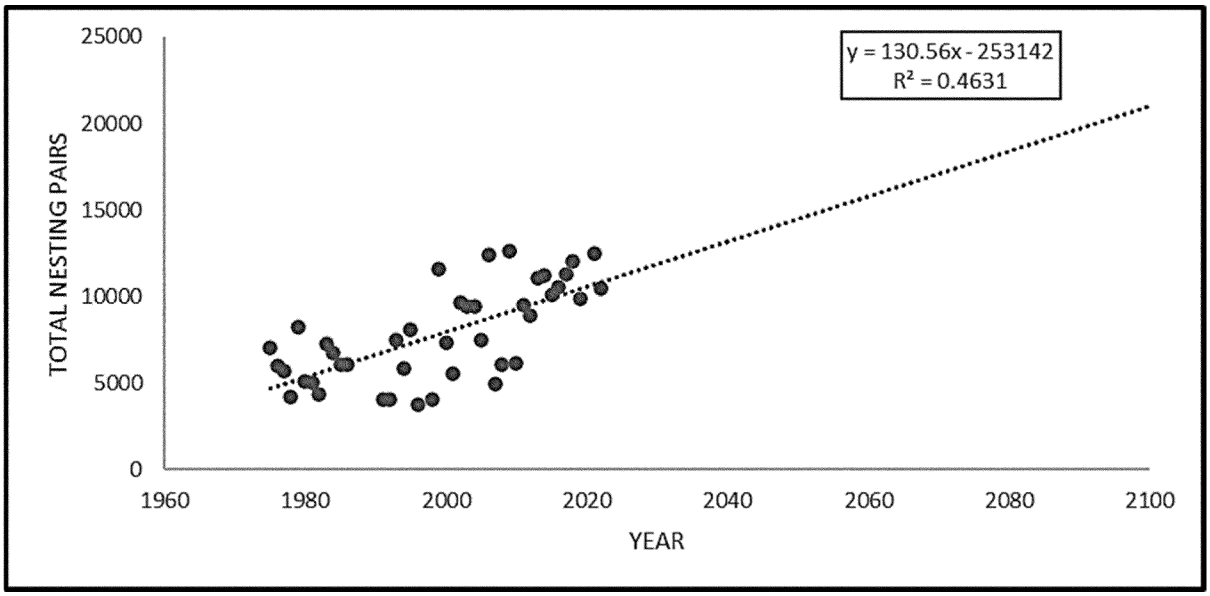

Figure 4. Long-term (1975–2022) wood stork population growth trend illustrated by annual wood stork nesting pair counts and projected out to 2100.

We also project that wood storks will vacate some currently occupied colony sites and pioneer new colonies, and that the number of active colonies will continue to grow as has been the trend since the 1980s (table 9; figure 5), resulting in the expansion of the breeding range continuing.

TABLE 9—NUMBER OF WOOD STORK NESTING COLONIES THAT BECAME ACTIVE OR INACTIVE DURING FOUR 10-YEAR PERIODS AND THE 10-YEAR ANNUAL AVERAGE NUMBER OF COLONIES DURING THAT TIMEFRAME

[Note: There have been 322 different nesting sites since 1982.]

Wood stork colonies	1982–1991	1992–2001	2002–2011	2012–2021
New	37	90	76	47
Became inactive	22	34	55	58
10-year annual average	25	43	85	97

