Wood stork (*Mycteria americana*)

5-Year Review:
Summary and Evaluation

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

5-YEAR REVIEW
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I. GENERAL INFORMATION

A. Methodology used to complete the review: The U.S. Fish and Wildlife Service's Jacksonville Field Office completed this review. All literature and documents used for this review are on file at the Jacksonville Field Office. Public notice of this review was given in the Federal Register on September 27, 2006 announcing a 60-day comment period that closed on November 27, 2006. In October 2005, a Wood Stork Ecology Workshop with invited papers was held and the proceedings are currently being published in a special edition of "Waterbirds," a scientific peer reviewed journal of the Waterbird Society. These papers, other wood stork literature and information presented at the Wood Stork Research and Monitoring Working Group's annual meeting were used in this review. None of this review was contracted to outside parties.

B. Reviewers

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C. Background

1. FR Notice citation announcing initiation of this review: 71 FR 56545, September 27, 2006

2. Species status: Improving (2006 Recovery Data Call) Three-year averages calculated from nesting data from 2001 through 2006 indicate that the total nesting population has been consistently above the 6,000 reclassification threshold for nesting pairs, and the averages have ranged from 7,400 to over 8,700. The 2006 nesting totals indicate that the stork population has reached its highest level since it was listed as endangered in 1984 and since the early 1960s with over 11,000 nesting pairs documented in FL, GA, SC and NC during the 2006 breeding season. Since listing, the number of nesting pairs is increasing, the number of nesting colonies is increasing, and the nesting range is growing. Even though threats that affect wood storks appear to be continuing at the same levels, the conclusion is that the overall population status is improving.

3. Recovery achieved: 3 (50-75% recovery objectives achieved) (2006 Recovery Data Call)

4. Listing history:
Original Listing
FR notice: 49 FR 7332
Date listed: February 28, 1984
Entity listed: U.S. breeding population
Classification: Endangered

5. Associated rulemakings: None

6. Review history: The Service conducted a five-year review for the wood stork in 1991 (56 FR 56882). In this review, the status of many species was simultaneously evaluated with no in-depth assessment of the five factors or threats as they pertain to the individual species. The notice stated that the Service was seeking any new or additional information reflecting the necessity of a change in the status of the species under review. The notice indicated that if significant data were available warranting a change in a species' classification, the Service would propose a rule to modify the species' status. No change in the wood stork's listing classification was found to be warranted.

Recovery Data Calls: 2007, 2006, 2005, 2004, 2003, 2002, 2001, 2000, 1999, and 1998. The recovery plan was updated and revised in 1997 and the original recovery plan was approved in 1986.

7. Species' Recovery Priority Number at start of review (48 FR 43098): 5c, the 5 indicates a high degree of threat and low recovery potential; the "c" reflects a high degree of conflict.

8. Recovery Plan
Name of plan: Revised recovery plan for the U.S. breeding population of the wood stork.
Date issued: Revised Plan signed on January 27, 1997; Original Plan signed on September 9, 1986.

II. REVIEW ANALYSIS

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

1. Is the species under review listed as a DPS?

No. The wood stork is a large wading bird that occurs from northern Argentina, eastern Peru and western Ecuador, north to Central America, Mexico, Cuba, Hispaniola, and the southeastern United States. The

breeding range of the species extends from the southeastern U.S. south through Mexico and Central America, to Argentina, Brazil, and Uruguay (Bent 1926). The Service listed the U.S. breeding population of wood storks in their known range of Florida, Georgia, South Carolina and Alabama in 1984, twelve years prior to the 1996 DPS policy.

2. Is there relevant new information regarding application of the DPS policy that would lead you to consider listing this species as a DPS in accordance with the 1996 policy?

No. However, we believe the original listing of the U.S. breeding population of wood storks likely meets the current standards of the DPS Policy for the following reasons. The population is physically separated from the adjacent population which breeds in southern Mexico. The loss of the U.S. breeding population would result in a significant gap in the range, as there would no longer be wood storks breeding in the U.S.

B. Recovery Criteria

1. Does the species have a final, approved recovery plan containing objective measurable criteria?

Yes. Measuring the biological aspect of the recovery of the wood stork is outlined in the Service's 1997 revised recovery plan. The recovery criteria contained in the plan are a viable measure of the species biological status. However, these biologically based criteria do not represent the current knowledge of the ecology of this population. The species biology and population status information can be updated and plans are being made to do so.

2. Adequacy of recovery criteria:

a. Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat?

No. The original recovery plan was published in 1986 and was updated and revised in 1997. Thus, it has been 10 years since the plan and recovery criteria were last updated and there is new research and ecological information available, including satellite-tracking data from over 150 individual wood storks since 2001 and a preliminary population model. The biological criteria are based upon historical population estimates and do not represent the current knowledge of the biology of this population. The delisting criterion includes a caveat about reproduction in the Everglades and Big Cypress systems, which may not be as significant to the

overall health and recovery of the population. Based upon the large nesting range extension since listing and the significant number of nesting wood storks in north FL, GA, SC, and NC, this caveat may not be necessary to recover this population.

The Service plans to establish a recovery team in the fall of 2007 to update and revise the recovery plan and recovery criteria to reflect the best available and most up-to-date information on the biology of the species and its habitat.

b. Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and is there no new information to consider regarding existing or new threats)?

No. The current wood stork recovery criteria are based upon two biological metrics, numbers of nesting pairs and productivity measured over time. During the upcoming initiative to update and revise the recovery plan, criteria will be developed to address relevant listing factors and current known threats that impact wood storks.

3. List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information. For threats-related recovery criteria, please note which of the 5 listing factors are addressed by that criterion. If any of the 5-listing factors are not relevant to this species, please note that here.

Reclassification Criteria: The plan's recovery criteria state that reclassification from endangered to threatened could be considered when there are 6,000 nesting pairs and annual regional productivity is greater than 1.5 chicks per nest/year (both calculated over a 3-year average). The basis for the 6,000 pairs for reclassification from endangered to threatened was the estimate of breeding pairs in 1975 (Ogden and Patty 1981). The 2001 through 2006 surveys (Brooks and Dean, in press) documented 3-year averages over 6,000 nesting pairs for all combined years: 7,417 pairs (2001-2003); 8,341 (2002-2004); 7,584 (2003-2005); and 8,406 (2004-2006), see Figure 1. The 3-year average productivity rate for all colonies monitored in the Southeast U.S. for 2004-2006 was 1.5 chicks/nest attempt; 2003-2005 was 1.2; and 4-year average for 2003-2006 was 1.5 (Brooks and Dean, in press), see Table 2.

Delisting Criteria: Delisting could be considered when there are 10,000 nesting pairs calculated over a 5-year period beginning at the time of reclassification and annual regional productivity is greater than 1.5 chicks per nest/year (calculated over a 5-year average). As a subset of the 10,000 nesting pairs, a minimum of 2,500 pairs must nest successfully in the Everglades and Big Cypress systems in South Florida. The delisting

estimate of 10,000 pairs was based on the estimated number of breeding wood storks in 1960, when good rates of reproduction were occurring at major Florida colonies (Ogden and Patty 1981). The delisting criteria have not been met as the recovery criteria first calls for the population to be reclassified to threatened prior to considering delisting. Also, the population has not met the nesting pair criteria of 10,000 nesting pairs calculated over a five-year period, as there has been only one year in the past five where the population was more than 10,000 nesting pairs.

