AMENDED
INCIDENTAL TAKE STATEMENT

The following Amended Incidental Take Statement replaces the one published in the U.S. Fish and Wildlife Service's (Service) November 17, 2006 Biological Opinion on the proposed continuation of the Interim Operational Plan for the Protection of the Cape Sable Seaside Sparrow (IOP) (Service consultation code: 41420-2007-F-0045). This Amended Incidental Take Statement was prepared in response to the May 5, 2009, ruling from the U.S. Court of Appeals for the Eleventh Circuit (Appeal No. 08-10799, District Court No. 05-23045-CIV-KMM). This Amended Incidental Take Statement only amends that section of the Incidental Take Statement entitled AMOUNT OR EXTENT OF TAKE, which begins on page 75 and ends at page 78 of the 2006 Biological Opinion. The EFFECT OF THE TAKE, REASONABLE AND PRUDENT MEASURES, and TERMS AND CONDITIONS sections of the 2006 Incidental Take Statement remain unchanged by this Amendment.

Sections 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are nondiscretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Corps shall report the progress of the action and its impact on the species to the Service as specified in the incidental take statement.

AMOUNT OR EXTENT OF TAKE

Cape Sable Seaside Sparrow

In addressing the Court's concern regarding our ability to quantify and monitor incidental take of individual sparrows using population parameters, we conducted a thorough review of the

EXHIBIT 1

scientific literature contained within the administrative record for the 2006 Biological Opinion (BiOp). The Service concludes that the current method used to estimate population abundance is insufficient to predict the number of sparrows that would be incidentally taken as a result of this action or to track incidental take of individual sparrows. Our reasons for this conclusion are as follows.

Since the discovery of the species in 1918, numerous researchers have written about the difficulty in finding individuals, not only due to the secretive nature of the species, but also due to the remote wilderness habitat the species occupies (Howell 1919, 1932; Nicholson 1928; Anderson 1942; Sprunt 1954; Stimson 1956, 1968; Woolfenden 1956; Werner 1975; Kushlan and Bass 1983; Lockwood et al. 1997; Pimm et al. 2002). The sparrow's reclusive habits and general inaccessibility of its preferred habitat have long discouraged critical comprehensive life history studies (Lockwood et al. 1997). In fact, seasoned observers typically have difficulty "seeing" individuals and usually rely on the chirping sound of singing adult males defending their breeding territory and vocalizing to attract females to determine presence or absence in an area. This, in turn, spurs more intensive investigation that sometimes results in seeing individuals and locating nests. In addition, the sparrow's distribution is patchy and temporally dynamic (Pimm et al. 2002).

The extensive survey method to estimate sparrow populations uses a helicopter to drop observers at remote sites within sparrow habitat who then record the number of sparrows seen or heard. To estimate the number of sparrows from the number observed (seen or heard), a correction factor is used. Kushlan and Bass (1983) were the first to develop and use a correction factor for their sparrow observations and it is still used today. A value of 15.87 (rounded to 16.0) is used based on the range at which observers can detect the sparrow's distinctive song, and on the assumption that each singing male is accompanied by one female. An individual male sparrow's territory is roughly 5 acres in size and the correction factor of 16 assumes that observers will count all birds within 656 ft of the observation station. Therefore, the correction factor of 16 is based on the fraction of total area sampled and detection probability, such that the area sampled multiplied by the detection probability equals 1/16 (Pimm et al. 2002; Walters et al. 2000). For that reason, one singing male heard or one individual seen is corrected to equate to a total of 16 individuals. This assumes statistically that an additional 15 individuals were also present in the area sampled, but due to the factors governing the probability of detection, were not seen or heard during the time of observation. It has been statistically determined that under good survey conditions, the chance or probability of detection is better than 60 percent using this method. The correction factor methodology has been the subject of two external reviews. The most recent review (1999/2000) was conducted as a result of a recommendation by the American Ornithologists' Union (AOU) external peer review committee. The outcome of the second review resulted in a determination by the AOU committee that the methodology employed is a reliable and accurate measure of abundance (Walters et al. 2000). However, this is not to say that it is a reliable method to track and count individual sparrows, rather it provides a reliable trend in population estimates comparable over time.

Intensive ground surveys for sparrows were conducted during the 2006 nesting season in subpopulations C, D, and F to better understand if and how these small subpopulations are recovering from reduction in numbers, the capability of these birds to disperse to other subpopulations, and to assess the accuracy of the annual helicopter surveys used to estimate the total sparrow population size (Lockwood et al. 2006). Information gained from these surveys included territory size, fecundity, nest success and survival rates through mark recapture. The researchers concluded the use of adaptive line transects did not produce enough sparrow detections to estimate density or abundance in these small populations; it did, however, prove useful in finding previously un-recorded sparrow breeding locations. The researchers noted "several logistical issues with conducting adaptive transect surveys for sparrows" given their rarity, whether or not they "cluster" and their "plastic" behavior. Although it is thought that this survey method more accurately counts sparrows within small subpopulations it is still prone to the same problems affecting the helicopter surveys in that not every adult, egg, nestling and/or juvenile may be accounted for and changes in the total number of birds observed in any given subpopulation cannot be directly attributed to perturbations in habitat suitability due to the project versus other environmental factors. Therefore, this method does not afford the Service the enhanced ability to assess incidental take in terms of individual sparrows. Specifically, then, the Service concludes it is impractical to find, count, and monitor the reproductive success of each individual sparrow in a subpopulation or throughout its range.