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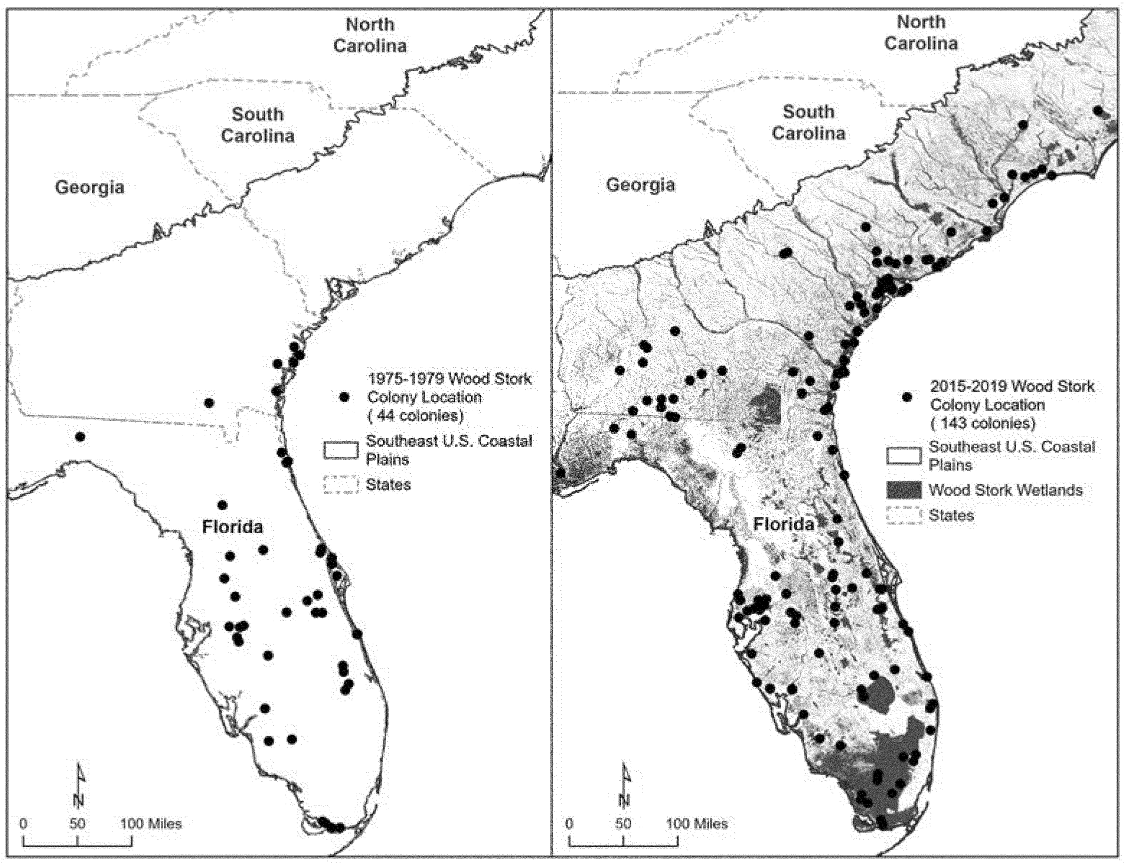

Figure 5. Active wood stork colonies 1975–1979 (left) and 2015–2019 (right); and wetland habitat generally suitable for wood storks (right).

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Future Resiliency Considerations—For our original analysis in the SSA report (version 1.0: Service 2021, entire), we projected future impacts to wood stork habitat using projections of future development, conservation actions, and the best sea level rise projections available at that time (Sweet et al. 2017, entire). We estimated the number of acres of habitat within the currently known footprint of the CFA that would be impacted by these influence factors in the future and used that as a proxy for wood stork future resiliency in the four breeding regions. Our updated SSA report (version 1.1: Service 2024, entire) employs updated sea level rise projections (Sweet et al. 2022, entire) as well as updated demographic information, such as the most recent survey data and considerations regarding nest colony site turnover and the productivity necessary to maintain populations, to project the future condition of the wood stork breeding regions.

The best scientific and commercial data available (Sweet et al. 2022, entire) indicate that our original assessment of CFA acreage that would be lost to sea level rise projections (Sweet et al. 2017, entire) was overestimated in version 1 of our SSA report (Service 2021, chapter 6). Our updated wood stork SSA report (version 1.1: Service 2024, entire) also incorporates estimates of the amount of currently occupied suitable wood stork habitat, not restricted to the current footprint of the CFA, that would be lost to future sea level rise compared with that which would remain available under high future projections of sea level rise. This updated analysis provides a more accurate representation of suitable habitat availability for wood storks in the future in relation to sea level rise, and further reinforces our assessment that habitat will not be a limiting factor for wood storks in the future.

The latest available field survey data that we incorporated into our SSA report update is consistent with previous breeding seasons, and further maintains the stable to increasing trend that has been demonstrated in wood stork abundance and productivity across the breeding regions. We also considered the productivity recovery criteria that were necessary to achieve recovery in other bird species that are similar to the wood stork in biology and ecology and determined that productivity targets necessary for recovery in the wood stork recovery plan were overestimated. Although the wood stork recovery plan criterion targets productivity of 1.5, productivity of 0.8 to 1.0 is likely adequate to maintain stable or increasing wood stork breeding populations, as it was for the bald eagle and brown pelican. This range of productivity has been achieved or exceeded by all the wood stork breeding regions, which helps account for the increase in abundance and number of breeding colonies that continues to be documented. Further, the consideration of colony site turnover, which is an ecological trait of wood storks that is shared by many other colonial waterbird species, also helps account for the demonstrated increases in numbers and breeding sites over time despite unfavorable environmental changes that have occurred at some of the historical colony sites.