The reclassification and delisting criteria described above are demographic. No threats based recovery criteria were developed when the recovery plan was updated in 1997. The demographic criteria provide support for assessment of the present or threatened destruction, modification, or curtailment of its habitat or range, and other natural or manmade factors affecting its continued existence.

C. Updated Information and Current Species Status

1. Biology and Habitat

a. Abundance, population trends, demographic features, or demographic trends:

Abundance and Population Trends:

Southeast U.S. Breeding Population: The United States breeding population of wood storks declined from an estimated 20,000 nesting pairs in the 1930s, to about 10,000 pairs by 1960 (49 FR 7332), and then to a low of around 5,000 nesting pairs in the late 1970s (Ogden et al. 1987). The lowest recorded annual total was 2,500 pairs in 1978, a result of poor nesting conditions in conjunction with the low population.

From the 1960s to the mid-1980s, the wood stork nesting population declined in southern Florida and increased in northern Florida, Georgia, and South Carolina (Ogden et al. 1987). Prior to 1970, a majority (70 percent) of the population nested south of Lake Okeechobee and declined from 8,500 pairs in 1961 to fewer than 500 pairs in the late 1980s and early 1990s. During the same period, nesting in Georgia increased from 4 to 1,501 pairs and nesting in South Carolina increased from 11 to 829 pairs (Service 1997). This extended the breeding range north along the coastal plain of Georgia and South Carolina. Overall, surveys between 1983 and 1995 documented a population in the Southeast U.S. ranging between 4,073 and 7,853 pairs (Service 1997).

More recently, synoptic surveys were completed in 1999 and 2001 to 2006 (Table 1). These surveys documented a population ranging between 5,560 and 11,279 pairs. The 2006 survey documented 11,279 pairs. This was the first time the nesting population was greater than 10,000 pairs since the early 1960s. Additionally, a majority of the population now breed north of Lake Okeechobee.

In the 23-year period from time of listing (1984) and 2006, 13 surveys of the entire breeding range were completed. Eight of those resulted in counts exceeding 6,000 pairs. Five of those occurred during the past eight years. In summary, annual nest counts have increased significantly from 6,245 pairs to 11,279 pairs in 2006 (Brooks and Dean, in press), indicating the population is stable or increasing across the southeastern U.S. (Borkhataria et al., in press).

Reclassification from endangered to threatened can be considered when there are 6,000 nesting pairs (calculated over a 3-year average). The 1993-1995 surveys averaged 6,783 nesting pairs. The 3-year averages from 2001 through 2006 also exceeded 6,000 pairs for all combined years: 7,417 pairs (2001-2003); 8,341 (2002-2004); 7,584 (2003-2005); and 8,406 (2004-2006), see Figure 1.

Florida Nesting Population: Nesting in Florida prior to 1980 is included in the preceding section. Ogden (2006), using 3-year running averages for total number of nesting wood storks in the Everglades and Big Cypress systems, found an increase from 175 pairs (1986-1988) to 1,868 pairs (2000-2002) and a subsequent decline to 800 pairs (2004-2006). Since listing, annual nest counts have increased significantly in South Florida from 1,245 pairs to 2,684 pairs (Brooks and Dean, in press). Annual nest counts in Central and North Florida have not significantly changed and fluctuate around of 3,100 pairs (Brooks and Dean, in press).

From 1991-2005, statewide surveys in Florida suggest that the nesting population is increasing, and while colonies are declining in size, the overall number of colonies is also increasing (Frederick and Meyer, in press). Frederick and Meyer also note that there are numerous colonies undetected by the current survey protocol, which may lead to biases in the estimation of population size and trend. Since listing, Florida's nest counts have shown an increase from 5,647 pairs to 7,216 pairs (Brooks and Dean, in press).

Georgia Nesting Population: From 1975 to 1984, Georgia averaged 3 colonies and an average total of 210 nesting pairs. Beginning in 1992, surveys in Georgia were expanded and 1,091 pairs were documented at 9 colonies. In 2005, 1,817 pairs were documented at 19 colonies (Winn et al., in press). In 2006 there were 1,928 pairs at 21 colonies (B. Winn, Georgia Department of Natural Resources, pers. comm., 2006).

Wood storks have nested at 43 different locations in the coastal plain of Georgia, with an average of 14 colonies during the past decade (Winn et al., in press). A statistical analysis of surveys from 1992 to 2005 indicates no significant population trend (Winn et al., in press). However, since listing, annual nest counts have increased significantly from 576 pairs 1,928 pairs (Brooks and Dean, in press).

South Carolina Nesting Population: From 1981-2006, wood stork nesting increased from 1 colony with 11 nesting pairs to 13 colonies with 2,010 pairs (Murphy and Coker, in press). Murphy and Coker (in press) indicate that the period from 1985 to 2006 reflects a growth phase in the population and that the growth rate will likely stabilize as the population reaches carrying capacity. Murphy (1995) estimated that the carrying capacity in South Carolina is approximately 2,400 pairs.

Wood storks have nested at 27 different locations in the coastal plain of South Carolina, with an average of 11 colonies during the past decade. Since listing, annual nest counts have increased significantly from 22 pairs to 2,010 pairs (Brooks and Dean, in press).

North Carolina Nesting Population: The first wood stork colony (32 pairs) in North Carolina was documented in 2005 on a managed impoundment in Columbus County (D. Allen, North Carolina Wildlife Resources Commission, pers. comm., 2005). The colony was active again in 2006 with a documented 132 pairs (D. Allen, North Carolina Wildlife Resources Commission, pers. comm., 2006).

It should be noted that much of the early nesting increases in Georgia and South Carolina were likely from non-natal birds from Florida. In recent years, the large number of chicks fledged contributes to increased nesting effort (Murphy and Coker, in press).

Demographic Features and Trends:

Nesting Colonies: Since listing, the number of colonies has increased significantly in the Southeast U.S. from 29 colonies to 81 colonies (Brooks and Dean, in press).

Wood storks are more likely to return to the same nesting site year after year than other wading birds (Frederick and Ogden 1997). Some colonies are known to be continuously active (Coulter et al. 1999) while others are active for only a year or two. Rodgers (1987) reported that wood storks often exhibit considerable inter year variation in nest numbers within the same colony. Frederick and Meyer (in press) showed that colony size in Florida has decreased over time. They also suggested that this trend reflects the increasingly fragmented nature of wetlands and a decreasing carrying capacity for most colony sites (Gibbs 1991).

Productivity Rates: In response to food availability and local habitat conditions, wood stork colonies experience considerable variation in production among years and locations (Holt 1929, Kahl 1964, Ogden et al. 1978, Clark 1978, Ehrhart 1979, Hopkins and Humphries 1983, Rodgers and Schwikert 1997). Recent studies (Rodgers et al., in press; Bryan, in press; B. Winn, Georgia Department of Natural Resources, pers. comm., 2006) documented productivity rates to be similar to the productivity rates published between the 1970s and 1990s, see Table 2.