Because we are unable to directly locate all nest sites each year using the current methodology; the estimated size of individual territories differ (Werner 1975) and differ between years (Werner and Woolfender 1983; Pimm et al. 2002); the fact that sparrows may be polygamous under some circumstances (Lockwood et al. 2006); and within areas of suitable habitat, there are gaps in territories (Werner 1975) (that is suitable, but unoccupied habitat), it is impractical to determine (count) or predict (estimate) how many sparrows would be incidentally taken as a result of water management actions. In other words, we are unable to map or model current locations of all nest sites and overlay those with project-related effects such as high water.

In addition, due to the variability in the breeding ecology of sparrows, such as beginning or ending nest initiation based on water levels independent of water management operations and/or rainfall (Werner 1975; Lockwood et al. 1997), the sparrow's ability to nest several times within a year (Lockwood et al. 2001), the fact that nest success rates vary between 12 to 53 percent (Lockwood et al. 2001), and that more than 75 percent of all documented nest failures are attributed to predation and that as water levels rise above ground surface nest predation rates also rise, it would be difficult, even if we could track individual sparrows/nests, to attribute nest success or failure directly to the proposed action and not other environmental factors.

Therefore, based on the above, we have assumed for purposes of calculating incidental take that harm will occur to individual sparrow eggs or nestlings as a result of high water levels during the breeding season. Cape Sable seaside sparrows build their nests near the ground surface at an average height of 6.2 inches between the soil surface and the base of the nest. Since sparrow nests are only 6 inches off the ground, they are especially vulnerable to flooding caused by rising water levels due to rainfall or water management actions. Therefore during the breeding season, the Service will rely on monitoring water levels within occupied sparrow habitat as a surrogate to measuring incidental take of sparrow eggs and young not yet capable of flight. We do not anticipate the loss of adult sparrows since the water levels in question here are not known to directly affect adult sparrows.

Regarding the Court's ruling and based on the information above, the Service does not propose changing our hydrologic-based assessments of incidental take. We did, however, review the incidental take statement to ensure explicit reinitiation "triggers" were stated for all effects that rose to the level of incidental take.

Eastern Marl Prairies

The 2006 incidental take statement for the Eastern Marl Prairies did contain an estimated number of sparrows to be incidentally taken. These estimates were provided for purposes of describing the relative scope of anticipated impacts. The 2006 incidental take statement clarified this by stating, "The precise impact of this activity is difficult to measure." Therefore, given our inability to count individual sparrows, we have revised the incidental take statement for the Eastern Marl Prairies by removing references to estimated numbers of sparrows to be incidentally taken to avoid confusion.

Harassment of all sparrows within 0.3 mile of construction activities associated with the S-332 Detention Area features may occur as a result of disturbance from construction equipment and human activity in the area. This level of incidental take will be exceeded if the footprint of the construction area increases. The Corps Construction Monitoring Plan should avoid all additional impacts to sparrows and nests near construction.

Likewise, operation of the S-332 structures may result in flooding of sparrow nests that occur within 0.6 mile of the S-332 Detention Areas, either because of increased water levels resulting from seepage or from overflow from the detention areas directly into sparrow habitat within ENP. This will result in loss of the contents of all nests within 0.6 mile of S-332. Operation of the detention areas that result in transition from groundwater conditions to surface water conditions beyond 0.6 mile from the detention areas prior to June 1 will result in incidental take not exempted in this opinion. In addition, operations that increase surface water levels by greater than 3.9 inches beyond 0.6 mile from the detention areas will exceed incidental take.

Western Marl Prairie

Information from various sources identifies different amounts of potential and available habitat, in the western marl prairies. To date, there is still limited detailed information about the condition and susceptibility to flooding within all portions of this area. Consequently, we used figures for habitat available that were presented in the Service's 1999 BiOp.

The Service anticipates that a maximum of 66 square-miles of potential and historic sparrow habitat may be subject to flooding during the nesting season near Subpopulation A due to water releases. This area corresponds to 60 percent of potential sparrow habitat within the area of Subpopulation A. Any adult birds that have territories within the 66 square-miles would be impacted by water levels too high to allow breeding or by lower fecundity associated with nest abandonment. Likewise, injury or death to juvenile sparrows or eggs could result from pump discharges that raise the water level above existing nests.

Currently an estimated 110 square-miles (70,400 acres) of potential sparrow habitat are available in the western marl prairies. Although not all 110 square-miles (70,400 acres) may actually be suitable for nesting, the habitat that is suitable for the sparrow is contained within this acreage. The highest recorded population estimate occurred in 1981 when an estimated 2,688 sparrows occupied Subpopulation A. In 1992, this estimate was 2,608 and the estimate has varied between 16 and 432 birds since that time. Werner (1975, 1976) recognized density variability between one pair per 5 acres to one pair per 50 acres. IOP would result in a minimum of 44 square-miles (28,160 acres, or 40 percent of the total) of potential nesting habitat that is not flooded and available for sparrow nesting for at least 60 continuous days from March 1 through July 15 in 8 out of every 10 years.

