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Attachments: The Reserve Final BO.pdf

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Sent: Thursday, January 12, 2012 9:15 AM
To: Terry, Tomeka
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FISH AND WILDLIFE SERVICE
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August 19, 2011

Lloyd Mullins
Regulatory Branch, CESWG-PE-RCC
U. S. Army Corps of Engineers
5151 Flynn Parkway, Suite 306
Corpus Christi, TX 78411-4318

Consultation Number: 21410-2009-F-0113

Dear Mr. Mullins:

This document transmits the U.S. Fish and Wildlife Service's (Service) Final Biological Opinion (BO) based on our review of Hal Jones Development, LLC's proposed canal housing development, "The Reserve", submitted as U.S. Army Corps of Engineers (USACE) Permit Application SWG-2007-00038 and the *Biological Assessment of Potential Impacts to Threatened and Endangered Species for Department of Army Permit Application SWG 2007-00038 by Hal Jones Development for The Reserve* (BA) dated March 2011, emphasizing the effects of the proposed project on the endangered whooping crane (*Grus americana*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. § 1531 et seq.). The proposed project is located in Lamar, Aransas County, Texas. The Service received a letter from USACE requesting formal consultation on March 23, 2011.

In accordance with the consultation procedure required by section 7(c) of the Act of 1973, as amended, the Service was notified by the USACE of the proposed activity and requested by letter to provide information regarding threatened and endangered species known to occur within Aransas County and to identify those species which would most likely be impacted by this project. The Service furnished the following list of endangered (E) and threatened (T) species on March 12, 2009, in addition to the whooping crane, potentially occurring in the project area:

Attwater's greater prairie chicken	*Tympanuchus cupido attwateri*	(E)
Northern aplomado falcon	*Falco femoralis septentrionalis*	(E)
Ocelot	*Leopardus (=Felis) pardalis*	(E)

Gulf Coast Jaguarundi	Helailurus yagouaroundi cacomitli	(E)
West Indian Manatee	*Trichechus manatus latirostris*	(E)
Leatherback sea turtle	*Dermochelys coriacea*	(E)
Hawksbill sea turtle	*Eretmochelys imbricate*	(E)
Green sea turtle	*Chelonia mydas*	(T)
Loggerhead sea turtle	*Caretta caretta*	(T)
Kemp's Ridley sea turtle	*Lepidochelys kempii*	(E)
Interior Least Tern	*Sterna antillarum spp.*	(E)
Piping plover	*Charadrius melodus*	(T)

The BA addressed each of the species above, and concluded that "The Reserve" project, would not affect each of the above listed species, excluding the West Indian manatee, whooping crane and non-nesting green sea turtles. The Service concurs with the USACE determination that "The Reserve" project may affect, but is not likely to adversely affect the West Indian manatee and conservation measures associated with this concurrence are located in Appendix A. These measures should be included as special conditions of the USACE permit prior to issuance. The Service recommends that the USACE continue to coordinate with the National Marine Fisheries Service (NMFS) concerning potential effects on non-nesting sea turtles.

In the BA, the USACE determined that the "The Reserve" project may affect whooping cranes and their critical habitat. This Biological Opinion (BO) for "The Reserve" project and its effects on the whooping crane is based on information provided in the BA, for impacts to "*Threatened and Endangered Species for Department of Army Permit Application SWG 2007-00038 by Hal Jones Development for The Reserve*" in Aransas County, Texas, project permit application materials, available literature, communication and coordination with the Service's National Whooping Crane Coordinator, USACE staff, and contracted consultants from Belaire Environmental Inc., field site-visits, and other information. A complete record of this consultation is on file in the Corpus Christi Ecological Services Field Office (CCESFO), Corpus Christi, Texas.

Consultation History

The current project is proposed by Hal Jones Development, Inc and the purpose of the project is to provide a canal subdivision for residential housing with access to the bay. The history of the consultation for the proposed project (21410-2011-F-0113) is as follows:

August 28, 2007	Joint Evaluation Meeting (JEM) with the USACE, NMFS, TPWD, and TGLO in attendance was held. The USACE proposes to issue a permit to authorize certain discharges of dredged or fill material as described in permit application number SWG-2007-0038 to Hal Jones Development, LLC pursuant to section 404 of the Clean Water Act, 33 U.S.C. §1344. Discussion included efforts

	made by the client to avoid and minimize impacts to estuarine wetlands, freshwater wetlands, oysters, seagrass and oak trees. The client recognized that consultation with the Service regarding potential impacts to whooping cranes would be required.
November 29, 2007	Whooping Crane coordinator emailed he had seen three whooping cranes using upland grasslands, close to the bay, facing Goose Island State park on his 11-27-2007 census flight.
April 14, 2008	Whooping Crane coordinator emailed stating bulldozers had started clearing at the proposed Reserve housing development site located just north of Goose Island State Park. The wetlands have remained undisturbed; however, whooping cranes have been documented in the uplands currently being cleared. Attempts were made contact owner and Service law enforcement was notified.
August 21, 2008	During a telephone conversation with developer and attorney, the Service discussed four different projects. Two proposed developments discussed were the Boardwalk and the Reserve. The Boardwalk development was underway without a federal permit and a section 10 was possibly needed. The Reserve would need a USACE permit.
January 14, 2009	The Service received a copy of the December 15, 2008, USACE application package for The Reserve at St. Charles Bay, proposed residential canal subdivision with boat access, St. Charles Bay, Aransas County, Texas.
March 13, 2009	The Service received a copy of a letter to the USACE from the consultant responding to the preliminary agency comments. Enclosed was the revised application.
April 15, 2009	The USACE submitted the *Draft Biological Assessment for Potential Impacts to Endangered and Threatened Species Associated with the Development of the Reserve at St. Charles Bay (Reserve), Aransas County, Texas* dated March 2009, for review, comment and concurrence with their determinations of effect on threatened and endangered species.

May 1, 2009	The National Whooping Crane Coordinator provided information prior to the planned JEM Meeting.
May 5, 2009	JEM meeting was held and revised information was presented. Discussion was held on the interdependency of the Boardwalk and the Reserve and that the Service did not concur with a may affect, but is not likely to adversely affect the whooping crane determination.
May 8, 2009	JEM meeting was held on the Reserve per e-mail. Tom Stehn had documented whooping cranes use in salt marsh wetlands, unvegetated tidal flats, as well as uplands on the property. He stated it was used by a small number of cranes every winter sometimes as a "transition" stopover as cranes travel between refuge marshes and marshes located on the Lamar Peninsula. He also stated he was concerned that there were no proposed buffers between the whooping crane wetlands and the constructed residential lots.
May 7, 2009	The Service requested TGLO to verify as to whether TGLO lands were in the area of the Reserve development. TGLO had not found any in their records but were still searching.
May 11, 2009	The Service provided comments on the April 15, 2009 BA. The Service commented its belief that the two developments were interdependent, there was no alternative analysis provided and ratios and acreage for compensation were not correct. The Service also requested that the applicant ensure agreements and funds were available to purchase necessary acreage if needed and had been coordinated with the Service. The Service informed the USACE that it does not provide concurrences with "no effect" determinations and did not concur with the USACE's "may affect but is not likely to adversely impact" determination for the whooping crane.
June 29, 2009	USACE issued a Public Notice for the Hal Jones Development project known as "The Reserve".
July 14, 2009	Briefing statement to Regional Director on wintering whooping crane issues and opportunities and emerging issues.

July 30, 2009	The consultant forwarded a copy of a letter to the USACE responding to the Service's comments on the May 11, 2009 Draft BA with a revised version of the Exhibit A and revised determination that the proposed project "may affect" the whooping crane and it was anticipated that The USACE will request formal consultation with the Service. The applicant also included proposed conservation measures to mitigate impacts to whooping cranes.
August 19, 2009	The Whooping Crane coordinator stated in an email that the majority of the crane sightings on the Reserve had been reported to him by reliable people and some were documented on his aerial surveys.
September 2, 2009	The USACE provided the consultant with copies of all public notice comments.
October 6, 2009	The applicant's attorney provided conservation measures his client was willing to implement at the Reserve and Boardwalk. Some of the components included wetland creation, deed restrictions signage, on-site monitoring, and ceasing activity if a whooping crane was within 1000 feet.
October 29, 2009	The Service provided applicant's attorney information on whooping cranes potentially using the Reserve/Boardwalk area. The Whooping Crane coordinator had estimated approximately 30 whooping cranes using the area for foraging over the winter season. This number included subadults dispersing and using it as a "safe zone" to escape from territorial cranes nearby. The area has also been a stopover site for cranes going out to forage on Lamar Peninsula.
November 10, 2009	The Regional office requested a briefing paper be prepared for the Assistant Regional Director to prepare for a meeting with the developer and his attorney.
November 13, 2009	Brief Statement to inform the Assistant Regional Director – Ecological Services of impacts the proposed developments may have on trust resources and concerns that cumulative impacts of these projects may significantly affect whooping crane recovery and wetlands along the Texas coast in Aransas and Calhoun counties.
November 16, 2009	Meeting with developer and consultant