Rodgers et al. (in press) reported a combined productivity rate for 21 north and central Florida colonies from 2003 to 2005 of 1.19+ 0.09 fledglings/nest (n=4,855 nests). Rodgers et al. (2006) reported a combined rate for nine colonies within the St. Johns River drainage from 2003 to 2006 of 1.64 fledglings/nest (n=2,809 nests).

Bryan and Robinette (in press) monitored 9 South Carolina and Georgia colonies in 2004 (n=421) and 2005 (n=359). Productivity rates were high; in 2004 there were 2.3 fledged young per nesting attempt and in 2005 1.6 fledged young per nesting attempt.

Since listing, colonies in South Carolina averaged 2.08 young per successful nest with a range of 1.72-2.73 (Murphy and Coker, in press). The annual consistency of chick production is related to the variety of available habitats (Murphy and Coker, in press). Nest abandonment is rare in active South Carolina colonies. Murphy and Coker (in press) attributed this to the variety of wetland

habitats in the South Carolina coastal plain, which provide adequate foraging habitat under a variety of rainfall conditions.

Rodgers et al. (in press) found latitude had a significant positive effect on colony productivity; thus, colonies in north Florida tended to exhibit greater productivity than those in central Florida. However, he states that the reasons for the north-south difference in productivity are unclear. Bryan and Robinette (in press) reported high rates for Georgia and South Carolina similar to those in north Florida. Coulter et al (1999) suggests the ecology is different in the northern portion of the nesting range and wood storks are feeding in small groups among low densities of larger prey and they usually breed successfully. Murphy and Coker (in press) suggest the annual consistency of production in South Carolina is related to the variety of habitats available under a variety of environmental conditions with both coastal river systems and large coastal marshes.

Reclassification from endangered to threatened can be considered when annual regional productivity is greater than 1.5 chicks per nest/year (calculated over a 3-year average). The 3-year average productivity rate for all colonies monitored in the Southeast U.S. for 2004-2006 was 1.5 chicks/nest attempt; 2003-2005 was 1.2; and 4-year average for 2003-2006 was 1.5, see Table 2.

b. Genetics, genetic variation, or trends in genetic variation:

Stangle et al. (1990) employed starch gel electophoretic techniques to examine genetic variation in Florida wood stork colonies. The study did not indicate significant allosyme differences within or between colonies. Van Den Bussche et al. (1999) used a combination of single-locus and multi-locus approaches and found low levels of genetic variability and allelic diversity within Georgia and Florida colonies, suggesting “one” population of wood storks in the southeastern U.S. A pilot study to compare microsatellite loci in genetic samples of Brazilian wood storks with those of the southeastern U.S. found differences between the two populations, but these differences were less than expected given the two populations are on different continents (A.L. Bryan and Travis Glenn, University of Georgia, pers. comm., 2007).

During a satellite tracking study of wood storks in Mississippi and Louisiana, extensive inter- and intra-regional movements from both Southeast U.S. and Mexican/Guatemalan populations of wood storks were documented (Bryan, in press). Generally, storks observed in eastern Mississippi likely originate from the

southeastern U.S. population and those observed in western Mississippi and Louisiana likely originate from Mexican/Guatemalan populations. The movement of one Louisiana captured sub-adult to Florida suggests population mixing is occurring at some level (Bryan, in press). Also, in 2006 a sub-adult captured in eastern Mississippi flew to the Pacific coast of Mexico (Borkhataria and Frederick 2006), suggesting a greater area of mixing between the two populations. The majority of nestlings outfitted with satellite transmitters from the southeastern U.S. population stayed in the southeastern U.S.; however, five nestlings from a South Florida colony flew as far west as eastern Mississippi, and one Georgia nestling dispersed to the Pacific coast of Mexico (Borkhataria and Frederick 2006) also suggesting some level of mixing is occurring. It should be noted that the wood storks that were documented making the cross into the other population were all sub-adults.

c. Taxonomic classification or changes in nomenclature:

The taxonomic classification and nomenclature for the wood stork (*Mycteria americana*) remains the same as at the time of listing. The wood stork is one of 17 species of true storks (Ciconiidae) occurring worldwide, and is the only stork that regularly occurs in the United States. Throughout its range of the Americas, wood storks are morphometrically indistinguishable, with no apparent differentiation in plumage or size (Coulter et al. 1999).

d. Spatial distribution, trends in spatial distribution or historic range:

At the time of listing in 1984, the range of the U.S. breeding population of wood storks was Florida, Georgia, South Carolina and Alabama. Breeding was restricted primarily to peninsular Florida, with only a few colonies occurring in Georgia (3) and South Carolina (1).

Prior to the 1970s, greater than 75 percent of the population nested in colonies in South Florida south of Lake Okeechobee; by the late 1980s, greater than 50 percent nested from central Florida north through South Carolina (Ogden et al. 1987, Harris 1995, Murphy 1995, Service 1997). The current breeding range includes peninsular Florida, the coastal plain and large river systems of Georgia (21 colonies) and South Carolina (13 colonies), and now extends north into southern North Carolina (1 colony), see Figure 2. The breeding range also extends west to south-central Georgia and the panhandle of Florida to the Ochlockonee River system.

The non-breeding season range includes peninsular Florida; the coastal plain and large river systems of Alabama, Georgia, South Carolina; and southern North Carolina and eastern Mississippi. Most wood storks observed in eastern Mississippi are likely from the Southeast U.S. breeding population.

The geographic expansion of nesting colonies into Georgia and South Carolina was from south to north. From 1984 to 1990, colonies located in Georgia's coastal plain increased from 3 to 10. From 1981 to 1993, South Carolina's 1to 3 nesting colonies were on the southern coast. In 1994, new colonies formed to the north near Charleston and Georgetown, and the total number of colonies in South Carolina increased from 3 to 7 colonies; however, there was no increase in the number of nesting pairs (Murphy and Coker, in press). By 1997, colonies had formed near the North Carolina state line. In 2005, the first colony was documented in southern North Carolina with 36 nests (D. Allen, North Carolina Wildlife Resources Commission, pers. comm., 2005). This colony formed again in 2006 and tripled in size with 136 documented nests (D. Allen, North Carolina Wildlife Resources Commission, pers. comm., 2006). Geographic expansion of colonies to the west also occurred with colonies forming in Florida and Georgia east and west of Tallahassee in the mid to late 1980s. A small colony was successful north of Apalachicola in Gulf County, Florida, in 2004, but did not re-form in 2005 or 2006. In early June 1997, six wood storks were observed sitting on nests at Jones Lake in western Mississippi; however, by late June no storks or nests were observed (Mueller et al., 1997). No successful nesting has been documented in Mississippi.

Several ongoing studies by the University Florida, University of Georgia, Florida Atlantic University, Avian Research and Conservation Institute and South Carolina DNR have and continue to contribute to our knowledge of movements and range of wood storks from the Southeast U.S. breeding population. These include a color marking study of nestlings from the Everglades and Central Florida colonies (1974-1979), an ongoing leg-banding project of nestlings in Georgia and North Florida (1984-present), satellite tracking studies of fledglings (n=135) from South Florida and Georgia (2001-present), satellite tracking of adults (n=30) captured in Florida, Georgia, South Carolina and Mississippi (1984 and 2003-present), and foraging follow surveys at Florida, Georgia and South Carolina colonies.