There is enough sparrow habitat within the 40 percent of potential habitat that will be available for the next 4 years to support over 500 pairs, or a population of 1,000 birds at a density of about one pair per 0.08 square-mile (50 acres). However, because we cannot predict which portion of the available suitable habitat (the 60 percent versus the 40 percent) an individual bird will nest in, we anticipate that incidental take will occur each time the 66 square-miles (42,240 acres) are flooded over the next 4 years. More specifically, if more than 66 square-miles (42,240 acres) of habitat are unavailable for nesting sufficient to maintain the subpopulation (fewer than 60 consecutive days with water levels below ground surface at NP-205) due to water releases in any 1 year, then incidental take will be exceeded.

IOP operations allow water releases into Subpopulation A beginning on July 15 of each year. Because sparrows may nest through August, release of water through the S-12 structures is expected to increase the rate of nest failure for any nests that are active on July 15. In most years, water levels are already high within Subpopulation A by July 15, nesting activity is likely reduced, and nest success rates during this period will be low due to increased depredation rates (Figure 1). However, we expect that water releases will cause increases in water depths that may result in injury to or death to the few, if any, sparrow eggs or nestlings that are active on or after July 15. Although these impacts may occur, the effect of the incidental take is negligible given that this late nesting, if it occurs, have naturally limited contributions to recruitment due to high nest failure rates. Therefore, a “trigger” for reinitiation based on these impacts is unnecessary.

The level of incidental take provided for in this amended Incidental Take Statement is consistent with the protections provided in the Reasonable and Prudent Alternative of the Service’s 1999 Biological Opinion and continues to allow for a self-sustaining sparrow subpopulation in this area.

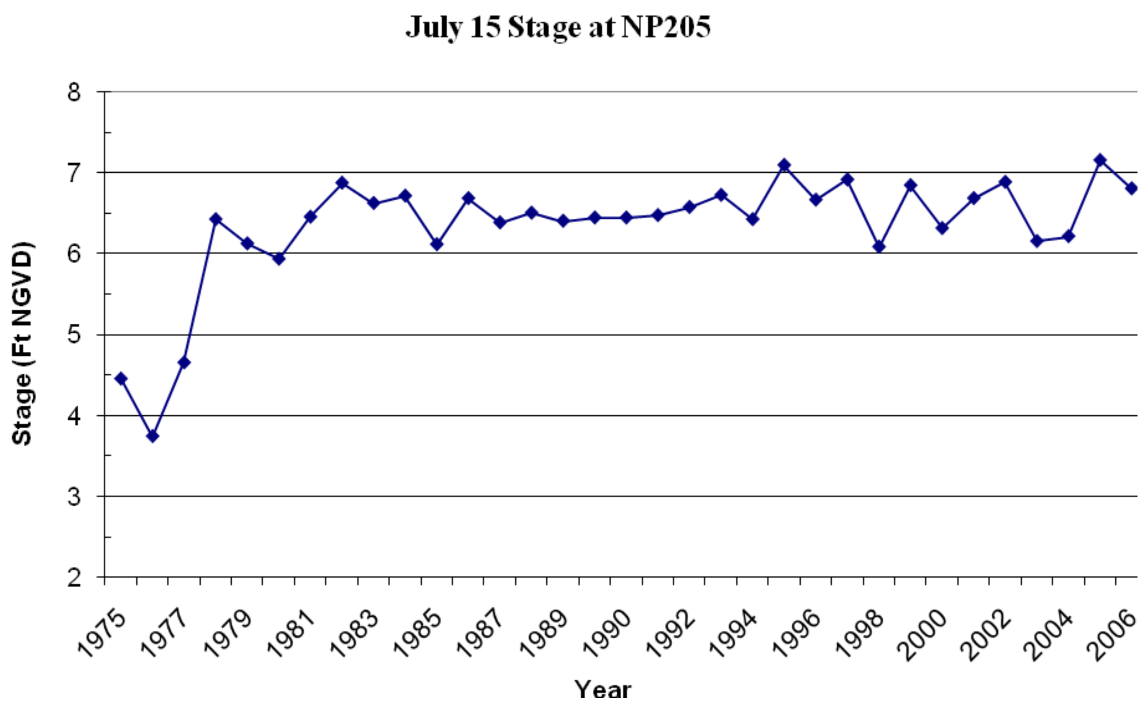

Figure 1. Graphic showing daily stage on July 15 at NP205 for the years 1975 through 2006. Note that in a majority of the years stages are above 6.0-ft NGVD which represents minimal available breeding habitat for sparrows.

Everglade Snail Kite

After a careful review of existing information, the Service has determined (1) it is impractical to quantify the number of individual snail kites that may be incidentally taken as a result of the indirect effects of water management operations on habitat, as no direct lethal effects are anticipated; (2) it would be impractical to discern the number of individual snail kites that were incidentally taken as a result of habitat impacts from other demographic and environmental parameters that will be occurring at the same time as the action, even if it were practical to monitor each individual snail kite; and, (3) current methodologies for tracking population trends are insufficient to document the incidental taking of individual snail kites or their reproductive success from a specific action in a subset of the range of the species. The reasons for these conclusions are based on the biology and ecology of the species as described in the "Species/ Critical Habitat Description" section of this BiOp, which are briefly outlined below.