November 23, 2009	The USACE provided a copy of the consultant's response to all public notice comments from the Environmental Protection Agency (EPA), TPWD, Texas Commission on Environmental Quality TCEQ, NMFS, the Service and other private individuals.
December 8, 2009	The Service, consultants, developer and his attorney met for a site visit and discussed the Reserve and Boardwalk project components and whooping crane concerns with a whooping crane sighting map for their use. The group also visited the Baily Ranch palustrine and estuarine mitigation sites.
December 14, 2009	Email from Whooping Crane coordinator that whooping cranes were documented on the Reserve/Boardwalk uplands December 10-12, 2009.
February 18, 2010	The Service met with the USACE to discuss The Reserve/Boardwalk, increased development and whooping crane issues. The USACE was not comfortable with the conclusion of "may affect, but is not likely to adversely affect the whooping crane. Recovery goals were discussed including human disturbance may occur at 1,000 feet or closer.
April 23, 2010 –	The Serviced received a copy of a letter from the USACE dated April 21, 2010, to the applicant concerning the investigation into the unauthorized discharge of fill material into waters of the United States, including wetlands, at the mouth of the drainage ditch that has been cut to Aransas Bay.
May 18, 2010 –	The applicant's consultant responded to the USACE's April 23, 2010, letter requesting the applicant cease upland activities until the consultation and permit process were complete. The response indicated that since the active borrow pits and drainage swales were located on non-jurisdictional uplands and as the unintentional minor washout had been fully restored and reinforced with additional BMPs the applicant did not believe it was warranted to cease the borrow pit activities.
August 3, 2010	Joint Evaluation Meeting for the Reserve at St. Charles Bay, SWG-2007-00038 was held. The purpose of the meeting was to allow agencies to review the revised compensatory mitigation plan.

August 11, 2010	The USACE submitted a BA, dated August 2010, to the Service for review and initiation of formal consultation on the Reserve at St. Charles Bay. The USACE determined the proposed project would adversely affect the whooping crane.
August 26, 2010	The Service met with the USACE to discuss documentation for the 1000 foot disturbance for whooping cranes, rates for conservation easements, creating increasing ratio, and alternatives such as creating new habitat.
September 8, 2010	The Service met with the USACE, applicant, consultant, and attorney. The Service recommended revisions to the BA, analyze direct and indirect impacts more closely, reconsider replacing lost habitat at an appropriate ratio, potentially searching for properties to replace habitat impacts near the site, and other conservation measures to help whooping cranes. Other topics discussed were documentation for the 1,000 foot disturbance buffer, rates for conservation easements ($1,375 per acre) and alternatives.
September 9, 2010	The Service responded that based on our meetings of August 26, 2010, September 8, 2010, and our joint review of the BA, the USACE and the Service mutually agree the USACE would review the BA and resubmit it to the Service. Once the Service reviewed the revisions and accepted the BA as complete the formal consultation process would begin.
September 16, 2010	The Service received an e-mail from the consultant to the USACE requesting the seagrass and estuarine sites remain within the general area as shown on the map at September 8th meeting for various reasons and requested our input. The Service replied that it was not appropriate for the Service to comment on a specific component of a larger project especially when we have already recommended significant revisions to the project as currently proposed. The Service was in need of a fully revised proposed project description and requested that other agencies be allowed to comment. The Service recommended they ground truth the elevations and survey site conditions prior to the whooping cranes returning to Texas. The Service also recommended that any work that would change site conditions or the