Following breeding in Florida, all age classes disperse throughout peninsular Florida and north along the coasts and in the vicinity of

large rivers on the coastal plain of Georgia, South Carolina, Alabama and to eastern Mississippi (Coulter et al. 1999; Borkhataria and Frederick 2006). Wood storks from colonies in South Carolina and Georgia also disperse across the coastal plain and up large river systems. During the El Nino winter of 2006, wood storks were documented along South Carolina's coast and as far north as Wilmington, North Carolina. Most wood storks retreat to Florida and South Georgia during the winter after dispersing widely throughout the coastal plain of the Southeast U.S. after breeding season (Coulter et al. 1999).

e. Habitat ecosystem conditions:

Currently habitat in the Southeast U.S. is supporting an increasing population of wood storks. Wood storks are a wetland dependent species and loss of foraging wetlands continues to be the primary threat to this population. To ensure long-term survival and recovery of this population, wood storks require a mosaic of wetlands with varying climatological and seasonal conditions around colonies and within the wintering habitat in the coastal plain of the Southeast U.S. To highlight this issue of wetland loss, of particular concern is the rate of urbanization and conversion of all habitat types, including short and long hydroperiod wetlands, around the Corkscrew Sanctuary Colony near Naples, Collier County, Florida. The human population in Collier County has increased from an estimated 86,000 in 1980 to over 300,000 in 2006 (U.S. Census Bureau 2006). This historic mega-colony site once supported 1,500 to 6,000 nesting pairs annually during the 1960s until the mid 1980s. In contrast, Corkscrew Sanctuary only supported 1,000 to 2,000 nesting pairs three times during the last 20 years (1992, 2000 and 2002) and only 250-800 in recent years. The urbanization around this colony highlights the effects of the loss of wetlands and changes to other environmental factors (including hydrology) and conditions around a wood stork nesting colony.

Dahl (1990) estimated that the U.S. coastal states from South Carolina to Texas lost about 38 million acres, or 45.6 percent, of their historic wetlands between the 1780s and the 1980s. In fact, since Florida became a State, total wetland area has decreased by approximately 44 percent (NRCS 2006). However, it is important to note wetlands and wetland losses are not evenly distributed in the landscape. Hefner et al. (1994) estimated 55 percent of the 2.3 million acres of the wetlands lost in the southeastern United States were located in the Gulf-Atlantic Coastal Flats. Between 1998 and 2004, the U.S. lost 523,500 acres of swamp and marsh wetlands

(Dahl 2006). Florida lost more than 260,000 acres of freshwater, emergent wetlands during 1985-1996, a rate that more than doubled compared to the 1970-1980 period (NRCS 2006). Natural wetlands continue to be impacted by residential and commercial development in the southeastern U.S. (Dahl 2006). Wetlands, particularly freshwater emergent wetlands, are essential for wood storks and other wildlife, yet losses continue (Service 1997).

Wood storks are increasingly documented using man-made wetlands. The U.S. gained 715,300 acres of shallow-water wetlands from 1998 to 2004 (Dahl 2006). The increasing human population in Florida, Georgia and South Carolina continues to necessitate more residential and industrial development projects to meet growing demands for housing and consumer services. Obvious by-products of these development projects are constructed wetlands (roadside drainage ditches and storm water retention ponds) and fragmentation and loss of natural wetlands. A major contributor to the increase in shallow-water wetlands includes construction of water traps on golf courses, ponds in residential areas, and storm water retention ponds adjacent to industrial complexes and roadways (Dahl 2006). The effects and impacts, good and/or bad, of man-made wetland systems on the wood stork need to be quantified and assessed. Man-made wetlands are significant in number, continue to increase in total acreage, and are utilized by wood storks for foraging throughout the southeastern U.S.

One positive note, natural wetlands are being targeted for acquisition to be protected through the management of public lands for wildlife and water conservation. More wetlands are being protected on private lands to assist in habitat and wildlife protection through conservation easements and restoration. Through regulatory mechanisms, wetland losses are being avoided, minimized and mitigated for at wetland mitigation banks.

Wetlands are being restored throughout the Southeast U.S. via programs such as the federal Wetlands Reserve Program (WRP), the Comprehensive Everglades Restoration Program, Kissimmee River Restoration Project, Upper St. Johns Basin Project and other large-scale restoration programs. Management plans such as The North American Waterfowl Management Plan identifies focus areas for conservation. By highlighting important areas such ACE Basin and Winyah Bay in South Carolina, funds and conservation initiatives can be directed towards these important habitat areas.

Thousands of acres are being protected, enhanced, restored, and brought under conservation easements to assist in wildlife conservation through programs such as the WRP and the Farm Bill. The WRP is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) provides technical and financial support to help landowners with their wetland restoration efforts. The NRCS goal is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program. This program offers landowners an opportunity to establish long-term conservation and wildlife practices and protection. In Florida, the WRP program has restored over one million acres of wetlands during the past 10 years (Herrington pers. comm., 2007).

A major key to wood stork recovery in South Florida is the Comprehensive Everglades Restoration Project. This major restoration effort has goals to provide food resources necessary to support traditional stork nesting patterns at historical nesting areas, and support a minimum of 2,500 successful nesting pairs. There are other initiatives underway to restore and protect significant ecosystems such as the Kissimmee River and the Upper St. Johns River.

Ecologically, wood storks represent an important species that should be used as a bio-indicator of the health of shallow wetlands throughout the southeastern U.S and are a sentinel species used to measure the success of the Everglades restoration. As described earlier, long-term monitoring of wood stork nesting at colony sites, like Corkscrew Sanctuary, will provide insight into the health of the surrounding wetland habitats within the core foraging area of each colony. Monitoring wood stork colonies regionally also provides insight into wetland habitats on a regional level.

2. Five-Factor Analysis

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

Throughout its range in the Southeast U.S., wood storks are dependent upon wetlands for breeding and foraging. Preventing loss of wood stork nesting habitat and foraging wetlands within a colony's core foraging area is of the highest priority. Also, winter foraging habitat is important to recovery, as it may determine the carrying capacity of the U.S. breeding population of wood storks.

Natural wetlands are being targeted for acquisition to be protected through the management of public lands for wildlife and water conservation (NRCS 2006). In Florida, the WRP program has restored over one million acres of wetlands during the past 10 years (Herrington pers. comm., 2007). Thousands of acres of wetlands are also being protected on private lands to assist in habitat and wildlife protection through conservation easements and restoration (Dahl 2006). Wetland losses are being avoided, minimized and mitigated through the regulatory process (Votteler and Muir 2002).

Many researchers (Flemming et al. 1994, Ceilley and Bartone 2000) believe that short hydroperiod wetlands provide a more important pre-nesting food source and a greater early nestling survivor value for wood storks than the foraging base suggests. Many of these are isolated wetlands and are being lost at an alarming rate (Fleming et al. 1994). Wetlands that wood storks use for foraging are being lost through permitted activities where mitigation is being provided. However, it is not known if wood stork foraging wetlands are being replaced with like quality foraging wetlands within the core foraging area of an impacted colony. Frederick and Meyer (in press) suggest that the decline in colony size in Florida reflects the increasingly fragmented nature of Florida's wetlands.