Our consideration of updated information as well as important additional factors that have influenced, and will continue in the future to influence, wood stork resiliency has provided a more holistic and rigorous assessment of wood stork viability into the future. While the more simplified analysis of negative impacts to habitat within the current footprint of the CFA projected a reduction in wood stork resiliency based on declines in CFA habitat condition (Service 2021, entire), we did not find these projected declines substantial enough to drive current or future wood stork viability to population decline (88 FR 9830, February 15, 2023). Our updated analysis incorporates the most recently available projections of sea level rise and wood stork survey data and includes additional wood stork habitat metrics and important demographic information to help evaluate future resiliency without relying solely upon CFA habitat metrics, all of which collectively serves to further illustrate that wood stork breeding regions will maintain adequate resiliency into the future.

Future Resiliency

In summary, wood storks have demonstrated adaptability to environmental and demographic changes through range expansion, facultative migration, and the adoption of novel foraging opportunities. We expect that the habitat and behavioral plasticity characteristics of this species will continue to allow it to respond to a dynamic and constantly changing environment into the future despite changes that occur within the current footprint of the CFA. Further, even given extreme scenarios of climate change, adequate suitable habitat for the wood stork will be available within the current CFA, and an abundance of suitable habitat will be available in currently occupied habitat outside the current CFA, indicating sustained resiliency of wood stork populations into the foreseeable future.

Future Redundancy

Overall, the future scenarios project either the continuation of current conditions or some deteriorated conditions within each of the four breeding regions. We project that overall wood stork breeding conditions will be adequate and all of the breeding regions (as currently defined) will be maintained despite varying degrees of potential habitat loss, conversion, or degradation; climate effects such as changing precipitation patterns and prolonged droughts; and reduced reproductive success. We expect that each breeding region will maintain most of the large, persistent nesting colony sites, as well as multiple other colonies, and that there will be no major reduction in the wood stork's overall range even with some of the acres within the current footprint of the CFA lost due to sea level rise. No extirpation of any of the breeding regions is anticipated. Local losses of current core foraging habitat and colony sites (CFA) due to environmental, anthropogenic, or stochastic changes are likely to continue to cause shifts in concentrations of individuals (as has occurred in the past). However, we expect that the Southeast U.S. DPS of the wood stork will also likely continue its trend of population growth and range shift or expansion into existing nearby suitable occupied habitat outside the current CFA, and to new colony sites to replace colonies that are impacted or otherwise rendered unsuitable, leading to the continuation of all four existing breeding regions into the future. Thus, despite impacts to some sites within the CFA given certain future scenarios under consideration, we expect that the wood stork will maintain its current level of redundancy in the Southeast U.S. DPS.

Future Representation

No behavioral, genetic, morphological, or observable variations have been described within or among the breeding regions in the Southeast U.S. DPS of the wood stork. However, current representation is thought to be high due to the wood stork's historically demonstrated ability to continuously respond to changing habitat conditions and maintain and increase abundance while expanding its range northward. If current trends continue, it would be expected that the wood stork's range will continue to shift and expand. The large majority of the breeding range, which extends across four States, is predicted to maintain resiliency into the future, and thus we expect that the wood stork will continue to be represented within the southeast U.S. coastal plains within the current range of Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina. However, any decrease in future resiliency in populations could translate to a modest loss of representation (*i.e.,* decreased resiliency may result in fewer individuals, which provide less opportunity for diversity). Regardless, the wood stork has exhibited a proclivity to respond to historical changes in habitat, so despite potential losses in resiliency within the four breeding regions and the associated implications for representation, we expect that representation will remain relatively high among breeding regions in each of the future scenarios we considered.

Determination of the Southeast U.S. DPS of the Wood Stork's Status

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of an endangered species or a threatened species. The Act defines an ''endangered species'' as a species that is in danger of extinction throughout all or a significant portion of its range, and a ''threatened species'' as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether a species meets the definition of an endangered species or a threatened species because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

Status Throughout All of Its Range

After evaluating threats to the species and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we find that, based on the best scientific and commercial data available, the wood stork in the Southeast U.S. DPS is not in danger of extinction or likely to become so within the foreseeable future throughout all of its range.

Currently, all four wood stork breeding regions are either increasing or stable in the number of nesting pairs and are in an overall moderate to high condition based on demographic measures including productivity; large, persistent colonies; and abundance. Thus, the wood stork exhibits adequate resiliency in all of the breeding regions.