The snail kite is a wide-ranging species which occupies expansive marsh habitat (Beissinger and Takekawa 1983, Sykes 1984, Rodgers et al. 1988, Bennets and Kitchens 1992, Rumbold and Mihalik 1994, Sykes et al. 1995) as well as a network of habitats that include smaller, widely dispersed wetlands (Bennetts and Kitchens 1997). WCA-3A contains 319,078 acres of designated critical habitat which represents 37.9 percent of the total listed critical habitat. Snail kites are periodically nomadic, likely in response to changing hydrologic conditions throughout their range (Sykes 1979; Martin et al. 2006). As a result, the range-wide distribution of snail kite nesting fluctuates among years. Therefore, changes in the annual distribution of snail kites in WCA-3A, either positive or negative, would not be a reliable indicator of incidental take as this nesting distribution could not be directly attributed to water management changes in the WCA as the population of snail kites may be responding to environmental conditions throughout their range in south Florida. In other words, a reduction in the number of snail kites in WCA-3A in 1 year would not necessarily indicate a loss of snail kites due to the action since those unaccounted for snail kites could be elsewhere in the larger system.

Snail kite productivity (number of young fledged per pair) is highly variable and likely influenced by environmental conditions (temperature, precipitation, wind, water management, predation, etc.) (Sykes 1979; Beissinger 1989, 1995; Sykes et al. 1995). Snail kites are long-lived and adults have high (85 to 98 percent) annual survival rates (Nichols et al. 1980; Bennetts et al. 1999; Martin et al. 2006), although adult survival is reduced in drought years (Takekawa and Beissinger 1989; Martin et al. 2006). Adult snail kites generally attempt to breed every year, with the exception of drought years (Sykes et al. 1995). Snail kites are also known to renest if a failed nesting attempt occurs early in the breeding season (Beissinger 1986; Sykes et al. 1995). In addition, adult snail kites display ambisexual mate desertion (Beissinger 1986, 1987); this behavior appears to occur primarily under conditions when prey is abundant and may be an adaptation to maximize productivity during favorable conditions. Hatching success is variable from year to year and between geographic locations (Sykes 1987c). Therefore, given the highly variable nature of this species reproductive strategy, the ability to detect individual losses in productivity of nest sites that is incidental take, as a result of one factor, water management, over all other environmental and biological factors would be difficult to discern.

The range-wide population of snail kites is estimated using the super population method (Dreitz et al. 2002). These population estimates and the estimates of demographic parameters such as dispersal and mortality are generated using mark-recapture methods that rely upon detection probabilities. Detection probabilities for snail kites have ranged from 0.15 (or 15 percent of birds counted) to 0.45 from 1998-2005. Since snail kite population estimates are the result of modeling predictions and do not represent actual individual snail kites observed, the loss of an individual snail kite from a subset of their range from the effects of this action would not be discernable within the error margin of the estimated population. Thus, current methods designed to monitor range-wide population estimates over time are unsuitable for tracking individual snail kites. Rather, the methodology is designed to estimate the recruitment of young and survival of adults over time on a range-wide basis. The proposed action is not expected to affect adult survival, but is anticipated to affect nest success (recruitment), which may be reflected in the results of this monitoring and evaluation effort, but the ability to track recruitment (*i.e.*, all nests within the project area) from a subset of the range is not possible.

Although we are unable to quantify incidental take of individual snail kites as a result of the proposed action, hydrologic variables such as the timing and magnitude of high water and the rate of water level recession directly affect snail kite habitat suitability and reproductive success. Therefore, we have established the following criteria as measures of incidental take.

Prolonged High Stages

High stages in WCA-3A will indirectly affect snail kites by reducing the abundance, growth, and reproduction of apple snails, the primary prey of the snail kite (Darby et al. 2005). Furthermore, high stages, if prolonged, will affect woody vegetation that kites use for nesting and perch-hunting (Kitchens et al. 2002). It is clear in Figure 2 below, that peak high water levels in southern WCA-3A (as indicated by the 3A-28 gauge) increased in frequency and duration since 1992. Test iterations 1-6 of the Experimental Water Deliveries to Everglades National Park were taking place during this time period which when coupled with above average rainfall (Figure 3), may have contributed to the rise in stages starting around 1992. The percent of time stage exceeded 10.5-ft NGVD in southern 3A prior to 1992 was approximately 7.6 percent (3 out of 39 years) with relatively short duration of 30 days or less. However, between 1992 and 2006 the frequency at which stage rose above 10.5-ft was 64.3 percent (9 of 14 years) with an average duration of 88.3 days. What is unclear from looking at the data is to what extent water management operations affected water levels in this area, as compared to such climatic events as hurricanes, droughts and tropical storms.

The effects of high water in WCA-3A were anticipated to continue under IOP until the completion of the Combined Structural and Operational Plan which includes Modified Water Deliveries to Everglades National Park and the C-111 South Dade Conveyance projects. It was anticipated that once these projects were complete and a percentage of flow was shifted from the west to the east, stages would be reduced and suitable snail kite habitat would improve in the southern portions of WCA-3A. These projects, however, are not yet completed. Although a high water trigger for reinitiation of consultation was not outlined in the 2006 Incidental Take Statement, the framework for a “trigger” was included which stated:

> High water levels in WCA-3A are expected to continue during the next 4 years resulting in a reduction in the quality of foraging habitat for snail kites and a reduction in the suitability of habitat to support abundant apple snails. As a result, the Service anticipates that incidental take of snail kites in the form of harm resulting from reduced ability to forage successfully because of habitat changes will occur whenever water levels rise above 10.5 ft NGVD as measured at gauge 3A-28.