The decline of South Florida's Everglades and Big Cypress ecosystems is well documented (Davis and Ogden 1994). Prior to 1970, a majority (70 percent) of the wood stork population nested south of Lake Okeechobee and declined from 8,500 nesting pairs in the early 1960s to around 500 pairs in the late 1980s and early 1990s (Service 1997). It is generally accepted that the primary cause of this decline was due to the loss of wetland function of these South Florida ecosystems that resulted in reduced prey availability or loss of wetland habitats (Service 1997). As a prerequisite for recovery of wood storks in South Florida, these ecosystems should once again provide the food resources that are necessary to support traditional stork nesting patterns at historical nesting areas. The Recovery Plan also suggests a minimum of 2,500 successful nesting pairs in the Everglades and Big Cypress systems. Since 1980, wood storks have expanded their breeding range north into Georgia, South Carolina and North Carolina and the total number of breeding adults is now approaching delisting goals. Seventy percent of the population now breeds north of Lake Okeechobee and the Everglades (Brooks and Dean, in press). These positive indicators throughout the range may suggest that

the viability of the U.S. breeding population of wood storks may no longer be as closely tied to the health of the Everglades for reproduction as originally believed.

Wood storks use man-made wetlands for foraging and breeding purposes. Man-made wetlands include, but are not limited to, storm water treatment areas and ponds, golf course ponds, borrow pits, reservoirs, roadside ditches, agricultural ditches, drainages, flow-ways, mining and mine reclamation areas, and dredge spoil sites. The impacts can be positive in certain scenarios as these wetlands provide forage, protected nesting habitat, and may offset some losses of natural wetlands caused by development. A significant number of wood stork colonies are located where water management practices can impact the nesting habitat negatively. Colonies that are perpetually flooded will have no tree regeneration. Draining surface waters of a colony's wetland or pond will prevent wood storks from nesting and lowered water levels after nest initiation facilitates raccoon predation. Lowering surface water or water table may occur through water control structures, manipulating adjacent wetlands, or water withdrawals from the local aquifer.

In summary, loss, fragmentation, and modification of wetland habitats continue as threats to wood storks. However, the significance of the threat cannot be quantified. Changes in local habitat conditions are known to impact wood storks. However, range-wide information on rates of loss, acquisition, protection, restoration, conversion, fragmentation, and creation of wetlands of value to wood storks is unavailable. Our subjective assessment is that the overall threat to the species is reduced, not necessarily because of habitat conservation programs, but rather due to expansion in the range of the species. Historically, the core of the wood stork breeding population was located in the Everglades of South Florida. Populations there had diminished because of deterioration of the habitat. But the breeding range has now almost doubled in extent and shifted northward along the Atlantic coast as far as southeastern North Carolina. So dependence of wood storks on any specific wetland complex has been reduced. The improved wood stork population statistics also suggest that wetland habitat is not yet limiting the population, at least at the landscape level. However, it is not known whether the current habitat base will support a population at levels sufficient to prevent extinction in the long term.

b. Overutilization for commercial, recreational, scientific, or educational purposes:

Monitoring of and research on wood storks over the past 20 years has increased. A small number of scientific research permits with potential to harm individual wood storks have been issued. This level of take/harm is not expected to adversely impact wood stork recovery.

Wading birds and other waterbird species can impact production at fish farms. To minimize the impacts, the Service issues depredation permits to aquaculture facilities for herons, egrets and other water bird species. A Georgia catfish farmer located approximately 25 miles west of the Chewmill and Birdsville colonies in Jenkins County, Georgia has documented hundreds of woods storks aggregating and foraging on the littoral edges of the ponds during the late summer in recent years. U.S. Department of Agriculture, Wildlife Services has documented hundreds and in one case 1,000 wood storks roosting on fish pond dikes in the eastern Mississippi/west-central Alabama area (J. Taylor, U.S. Department of Agriculture, pers. comm., 2007). Wildlife Services found that the storks were generally loafing and if they were feeding, they were taking diseased and oxygen deprived fish and not impacting production. Wood stork take has been documented at a Mississippi catfish farm and a Florida tropical fish farm, which ended in prosecution for shooting wood storks. It is likely that wood stork take at aquaculture facilities occurs. To what extent this type of take occurs is unknown.

At the time of listing and today, this factor is not a concern for the recovery of the wood stork.

c. Disease or predation:

Predation: Colonies with adequate water levels under nesting trees or surrounding nesting islands deter raccoon predation. Water level manipulation can facilitate raccoon predation of wood stork nests when water is kept too low. In many cases, colonies have a population of alligators that also deter raccoon predation (Coulter and Bryan 1995). Removal of alligators from a nesting colony site could lead to raccoon predation. Human disturbance may cause adults to leave nests, exposing the eggs and downy nestlings to predators (fish crows), sun and rain. Great horned owls have been documented nesting in and near colonies and they likely impact the colony to some degree.

A breeding population of Burmese pythons has been documented in the Florida Everglades. If this snake and/or other species of reptiles become established in the South Florida ecosystem, they

could pose a significant threat to nesting wood storks and other species of colonial nesting water birds.

Disease: Hematozoa have limited documentation in wood storks in Florida and Georgia (Forrester et al. 1977, Fedynich et al. 1998).

At this time, this factor is not considered to significantly affect the recovery of the wood stork.

d. Inadequacy of existing regulatory mechanisms:

The Migratory Bird Treaty Act provides federal protection to the Southeast U.S. breeding population of the wood stork. Florida, Georgia, South Carolina, North Carolina, Alabama and Mississippi wildlife laws also protect wood storks. These federal and state laws prohibit the taking of a wood stork, their nests or eggs, except as authorized. Even though these federal and state laws prohibits taking of individuals, or parts thereof, or their nests or eggs, they likely do not prohibit clearing/alteration/conversion of wetland foraging habitats or nesting colony sites during the non-nesting season.

The Clean Water Act regulates dredge and fill activities that would adversely affect wetlands. Section 404 of Clean Water Act regulates the discharge of dredged or fills materials into wetlands. Discharges are commonly associated with projects to create dry land for development sites, water-control projects and land clearing. The U.S. Army Corps of Engineers and the Environmental Protection Agency (EPA) share the responsibility for implementing the permitting program under Section 404 of the Clean Water Act.

When impacts to wetlands cannot be avoided or minimized, wetland mitigation is often employed to replace an existing wetland or its functions by creating a new wetland, restoring a former wetland, or enhancing or preserving an existing wetland. This is done to compensate for the authorized destruction of the existing wetland. As discussed earlier, it is not known if wood stork foraging wetlands are being replaced with like quality foraging wetlands within the core foraging area of an impacted colony. To assist in wood stork recovery, the Service is advocating that when suitable foraging wetlands are being impacted, mitigation should include replacing suitable foraging

wetlands with suitable foraging wetlands of a like or higher quantity and quality.

There is currently little protection of isolated wetland habitat. A 2001 U.S. Supreme Court opinion substantially reduced the jurisdiction of the federal government. While many States in the southeastern U.S. regulate those activities affecting wetlands that are exempt from the Section 404 program of the federal Clean Water Act, Florida is the only one known to regulate isolated wetlands. In South Carolina, Georgia, Alabama and North Carolina there are no State laws that protect the isolated wetlands.