There are more than 3.5 times the number of wood stork breeding colonies currently in existence as there were at the time of listing (108 in 2022 compared to 27 in 1984), indicating that redundancy in the population has been increasing over time. Suitable wood stork habitat is also currently abundant, with approximately 10.8 million suitable wetland acres within the CFA (figure 3; table 8) and an additional 15.4 million acres of suitable wood stork habitat outside the CFA available for breeding and foraging. Wood storks have nested at 332 different locations historically, and there are currently over 100 colonies spread throughout the wood stork's historical breeding range and beyond that are active each year. Generally, the wood stork is distributed broadly, demonstrates plastic use of breeding colony sites, and would likely be able to recolonize any portion of its range that could be lost due to a catastrophic event. As such, the wood stork currently demonstrates a high level of redundancy.

The shift in concentration of the wood stork population from primarily south Florida northward to include Georgia, South Carolina, and North Carolina since the 1980s makes the population more resilient, as it is now less dependent on one geographical area and ecotype. Further, wood storks are now exploiting many more types of foraging and breeding habitats than they did historically, including coastal salt marsh and the adjacent freshwater wetlands of Georgia and South Carolina, and inland freshwater wetlands of southwest Georgia, in addition to manmade wetlands. They are also using both native and exotic vegetation as nesting substrate and foraging on native and exotic introduced novel prey items. Coastal salt marsh is abundant throughout the Southeastern United States and provides a more consistently reliable food source year-round than does the inland freshwater wetland habitat upon which the population was dependent historically. The wood stork's shift from dependence primarily on freshwater wetlands during the breeding season to also use coastal, tidally influenced fresh, brackish, and salt marsh as well, means that it is less reliant on favorable climate and weather patterns, and less vulnerable to unfavorable anthropogenic influences, all of which influence the seasonal hydrological cycles that dictate prey availability in inland freshwater wetland ecosystems. All of these factors indicate high adaptive capacity and, therefore, adequate representation within the population.

Further, conservation and favorable management have increased since the time of listing in 1984, and many regulated wetlands are now being managed in ways that allow for public water management goals to be met while also providing suitable conditions for wood stork breeding and foraging. With moderate to high resiliency in each breeding region, and adequate redundancy and representation in the Southeast U.S. DPS of the wood stork, the wood stork is not currently in danger of extinction throughout the DPS's range.

We next considered whether the Southeast U.S. DPS of the wood stork is likely to become in danger of extinction throughout its range in the foreseeable future. We determined the foreseeable future as approximately 2080, as that is the timeframe in which we can make reasonably reliable predictions about both the threats to the wood stork and the wood stork's response to those threats. Two time-steps (2050 and 2080) were considered for the future condition analysis. These time-steps are within the predictive range of the model used to project future development for the southeastern U.S. coastal plains (Terando et al. 2014, entire), are within the climate change forecasts that cover the Southeastern United States (Sweet et al. 2022, entire), and represent 7 and 15 wood stork generations, respectively, which allows for adequate time to predict a population response to the influence factors we analyzed.

Climate change (Factor E) is likely to lead to increased hurricane intensity and changes to precipitation patterns in the future, but these impacts are likely to vary locally, and the wood stork's response to these changes could be positive, negative, or both. Projections of increased temperature may lead to increased evaporative deficit and greater potential for drought-like conditions, which over time would likely reduce resiliency of wood stork populations to some degree, although these effects would likely vary locally. In addition, sea level rise will displace wood storks from some of their currently occupied coastal foraging and breeding habitat in the future. However, sea level rise will also create new tidally influenced marsh habitats that wood storks will be able to exploit, as coastal wetland ecosystems will migrate upslope and continue to occupy the ocean–land interface. Further, habitat does not appear to be a limiting factor, as there is an abundance of suitable freshwater wetland and salt marsh habitat available that is not yet being used by the expanding wood stork population. The Southeastern United States has nearly 48 million acres of estuarine, riverine, lacustrine, and palustrine wetlands, accounting for more than 43 percent of the Nation's palustrine and estuarine wetlands (Sucik and Marks 2015, p. 11). In 2080, high sea level rise projections of 4 feet would impact 3.5 of the 10.8 million acres of wood stork habitat within the CFA, leaving 7.3 million acres of suitable habitat within the CFA intact, and an additional 13.3 million adjacent acres of suitable habitat outside the current footprint of the CFA intact (figure 3; table 8). Thus, while sea level rise will render some currently suitable habitat unusable for wood storks, the best scientific and commercial data available indicate that there will be ample suitable habitat available for use within the foreseeable future even under scenarios of future sea level rise.