The 10.5-ft NGVD threshold, when exceeded for long periods of time (that is, greater than 3 months) is believed to have negative impacts on snail kite nesting and foraging substrate and the vegetation mosaic most suitable for apple snail reproduction, which is the primary food source for snail kites (Bennets et al. 1998; Kushlan 1990; and Mooij et al. 2002). Dr. Wiley Kitchens, in his 2006 Annual Report to the Service, states:

> Several researchers (e.g., Mooij et al. in review; Kitchens et al 2002; Darby et al. 2005) have raised their concerns about potentially adverse effects of flooding in WCA3A. In recent years water levels in WCA3A have been maintained at alarmingly high levels (in part due to recent hurricanes) for the period September to January. We suggest that water levels in WCA3A should be maintained around

> Zone E regulation for the period September to January (more specifically, water stages at 3AS3W1 should not go above 10.5 feet for any prolonged period of time (>3 months)) in order to mitigate negative effects of prolonged hydroperiod (or/and greater water depth) on vegetation communities and apple snail production (Kitchens et al. in prep and Darby et al. 2005) [pg 19].

To further refine this parameter, field studies on Everglades vegetation communities suggest that the habitat suitable for kites and apple snails would not change substantially after just a single year with conditions above 10.5-ft NGVD for more than three months. Rather, these plant species, and the Everglades ecosystem in general, has adapted to environmental fluctuations of wet and dry periods; therefore, it is more likely that it would take at least 3 consecutive years of these high water conditions to significantly alter the habitat (Nott et al. 1998, Armentano et al. 2006; Ross et al. 2006).

We compared the gauge Dr. Kitchen references in his report (3AS3W1) and the 3A-28 gauge which has a longer period of record and is included in the 3-gauge average which the Corps uses to regulate water levels in WCA-3A. A location map showing these two gauges in southern WCA-3A is shown in Figure 4. Since the average ground surface around the 3AS3W1 gauge (8.98-ft NGVD) is roughly 1 foot higher than that around the 3A-28 gauge (7.95-ft NGVD), if the 3A-28 gauge is conservatively raised from a 10.5-ft threshold to 11.0-ft threshold it is likely to provide the same or slightly more protection as 10.5-ft measured at the 3AS3W1 gauge. Thus, if water levels rise above 11.0-ft NGVD at the 3A-28 gauge for 80 consecutive days in 3 consecutive years, incidental take will be exceeded. This stage would translate into water depths in excess of 3.0-ft for 80 days in 3 consecutive years and would most likely result in significant loss of snail kite foraging and nesting habitat, as well as loss of habitat suitable for apple snail reproduction.

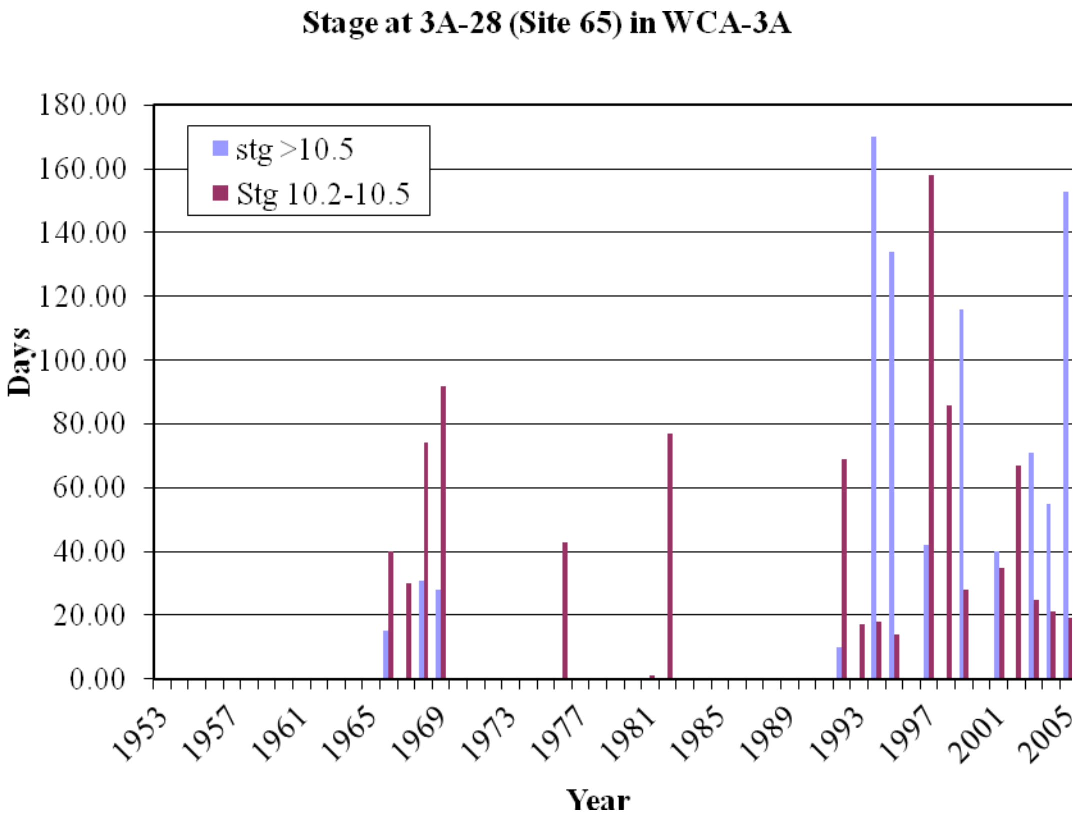

Figure 2. Chart showing the frequency and duration of stages above 10.5-ft and between 10.2 and 10.5-ft NGVD in southern WCA-3A. Note the sustained increase in stages starting around 1992.