The Service recommends, through its Wood Stork Habitat Management Guidelines (Service 1997), that active colony sites be protected from local hydrologic changes and from lumbering, vegetation removal, construction, and other human activities. These habitat-altering activities are likely to be detrimental to the colony. The Service also recommends that feeding sites should be protected to the maximum extent possible.

In summary, there are a number of regulatory mechanisms implemented by Federal and State agencies to protect wood storks and conserve their habitat. There is no evidence that killing or harassment of the birds threatens the viability of the species under current regulations. Whether habitat protection and conservation mechanisms are inadequate can only be assessed in terms of the wood stork population. Recent trends indicate that the range is expanding and the breeding population has increased, suggesting that current conservation measures are sufficient to allow population growth.

e. Other natural or manmade factors affecting its continued existence:

Even though it has been documented, pesticide contamination has not generally been considered to adversely affect wood storks but impact health and reproduction. Contamination events can be triggered by restoration or natural events such as hurricanes when flooding can expose contaminated hot spots. For example, from November 1998 through early April 1999, a tragic bird mortality event occurred on the north shore of Lake Apopka, Florida on former farmlands that had been purchased by the St. Johns River Water Management District and NRCS. An estimated 676 birds died on-site, mostly comprised of white pelicans and wading birds, including the wood stork. Of the estimated 1,991 wood storks present in the area, 43 died on-site (Rauschenberger 2007). The

cause of death was attributed to organochlorine pesticide (OCP) toxicosis (Rauschenberger 2007). The birds were exposed to OCPs by eating OCP-contaminated fish, which became easy prey as fish moved from ditches into the flooded fields, located in the eastern part of the restoration area (Rauschenberger 2007). Mercury, heavy metals and other contaminants that may impair reproduction and cause other health issues are being studied in wood storks and many other wading bird species. Also, exposure to contaminants by foraging in man-made wetlands may pose a potential risk to wood stork health and reproduction.

Harmful algal blooms and specifically red tide events have become more prevalent along Florida's coast. Brevitoxicosis was recently (2005) documented in the cause of death of a wood stork (Spalding 2006). Wood storks can be exposed to harmful micro algae and their toxins through a variety of mechanisms, including aerosolized transport (e.g., respiratory irritation in mammals, turtles, birds); bioaccumulation through consumption of prey containing toxins or toxic cells (crustaceans, gastropods, fish, birds, turtles, mammals); and mechanical damage by spines, setae, or other anatomical features of the cells (FWC 2007). In addition to the usual reports of dead fish during the Florida west coast *Karenia brevis* red tide of October 1973 to May 1974, large numbers of aquatic birds, particularly double-crested cormorants *(Phalacrocorax auritus)*, red-breasted mergansers *(Mergus merganser)*, and lesser scaup *(Aythya affinis)*, were found moribund or dead in red tide areas (FWC 2007).

Electrocution mortalities from power lines have been documented. In most cases, when a problem location is identified, it is retrofitted using standard avian protection guidelines to prevent electrocutions. The guidelines recommend using heavily insulated wire, spreading the wires apart to prevent grounding as body parts touch the wires, or burying the wires underground. The Service's Wood Stork Habitat Management Guidelines (Ogden 1990) include recommendations that new transmission lines be at least one mile away from colony sites.

Human disturbance is a factor known to have a detrimental affect on wood stork nesting (Service 1997). Wood storks have been documented to desert nests when disturbed by humans, thus exposing eggs and young birds to the elements and to predation by gulls and fish crows. See the Service's Wood Stork Habitat Management Guidelines for recommendations.

Documentation of road kill mortalities has increased. This may be a factor of better reporting or more storks using roadside ponds, ditches, swales, and flow-ways as foraging habitat. If problem areas are identified, efforts need to be made to manage the site to prevent mortalities.

Stochastic events such as severe thunderstorms and hurricanes pose a potential risk. The habitat alteration within a colony due to hurricanes can have a negative impact on nesting habitat. Severe local storm events have impacted individual colonies, causing chick mortality and even blowing nests out of trees.

The invasion of exotic plants into natural wetland areas can prevent wood storks from foraging due to density and canopy cover. Invasion into natural nesting habitats by exotic species, including Brazilian pepper, maleleuca, and Australian pine, may present a problem; however, wood storks are using exotic species for nesting habitat at many man-made wetland colony sites, such as borrow pits.

A small population of sacred ibis escaped from one of the South Florida zoos and has established a small breeding population. They may compete with wood storks for nesting space.

In summary, other natural or man-made factors affecting the wood stork's continued existence such as contaminants, harmful algal blooms, electrocution, road kill, invasion of exotic plants and animals, disturbance, and stochastic events, are all documented to effect wood storks, but not to a degree to impede recovery.

D. Synthesis

The Southeast U.S. breeding population of the wood stork is increasing and expanding its overall range. Population and productivity criteria for reclassification have been met with three-year population averages of 6,000 nesting pairs and productivity of 1.5 chicks per nest/year. Delisting criteria of 10,000 nesting pairs (5 year average) have not been achieved. The wood stork population has exceeded 10,000 nesting pairs only once in the past five years (2006).

Alterations in the quality and amount of foraging habitats in the Florida Everglades and extensive drainage and land conversions throughout South Florida led to the initial decline of the wood stork nesting population. Since listing, wood stork nesting has increased in South Florida and the Everglades, but the timing and location of nesting has changed in response to alterations in hydrology and habitat. The overall distribution of the breeding population of wood storks is also

in transition. The wood stork appears to have adapted to changes in habitat in South Florida in part by expanding its breeding range north into Georgia, South Carolina and North Carolina.

Habitat loss, fragmentation, and modification, is known to impact the species but the significance of the threat cannot be quantified. Likewise the degree to which regulatory mechanisms may be inadequate cannot be determined until the habitat base is shown to be either sufficient or insufficient to minimize risk of extinction in all or a significant portion of its range.

Other threats such as utilization of the species for commercial, recreational, scientific, or educational purposes; disease and predation; and other natural or man-made factors (i.e., contaminants, electrocution, road kill, invasion of exotic plants and animals, disturbance, and stochastic events) are known to occur but are not significant.

Based on the analysis presented in this review, we believe the Southeast U.S. breeding population of wood storks is not presently endangered (in danger of extinction throughout all or a significant portion of its range). However, the population is likely to become in danger of extinction in the foreseeable future (i.e., threatened), if adaptations to changing habitat conditions or the extent of habitats are not sufficient to sustain this population. Therefore, the Service recommends that the Southeast U.S. breeding population of the wood stork be reclassified as threatened.

III. RESULTS

A. Recommended Classification: Reclassify from Endangered to Threatened

B. New Recovery Priority Number: No change

C. Reclassification (from Endangered to Threatened) Priority Number: 4

IV. RECOMMENDATIONS FOR FUTURE ACTIONS

Proposed Rulemaking -- Prepare proposed rule to reclassify wood storks from endangered to threatened status and expand their known range to include Mississippi and North Carolina. The proposed rule will include a DPS evaluation of the listed entity. The Service believes there is sufficient information presented in the original listing and based upon the current knowledge of the biology to consider the application of the DPS criteria by physical separation of the breeding populations and loss of this population would result in a significant gap in the range.