Wood storks exhibit behavioral plasticity, with some individuals readily responding to changing environmental conditions by employing facultative migration and optimizing use of breeding and foraging habitat within and among colony sites, breeding regions, and breeding years. In addition, colony site turnover, or the periodic establishment of new colonies in sites that offer more advantageous conditions than old ones, is a behavioral trait of wood storks that is also shared by many other colonial waterbird species. The wood stork's behavioral flexibility suggests that the species will have the ability to adjust to changing habitat conditions into the future, just as they currently do and have done historically, in response to anthropogenic changes to the Greater Everglades. Therefore, we expect that, wood storks in the Southeast U.S. DPS will be able to tolerate and respond to shifts in suitable habitat within the foreseeable future.

Habitat conversion due to urbanization (Factor A) is the other population-level threat to the wood stork. Land use modeling shows that urban and suburban expansion and development will continue to impact currently occupied habitat to a similar degree throughout the range of the wood stork. However, conservation efforts are expected to help to mitigate this threat, and wood storks have adapted to human landscapes successfully in many areas throughout their range.

Regulatory and voluntary conservation programs are ongoing and benefit wood stork foraging and breeding habitat, and include efforts to maintain and protect existing wetlands and colony sites, acquire wetland habitat for maintenance and protection, create new wetland habitat, and restore previously impacted habitat. These efforts have been implemented for years and have been demonstrated to be effective. There are many Federal laws and regulations for the restoration, management, and protection from alteration, degradation, and destruction of wetland resources (Votteler and Muir 2002, entire), including, but not limited to: the Clean Water Act (33 U.S.C. 1251 *et seq.*); Migratory Bird Treaty Act (16 U.S.C. 703–712); National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd–668ee); North American Wetlands Conservation Act of 1989 (16 U.S.C. 4401 *et seq.*); Coastal Zone Management Act of 1972 (16 U.S.C. 1451 *et seq.*); Rivers and Harbors Act of 1899 (33 U.S.C. 401 *et seq.*);

National Environmental Policy Act (42 U.S.C. 4321 *et seq.*); National Forest Management Act of 1976 (16 U.S.C. 1600 *et seq.*); Sike Act (16 U.S.C. 670a *et seq.*); and the National Wildlife Refuge System Improvement Act (16 U.S.C. 668dd).

Even in the absence of the Act's protections, as a wetland-dependent species, wood storks will continue to benefit from wetland restoration and protection. For example, the Comprehensive Everglades Restoration Plan (CERP), authorized by the Water Resources Development Act of 2000 (33 U.S.C. 2201 *et seq.*), remains among the highest national conservation priorities for the Service and one of Florida's primary wetland conservation initiatives. The CERP includes performance goals for wood storks, such as achieving 1,500 to 3,000 nesting pairs annually and that the initiation of breeding shifts back to winter months each year to maximize successful productivity. Contributions of the CERP are evidenced by the large reproductive effort in 2009 when 6,452 pairs of wood storks nested in south Florida, and thousands of chicks fledged before the onset of the rainy season (Cook and Kobza 2009, pp. 1–2). As such, this unique Federal/State partnership drives Everglades and Big Cypress restoration efforts, and we anticipate will continue to support and lead to a robust wood stork breeding population within the foreseeable future.

The wood stork's past and continued recovery is owed in part to conservation efforts to protect and restore wetlands. Because many of these conservation efforts are aimed at wetland protection and restoration, and therefore unrelated to species-specific protections, we expect that they will continue to benefit the Southeast U.S. DPS of the wood stork into the foreseeable future regardless of its status under the Act.

Further, the wood stork's increased use of urban and suburban environments, and human-made and -altered wetlands, indicates that the wood stork is more likely to tolerate at least some degree of urbanization compared with other species that rely more exclusively on relatively unaltered natural ecosystems.

We anticipate that the wood stork's positive population growth rate will continue into the near future, and peak nest counts from each region (summing to more than 18,000 nesting pairs, collectively) indicate that the habitat can support this growth. We also expect that wood storks will continue to pioneer new colony sites within the four breeding regions, and that the expansion of the breeding range will continue as the number of colonies continues to grow as has been the trend since the 1980s. As such, we expect that the wood stork will maintain robust (sufficiently resilient) breeding colonies comparable in size and distribution to those that exist today in each of the breeding regions, across and beyond its historical range (redundancy), and will continue to demonstrate high adaptive capacity (representation) by making use of its ecological and behavioral plasticity in order to optimize survival and productivity now and into the future despite varying degrees of threats due to habitat loss and climate change. Thus, after assessing the best commercial and scientific data available, we conclude that the wood stork is not in danger of extinction or likely to become so within the foreseeable future throughout all of its range.

Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so within the foreseeable future throughout all or a significant portion of its range. Having determined that the wood stork is not in danger of extinction or likely to become so in the foreseeable future throughout all of its range, we now consider whether it may be in danger of extinction (*i.e.,* endangered) or likely to become so within the foreseeable future (*i.e.,* threatened) in a significant portion of its range—that is, whether there is any portion of the species' range for which both (1) the portion is significant; and, (2) the species is in danger of extinction or likely to become so in the foreseeable future in that portion. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of the species' range.

In undertaking this analysis for the wood stork, we choose to address the status question first. We began by identifying portions of the range where the biological status of the species may be different from its biological status elsewhere in its range. For this purpose, we considered information pertaining to the geographic distribution of (a) individuals of the species, (b) the threats that the species faces, and (c) the resiliency condition of populations.

We evaluated the range of the wood stork to determine if the species is in danger of extinction now or likely to become so within the foreseeable future throughout any portion of its range. The range of a species can theoretically be divided into portions in an infinite number of ways. We focused our analysis on portions of the species' range that may meet the Act's definition of an endangered species or a threatened species. For the wood stork, we considered whether the threats or their effects on the species are greater in any biologically meaningful portion of the species' range than in the rest of the range such that the species is in danger of extinction now or likely to become so within the foreseeable future in that portion. We examined sea level rise and other threats associated with climate change, and urbanization, including cumulative effects.

We focused our analysis on the four wood stork breeding regions described in the SSA report (Northwest, Northeast, Central, and South) (Service 2024, chapter 3.2). At the outset we note that all of the wood stork recovery targets originally established in the recovery plan have been met or exceeded in the Northwest, Northeast, and Central breeding regions. The productivity metric alone in the South Breeding Region has not been fully achieved in the manner specifically identified in the recovery plan. The target set in the recovery plan for productivity is a 5-year average of 1.5 chicks fledged per nest per year, and that metric for the South Breeding Region has fluctuated between 0.8 and 1.1 for the past 5 years and has been relatively stable just below 1 for over a decade. This level of productivity has been shown to reflect stable or growing populations for other similar species. Further, annual productivity less than 1 is to be expected for a long-lived species like the wood stork where an individual needs to reproduce successfully only once in its lifetime to replace itself, but often has multiple attempts throughout its life to do so. For example, both the brown pelican and bald eagle are similarly long-lived, fish-eating birds associated with aquatic environments that fully recovered with annual productivity rates that were less than 1. In conclusion, productivity appears to be sufficient in maintaining a relatively stable breeding population in the South Breeding Region. Accordingly, we consider the intent of the recovery criteria for productivity as having been met for the South Breeding Region. More importantly for our determination though, the South Breeding Region's 5-year average productivity rate of approximately or slightly below one chick/nest/year does not indicate an endangered or threatened status for the individuals that breed in the South

Breeding Region (*i.e.,* does not indicate that the individuals that breed in that portion of the range are at risk of extinction now or in the foreseeable future).

In addition to the intent of the recovery criteria in the South Breeding Region being satisfied either effectively or explicitly as defined in the recovery plan, the South Breeding Region supports a robust and growing wood stork population. While the breeding population in the South Breeding Region continues to fluctuate naturally as it has historically (Frederick and Ogden 2001, pp. 484–485; Frederick et al. 2009, p. s85), it has been stable or increasing for over a decade (table 3) and appears to be contributing to the overall expansion and growth of the DPS as a whole (table 1; figure 5). In summary, there is no indication that individuals in the South Breeding Region are in danger of extinction now or likely to become so in the foreseeable future.

In addition to determining that each region has met (or effectively met) its recovery criteria, we considered whether the threats or their effects on the wood stork are greater in any portion of its range than in the rest of the range such that the wood stork is in danger of extinction now or likely to become so within the foreseeable future in that portion.

Climate change is projected to result in warmer temperatures, increased precipitation, increased evaporative deficits (drought-like conditions), and increased intensity of hurricanes, but the effects of these factors on the resiliency of the wood stork are expected to vary locally depending on ecological conditions and landscape attributes at each colony site. While downscaled climate models may in some cases provide higher confidence projections for localized effects, they are not available for comparison across all of the wood stork's distribution. Instead, projections for climate variables that are available for comparison across all colony sites are at the scale of the South Atlantic–Gulf Region, which includes the entirety of the wood stork's current U.S. distribution. We consider this regional climate projection to be the best scientific and commercial data available regarding the potential effects of climate change that may affect the wood stork in this region. As such, our analysis of these projections does not indicate that any one portion of the wood stork's range will be more impacted by the effects of increasing temperatures, changes in precipitation patterns, and drought-like conditions than any other.