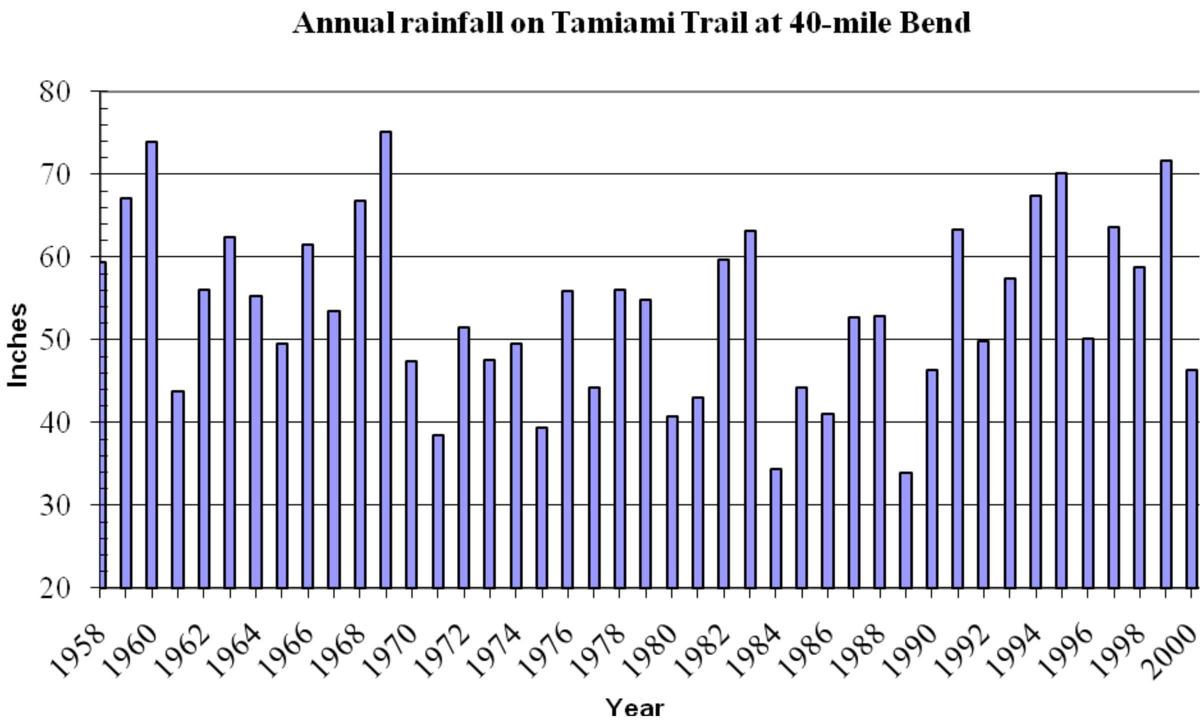

Figure 3. Average rainfall from 1958-2001 as measured at 40-mile Bend on Tamiami Trail.