Habitat -- Protect wood stork foraging, nesting and roosting habitat. Ensure wetland mitigation procedures consider replacing impacted wood stork foraging wetlands with

wood stork foraging wetlands of similar or better quality and quantity. Update Wood Stork Habitat Management Guidelines. Draft white paper on wood stork colony habitat protection under current conservation laws.

Recovery Plan -- Update and revise the recovery plan for the wood stork to reflect the best available and most up-to-date information on the biology of the species and its habitat. Develop recovery criteria to address the relevant listing factors and current known threats to wood storks.

Recovery Monitoring -- Develop a long-term program to monitor productivity at fewer selected (index) colonies within the major regions of the breeding range. Develop a systematic design for aerial surveys.

Population Model -- Continue to support the development of a demographic model. Establish and refine population parameters and other factors, such as adult survival, variance in vital rates, sampling error, and research-induced biases, to improve the model.

Genetics -- Conduct genetic studies to find additional micro satellite loci and highly variable nuclear loci to better understand genetic diversity in wood stork populations in the Southeast U.S., Caribbean, Latin America and South America. A multi-year study of large-scale movements of all ages of wood storks is needed to determine the frequency and importance to population mixing. Isotope studies on feathers of 1st and 2nd year birds in the mixing areas of Louisiana, Mississippi and Alabama may indicate the sites and environmental conditions where breeding populations are mixing.

Contaminants -- Develop baseline contaminant information. Develop an understanding of how man-made wetland systems affect wood stork health and develop management strategies for these wetlands to benefit the recovery of the wood stork.

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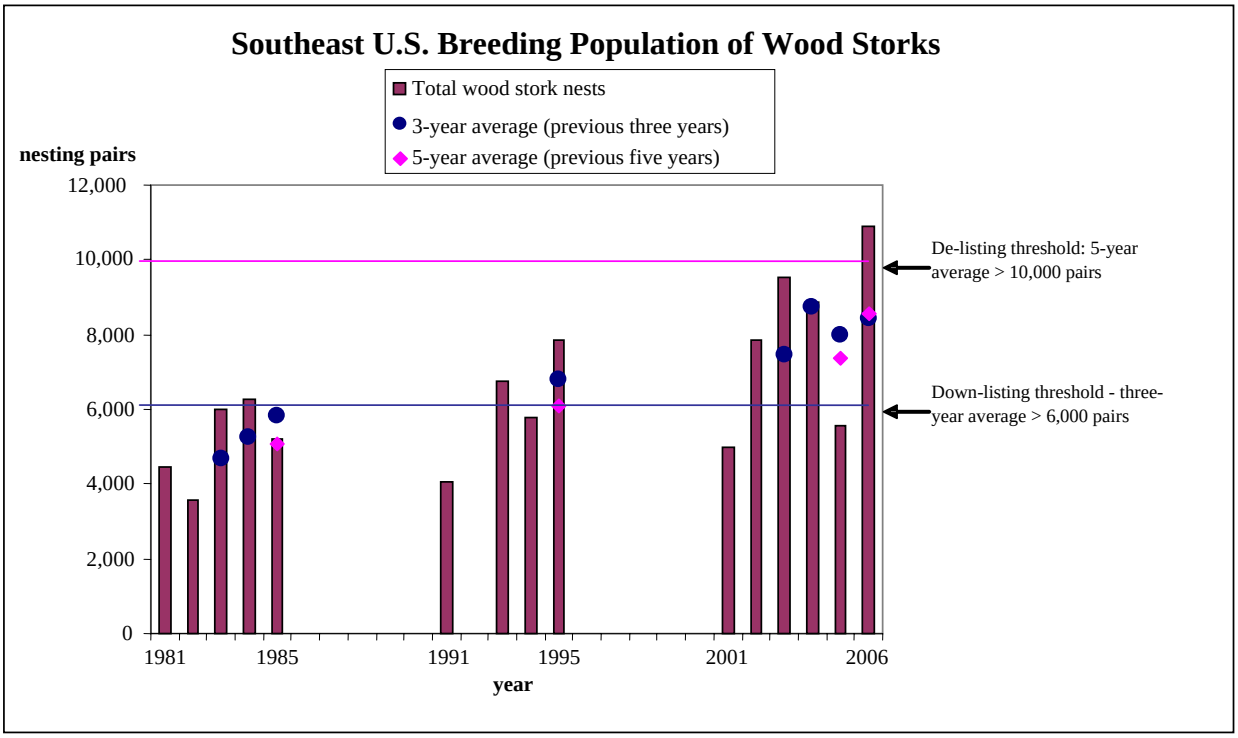
VI. FIGURES

Figure 1. Total wood stork nests in the Southeast U.S., 1981 to 2006 (Brooks and Dean in press).



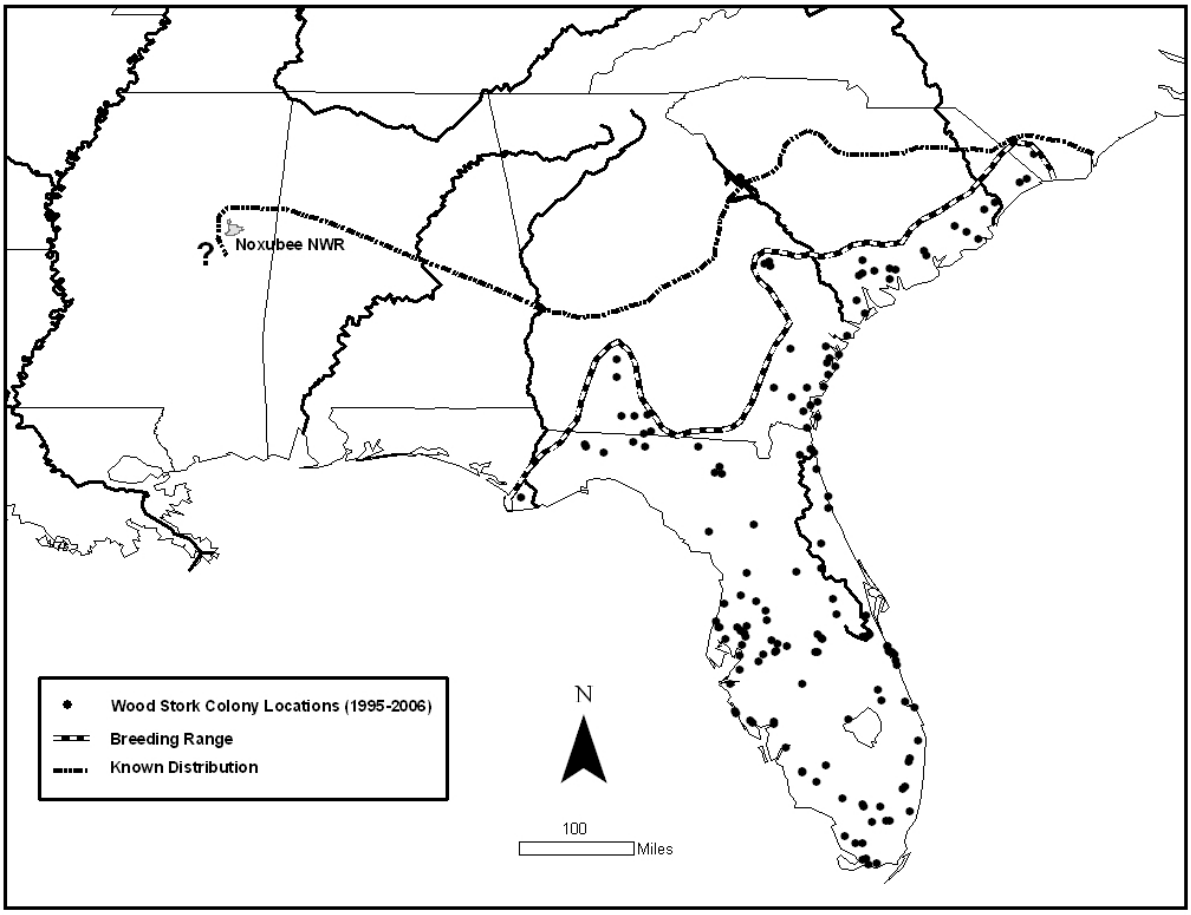


Figure 2. Current breeding range and distribution of wood storks in the Southeast U.S. (Brooks and Dean in press).