Sea level rise projections are similar across the range of the wood stork, with an increase of 1 to 2 feet expected by 2050 across all breeding regions, and 3 to 4 feet expected by 2080 across all breeding regions, depending on whether the intermediate or high sea level rise scenario is considered. While sea level rise projections may be similar throughout the wood stork's range, impacts to wood stork resiliency are expected to be most pronounced in the Northeast Breeding Region, as it is in closer proximity to the coastline when compared to the other breeding regions. Tidal freshwater marshes will shift and possibly decline in size as saltwater intrudes and brackish marshes migrate inland to replace them. Some currently occupied wood stork habitat will be lost as sea level rises, but new habitat is also likely to become available, as marsh migration models indicate a net expansion in coastal marshes in response to sea level rise in many places (Kirwan et al. 2016b, p. 4366). Further, we know that even with the highest sea level rise projections (4 feet by 2080) that only 32 percent of suitable habitat within the current footprint of the CFA will be impacted, and 13.3 million adjacent acres of suitable habitat will be unimpacted by sea level rise and available for continued use by wood storks. Thus, even under this future scenario, the wood stork would retain sufficient resiliency.

Further, given the wood stork's tendency to shift both geographically and behaviorally in order to take advantage of optimum breeding and foraging conditions, and the abundance of suitable habitat that still exists in this region, we expect the wood storks in the Northeast Breeding Region will continue to form new colonies within their occupied range in response to the effects of sea level rise. Accordingly, we expect that the Northeast Breeding Region will not only remain sufficiently resilient, but also a valuable and productive part of the wood stork's distribution into the future. Therefore, despite changes to habitat that result from sea level rise, wood storks in this breeding region are not likely to have a different status.

Models project that urbanization and land conversion will continue to occur into the future across the range of the wood stork, and impacts will be relatively evenly distributed among breeding regions. Specifically, the urbanization model projects that under the worst-case future scenarios and over the longest timeframe (to 2080), developed areas within the CFA will increase by a maximum of 10 to 14 percentage points depending on the breeding region (*i.e.,* increasing from 18 to 30 percent in the South Breeding Region, from 25 to 39 percent in the Central Breeding Region, from 8 to 22 percent in the Northwest Breeding Region, and from 11 to 21 percent in the Northeast Breeding Region). As such, no one area of the wood stork's range will be impacted significantly more by urbanization than any other and, consistent with discussions above, wood storks populations in the various breeding regions are expected to retain sufficient resiliency that the species does not meet the definition of a threatened or endangered species in any individual region. Regulatory and voluntary conservation efforts that help mitigate the impacts of urbanization are also well distributed across the range of the wood stork, and multiple examples of ongoing efforts in all four breeding regions can be found in the SSA report (Service 2024, chapter 5.3).

In general, while the degree to which threats such as sea level rise and urbanization will impact the wood stork varies to some extent at different locations, the populations within the various locations are stable or increasing, and we project these trends to continue into the foreseeable future across the breeding regions so that the future status of wood storks among breeding regions does not differ. Additionally, the Southeast U.S. DPS of the wood stork consists of a single, genetically undifferentiated population where a proportion of the individuals move between and among breeding colonies and breeding regions, both inter- and intra-annually. The fluid nature of the wood stork population across its range means that even if certain colony sites or geographical areas experience an increase in exposure to a certain threat at a given time and location, the movement of individuals among colony sites throughout the range would prevent any one group of individuals from being disproportionately affected.

In conclusion, we found no portion of the wood stork's range where threats are impacting individuals differently from how they are affecting the species elsewhere in its range such that the status of the species in that portion differs from its status in any other portion of the species' range.

Therefore, we find that the species is not in danger of extinction now or likely to become so within the foreseeable future in any significant portion of its range. This does not conflict with the courts' holdings in *Desert Survivors* v. *U.S. Department of the Interior,* 321 F. Supp. 3d 1011, 1070–74 (N.D. Cal. 2018) and *Center for Biological Diversity* v.