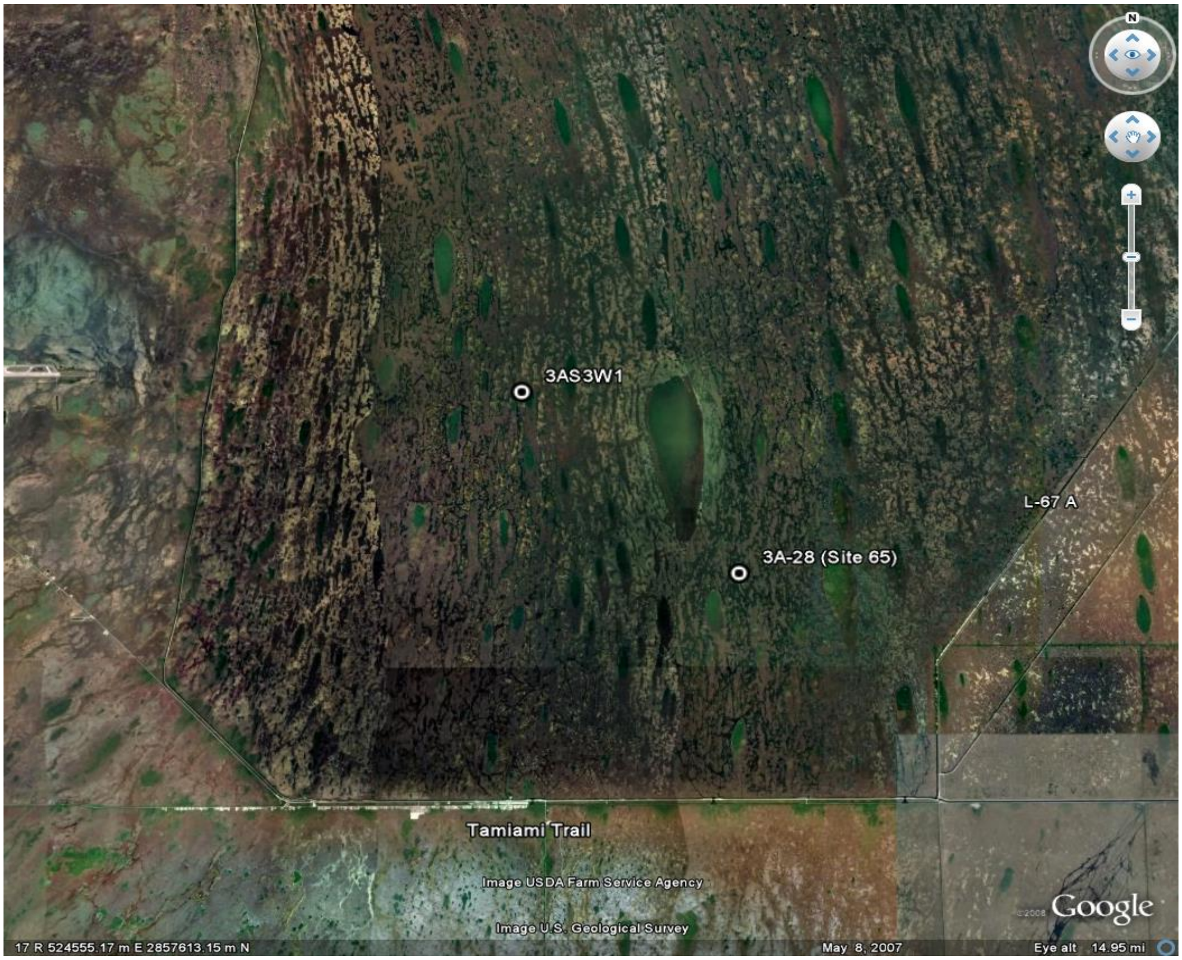

Figure 4. Map showing the location of the 3A-28 and 3AS3W1 gauges in southern WCA-3A.

Rapid recession rates

The Service anticipates injury or death of snail kite nestlings and eggs due to abandonment may result from rapid dry-season recession rates. A rapid dry-season recession may occur under IOP, thus increasing the risk of nest loss through over-drying in areas where snail kites initiated nesting under high water levels. It is difficult to estimate the number of eggs and nestlings that will be impacted for the reasons described above. Therefore, we expect incidental take in the form of harm will occur when water levels within southern WCA-3A (as measured at gauge 3A-28) recede by more than 1 ft during the period from February 1 to May 1 each year. Incidental take will increase as the recession rate from February 1 to May 1 increases. However, the Service does not anticipate the recession rate will exceed 1.7 ft from February 1 through May 1 in any year. Therefore, the level of incidental take anticipated will be exceeded if stages in WCA-3A recede by more than 1.7 ft from February 1 through May 1 in any year.

Wood Stork

The Service reviewed the 2006 incidental take statement for the wood stork and believes it generally meet the court's requirements. The 2006 incidental take statement did, however, contain an estimated number of wood storks to be incidentally taken. This estimate was included to provide a relative scope of anticipated impacts, although it was acknowledged that "it is difficult to estimate incidental take." Given the inability to quantify the number of individuals to be incidentally taken (see below), we provide the following revised incidental take statement without reference to an estimated number of wood storks to be incidentally taken as a result of the action and, therefore, provide a hydrologic parameter that is readily measurable as a means to establish a reinitiation "trigger."

Although wood storks nest colonially and often in the same site for many years, the ability to count individual wood storks and their young and attribute any changes from year to year as an effect of the action is complicated by many factors. First wood stork colonies are censused as estimates and do not reflect actual counts, not all wood storks return to the same colony every year even if the colonial site is used again (Kushlan and Frohring 1986), nesting sites may be abandoned if water levels recede too far (Rodgers et al. 1996) or there is disturbance to the site and the colony or individual birds may re-nest elsewhere (Ogden 1991, Borkhataria et al. 2004; Crozier and Cook 2004). In addition, new wood stork colonies are often discovered which may represent a shift from historic colonies due to environmental conditions or establishment of a new colony (Meyer and Frederick 2004).

The annual hydrologic pattern in south Florida is annually consistent, with water levels rising during the wet season (June to November), then receding gradually during the dry season (December to May). Wood storks nest during the dry season and rely on the drying wetlands to concentrate prey items. Once the wetland has dried to where water levels are near the ground surface, the area is no longer suitable for wood stork foraging and will not be suitable again until water levels rise and the area is repopulated with fish. Wood storks prefer calm water, about 2 to 16 inches deep and free of dense vegetation for foraging (Coulter and Bryan 1993).

As such, there is a general progression in the suitability of wetlands for wood stork foraging based on their hydroperiods and the distance of the wetlands from the nest. Short hydroperiod wetlands are used early in the nesting season, the mid-range hydroperiod sites are used during the middle of the nesting season, and the longest hydroperiod areas are used later in the nesting season. Adult wood storks feed farthest from the nesting site prior to laying eggs, forage in wetlands closer to the colony site during incubation and early stages of raising the young, and then farther away again, when the young are able to fly.