Table 1. Total number of nesting pairs of wood storks in the Southeast U.S., 1975-2006 (Brooks and Dean in press). Total N = (Total number of nesting pairs) and Total C = (Total number of active colonies).

	S FL	S FL	N FL	N FL	GA	GA	SC	SC	NC	NC	SE US	SE US
YEAR	TOTAL N	TOTAL C	TOTAL N	TOTAL C	TOTAL N	TOTAL C	TOTAL N	TOTAL C	TOTAL N	TOTAL C	TOTAL N	TOTAL C
1975	5,580	5	4,030	19	142	3					9,752	27
1976	2,375	2	2,919	14	16	1					5,310	17
1977	1,225	4	3,900	17	138	4					5,263	25
1978	0	0	2,595	16	100	2					2,695	18
1979	1,259	4	3,541	18	55	2					4,648	24
1980	1,225	2	3,541	18	297	5					5,063	25
1981	2,428	6	1,728	13	275	2	11	1			4,442	22
1982	1,237	5	2,183	13	135	2	20	1			3,575	22
1983	2,858	2	2,742	20	363	2	20	1			5,983	25
1984	1,245	2	4,402	23	576	3	22	1			6,245	29
1985	798	4	3,764	13	557	5	74	1			5,193	23
1986	643	3			648	4	120	3				
1987	100	1			506	5	194	3				
1988	755	6			311	4	179	3				
1989	515	3			543	6	376	3				
1990	475	1			709	10	536	6				
1991	550	4	1,890	21	969	9	664	3			4,073	37
1992	1,917	7			1,091	9	475	3				
1993	587	6	3,675	23	1,661	11	806	3			6,729	43
1994	741	3	2,847	23	1,468	14	712	7			5,768	47
1995	1140	5	4,383	26	1,501	17	829	6			7,853	54
1996	1215	1			1,480	18	953	7				
1997	445	4			1,379	15	917	8				
1998	478	3			1,665	15	1,093	10				
1999	4,884	15	3,435	35	1,139	13	520	8			9978	71
2000	3,996	8			566	7	1,236	11				
2001	2,888	9	358	14	1,162	12	1,174	9			5,582	44
2002	3,463	11	2,000	35	1,256	14	1,136	10			7,855	70
2003	1,747	9	4,057	40	1,653	18	1,356	11			8,813	78
2004	1,485	9	3,241	54	1,596	17	2,057	13			8,379	93
2005	591	3	1,713	37	1,817	19	1,407	13	32	1	5,560	74
2006	2,648	9	4,568	38	1,928	21	2,010	13	125	1	11,279	82

Table 2. Wood stork productivity rates, 2003 to 2006 (Brooks and Dean in press; Rodgers et. al in press; Bryan and Robinette in press).

State	Colony Name	2006 P	2006 Nests	2005 P	2005 Nests	2004 P	2004 Nests	2003 P	2003 Nests
SC	Dungannon			1.40	30	2.00	54		
SC	Pon Pon			1.92	25	2.08	36		
SC	White Hall			1.40	67	2.48	82		
GA	Birdsville	2.10	30	1.37	38	2.38	36	1.40	32
GA	Chew Mill Pond	2.40	33	1.30	43	2.41	51	1.00	57
GA	Blackwater			1.45	31	2.68	31		
GA	Harris Neck	2.46	80	2.00	64	2.24	55	1.98	60
GA	Durango Paper	2.20	37	0.98	36	2.32	38		
GA	Kings Bay	2.80	31	1.76	25	1.93	27		
GA	Jekyll					0.05	12	1.21	28
GA	Br Alligator Farm			0.21	37	1.79	58	1.60	31
GA	Black Hammock	2.00	20	2.00	33			1.16	30
GA	Brailey Swamp					2.35	60		
GA	St. Simons			2.02	37				
N FL	Chaires			0.96	117	1.93	141	1.06	207
N FL	Ochlockonee North			1.25	61	1.70	44	1.35	71
N FL	Ochlockonee South			1.04	47	1.78	37		
N FL	Jacksonville Zoo	2.11	147	2.40	91	2.37	87	2.21	82
N FL	Pumpkin Hill			1.52	42			1.56	68
N FL	Dee Dot	2.11	62	1.78	96	1.42	69	1.51	188
N FL	Matanzas Marsh	0.12		0.02	42	0.25	28	1.39	18
C FL	Deseret Ranch	2.59	249	0.44	176	1.48	254		
C FL	Pelican Island			0.00	29	0.92	78		
C FL	North Fork	2.54	132	0.88	68	1.37	86		
C FL	Croom			0.40	154	1.09	177	1.29	292
C FL	Little Gator Creek					1.19	78	1.68	171
C FL	New Port Richey			0.51	156	1.73	172	1.85	215
C FL	Cypress Creek			0.78	36	1.59	67	1.85	163
C FL	Cross Creek			1.11	18	1.79	39		
C FL	Lake Rosalie			0.46	37	1.62	47	1.52	102
C FL	Lone Palm			0.27	63	1.48	67	1.36	153
C FL	Lake Russell			0.53	87	1.05	62	1.71	65
C FL	Kemper	2.47	125	0.59	74				
C FL	Hontoon Island	2.06	67						
C FL	Lake Disston	2.08	112						
S FL	Bird Isl/Sewell Pt	2.31	147	0.19	74	0.95	87		
S FL	PBC Solid Waste	1.25	28	0.25	52	1.49	45	0.63	70
S FL	Corkscrew	1.94	600	0.00	250	0.87	520	1.69	462
	Total	2.14	1,960	0.83	2,236	1.50	2,725	1.53	2,565
Region									
SE US	2004 to 2006 P	1.49							
SE US	2003 to 2005 P	1.23							
SE US	2003 to 2006 P	1.50							

P = Prodcutivity (chicks/nest per year) N = (Number of nests monitored)

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Mycteria americana*

Current Classification: Endangered

Recommendation resulting from the 5-Year Review: Reclassify to Threatened

Appropriate Listing/Reclassification Priority Number, if applicable: 4

Review Conducted By: Bill Brooks

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date 8/7/07

REGIONAL OFFICE APPROVAL:

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

Approve _____ Date 9/21/07

Cooperating Regional Director, Fish and Wildlife Service

_____Concur _____ Do Not Concur

Signature_____Date_____