Jewell, 248 F. Supp. 3d. 946, 959 (D. Ariz. 2017) because, in reaching this conclusion, we did not apply the aspects of the Final Policy on Interpretation of the Phrase ''Significant Portion of Its Range'' in the Endangered Species Act's Definitions of ''Endangered Species'' and ''Threatened Species'' (79 FR 37578; July 1, 2014), including the definition of ''significant'' that those court decisions held to be invalid.

Determination of Status

Based on the best scientific and commercial data available, we determine that the wood stork does not meet the definition of an endangered species or a threatened species in accordance with sections 3(6) and 3(20) of the Act. In accordance with our regulations at 50 CFR 424.11(e)(2) currently in effect, the wood stork has recovered to the point at which it no longer meets the definition of an endangered species or a threatened species. Therefore, we are removing the wood stork from the Federal List of Endangered and Threatened Wildlife.

Effects of This Rule

This rule revises 50 CFR 17.11(h) by removing the wood stork from the Federal List of Endangered and Threatened Wildlife. On the effective date of this rule (see **DATES**, above), the prohibitions and conservation measures provided by the Act, particularly through sections 7 and 9, will no longer apply to this species. Federal agencies will no longer be required to consult with the Service under section 7 of the Act in the event that activities they authorize, fund, or carry out may affect the wood stork.

There is no critical habitat designated for this species, so there will be no effect to 50 CFR 17.95. Removal of the wood stork from the List of Endangered and Threatened Wildlife does not affect the protection given to all migratory bird species under the Migratory Bird Treaty Act.

Post-Delisting Monitoring

Section 4(g)(1) of the Act requires us, in cooperation with the States, to implement a monitoring program for not less than 5 years for all species that have been recovered. Post-delisting monitoring (PDM) refers to activities undertaken to verify that a species delisted due to recovery remains secure from the risk of extinction after the protections of the Act no longer apply. The primary goal of PDM is to monitor the species to ensure that its status does not deteriorate, and if a decline is detected, to take measures to halt the decline so that proposing it as endangered or threatened is not again needed. If at any time during the monitoring period, data indicate that protective status under the Act should be reinstated, we can initiate listing procedures, including, if appropriate, emergency listing.

We have prepared a PDM plan for the wood stork. We published notification of the availability of a draft PDM plan with the proposed delisting rule (88 FR 9830, February 15, 2023), and we did not receive any comments on the plan. Therefore, we consider the plan final. As discussed in the proposed rule, the PDM plan: (1) Summarizes the status of the wood stork at the time of proposed delisting; (2) describes frequency and duration of monitoring; (3) discusses monitoring methods and potential sampling regimes; (4) defines what potential triggers will be evaluated to address the need for additional monitoring; (5) outlines reporting requirements and procedures; (6) proposes a schedule for implementing the PDM plan; and (7) defines responsibilities. It is our intent to work with our partners towards maintaining the recovered status of the wood stork.

Required Determinations

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994 (''Government-to-Government Relations With Native American Tribal Governments;'' 59 FR 22951, May 4, 1994), E.O. 13175 (''Consultation and Coordination with Indian Tribal Governments''), the President's memorandum of November 30, 2022 (''Uniform Standards for Tribal Consultation;'' 87 FR 74479, December 5, 2022), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with federally recognized Tribes and Alaska Native Corporations on a government-to-government basis. In accordance with S.O. 3206 of June 5, 1997 (''American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act''), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that Tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes. We informed the Seminole Indian Tribe of Florida and Miccosukee Indian Tribe of Florida in November 2019 that the wood stork assessment had been initiated, and invited their participation. In February 2021, we contacted affected Tribes with an opportunity to review the draft SSA report and received no responses. FWS received no comments from Tribes during the public comment period on the proposed delisting rule.

References Cited

A complete list of references cited in this rulemaking is available on the internet at *https://www.regulations.gov* under Docket No. FWS–R4–ES–2022–0099 and upon request from the Florida Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Plants, Reporting and recordkeeping requirements, Transportation, Wildlife.

Regulation Promulgation

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

■ 1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245, unless otherwise noted.

§ 17.11 [Amended]

■ 2. In § 17.11, in paragraph (h), amend the List of Endangered and Threatened Wildlife by removing the entry for ''Stork, wood [Southeast U.S. DPS]'' under BIRDS.

Brian Nesvik,

Director, U.S. Fish and Wildlife Service.

[FR Doc. 2026–02588 Filed 2–9–26; 8:45 am]

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 635

[Docket No. 220919–0193; RTID 0648–XF427]

Atlantic Highly Migratory Species; Atlantic Bluefin Tuna Fisheries; Longline Category Quota Transfer

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.