IOP may affect hydrologic conditions within areas occupied by wood storks, although it will be difficult to distinguish these effects from other environmental factors such as drought and heavy rains. IOP may influence wetland hydroperiods causing changes in foraging suitability for wood storks. If IOP contributes to reduced depth and hydroperiod during the preceding wet season it generally will result in reduced densities of wood stork prey. Additionally, if increased hydroperiod and water depth occurs during the nesting season it generally results in decreased productivity and abundance of prey. Therefore, the Service anticipates incidental take in the form of harm, from reductions in foraging habitat suitability, may result in injury or death of a limited number of wood storks (eggs or nestlings) each year based on slight changes to foraging habitat suitability, as predicted by hydrologic modeling, that is expected to occur under IOP operations. Examples of this could include water level manipulations of several inches in and around the colonies which could make it more difficult for wood storks to forage and provide for young, as well as, increase the availability of wood stork nests to predators. In some years conditions for wood storks may actually be favorable under IOP operations. The Service does not anticipate widespread abandonment or nest failures as a result of IOP operations.

Therefore, incidental take will be exceeded if IOP results in an increase in water depth of more than 8 inches across an area of greater than 16 square-miles from December 15 through May 1 within the core foraging area of any active wood stork colony. An increase in water depth of 8 inches during the nesting season across a large part of the core foraging area would lower the suitability of foraging habitat (Figure 5) to the point where wood storks ability to forage would be severely impaired and most likely result in widespread abandonment of nests and fledglings within the affected colony (Gawlik 2002; Gawlik et al. 2003).

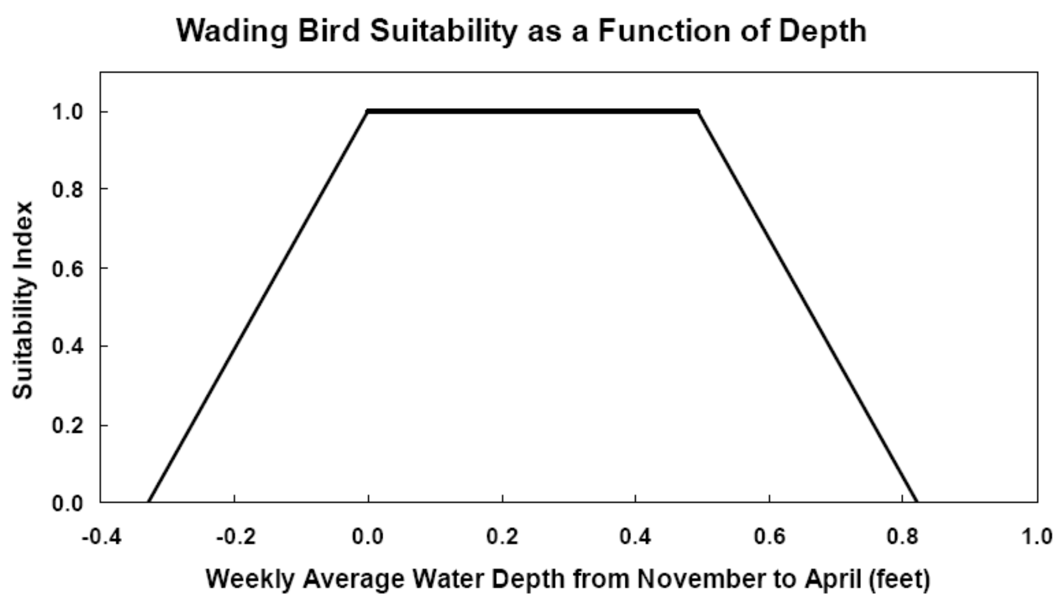

Figure 5. Wading bird suitability as a function of weekly average water depth (Gawlik et al. 2003).

LITERATURE FROM THE ADMINISTRATIVE RECORD NOT PREVIOUSLY CITED

Armentano, T.V., J.P. Sah, M.S. Ross, D.T. Jones, H.C. Cooley, and C.S. Smith. 2006. Rapid responses of vegetation to hydrological changes in Taylor Slough, Everglades National Park, Florida, USA. Hydrobiologia 569:293-309.

Beissinger, S.R. 1989. Everglades water levels and snail kite population viability. Presented at the Colonial Waterbird Group Meeting, Key Largo, Florida. October 27, 1989.

Bennets, R.E. and W.M. Kitchens. 1992. Estimation and environmental correlates of survival and dispersal of snail kites in Florida. First Annual Progress Report. Prepared for U.S. Fish and Wildlife Service, Jacksonville, Florida.

Darby, P.C., R.E. Bennets, S.J. Miller, and H.F. Percival. 2002. Movements of Florida apple snails in relation to water levels and drying events. Wetlands 22(3):489-498.

Gawlik, D.E., G. Crozier, and K.C. Tarbaton. 2003. Wading bird habitat suitability index. In: SFWMD, Habitat Suitability Indices, South Florida Water Management District, West Palm Beach, Florida. Chapter 8.

Kushlan, J.A. 1990. Wetlands and wildlife, the Everglades perspective in Freshwater Wetlands and Wildlife, R.R. Sharitz and J.W. Gibbons (Eds.), CONF-8603101, DOE Symp. Ser. No. 61, Office of Scientific and Technical Information, U.S. Department of Energy, Oak Ridge Tenn.

Mooij, W.M., R.E. Bennets, W.M. Kitchens, D.L. DeAngelis. 2002. Exploring the effect of drought extent and interval on the Florida snail kite: interplay between spatial and temporal scales. Ecological Modelling 149(2002):25-39.