	potential alternatives available for inclusion into the revised project not be initiated until section 7 consultation was complete.
September 17, 2010	The consultant requested information regarding the NRCS CRP $1,375 per acre conservation easements as mentioned at the September 8, 2010 meeting.
November 29, 2009-	The Whooping Crane coordinator reported a family group of whooping cranes were sighted on November 10th and November 25th. He believed it was the small marsh area that the applicant was donating to the State Park.
December 1, 2010	The USACE transmitted an electronic copy of the November 2010 *BIOLOGICAL ASSESSMENT FOR POTENTIAL IMPACTS TO ENDANGERED AND THREATENED SPECIES ASSOCIATED WITH THE DEVELOPMENT OF THE RESERVE AT ST. CHARLES BAY ARANSAS COUNTY, TEXAS*
December 13, 2010	The Service received a conservation easement form for review that the applicant was proposing to use for their voluntary conservation of crane habitat at Falcon Point Ranch to offset the impacts of the Reserve.
December 15, 2010	The Service met with the applicant's lawyer to discuss the Reserve mitigation. Discussions included a voluntary gift to TPWD (donated land), creating a 35 acre wetland with a year round solar pump, and 165 acre conservation easement. Further revisions to the BA were recommended.
December 16, 2010	The Service provided comments on the November 2010 Biological Assessment.
December 17, 2010	the attorney forwarded a copy of the Warranty Deed via email, conveying 9.35 acres of land from the Reserve to TPWD, Goose Island State Park.
December 23, 2010	Conference call discussing potential Falcon Point Ranch Conservation Easement was held . Discussion included potential conveyance of the easement to a third party, construction of a solar powered freshwater source, exclusion fencing, elimination of crop growing within the easement, coordination of grazing, hunting and signage.

	Attendees included Service Field Supervisor, Service staff, developer and his attorney.
January 20, 2010	The consultant provided a copy of the 2009-2010 whooping crane monitoring plan.
January 19, 2011	The USACE forwarded an e-mail from the consultant to the Service with a revised palustrine mitigation plan and a comment that they were still seeking information on water pumps for the proposed mitigation sites. The Service responded it still recommended that a National Resource Conservation Service (NRCS) engineer independently confirm the feasibility of the project as proposed. The Service also inquired as to whether the mitigation area was a depressional wetland and if so, did the jurisdictional determination done in 2006 cover that area and/or have conditions changed since then that might need to be considered in determining the current status of the proposed mitigation site.
March 23, 2011	USACE sent revised BA and requested formal consultation
August 11, 2011	Draft BO sent to USACE for comment.
August 18-19, 2011	Comments received from USACE and incorporated into BO.
August 19, 2011	Final draft submitted to USACE.

BIOLOGICAL OPINION

I. Description of the Proposed Action

A. Purpose of Project and Location

Purpose

The purpose of this project, known as The Reserve at St. Charles Bay (Project), is to provide approximately 188 waterfront canal housing lots for a single-family residential development within a 121-acre land tract on the Live Oak Peninsula in Aransas County with proximity to water access.

Project Location

The location of the Project is three distinct areas, first the canal housing lots are proposed for an approximately 121-acre tract of land, in Lamar, Texas, north of Rockport-Fulton, Aransas County, Texas. The property is adjacent to St. Charles Bay and northeast of Goose Island State Park (Figure 1, USACE 2011). This project area does not include designated critical habitat. Second, the applicant Hal Jones Development, LCC, has proposed to provide a conservation easement and enhance wetlands at Falcon Point Ranch, southeast of Seadrift, Calhoun County, Texas. This portion of the project area is located within critical habitat designated for the endangered whooping crane (Figure 2, USACE 2011).

Third, the applicant has provided a donation of land adjacent to the Project to Texas Parks and Wildlife Department (TPWD) (Figure 1) to use as non-federal, matching resources in order to purchase Big Tree Ranch, just north of the project area, adjacent to St. Charles Bay, Lamar, Aransas County, Texas. This portion of the project area is partially located within critical habitat designated for the endangered whooping crane (Figure 3, USACE 2011).

Action Area

For the purpose of this biological opinion, the Service has defined the action area in two distinct areas (Figure 4). First, the action area includes the portions of Live Oak Peninsula, at the southern most point to including Goose Island State Park to the wetlands north of Big Tree Ranch and west to encompass the entire lower portion of the peninsula. This area covers approximately 5 miles (8 kilometers) from the southeast point of the project area going northwest near Shell Point Ranch. This area includes state park areas, residential and commercial development and shallow waters and wetlands around the peninsula, and designated critical habitat for the whooping crane. The second portion of the action area is approximately 25 miles (40.2 kilometers) north of the residential project site and includes the proposed preservation and mitigation areas within critical habitat for the whooping crane at Falcon Point, southeast of

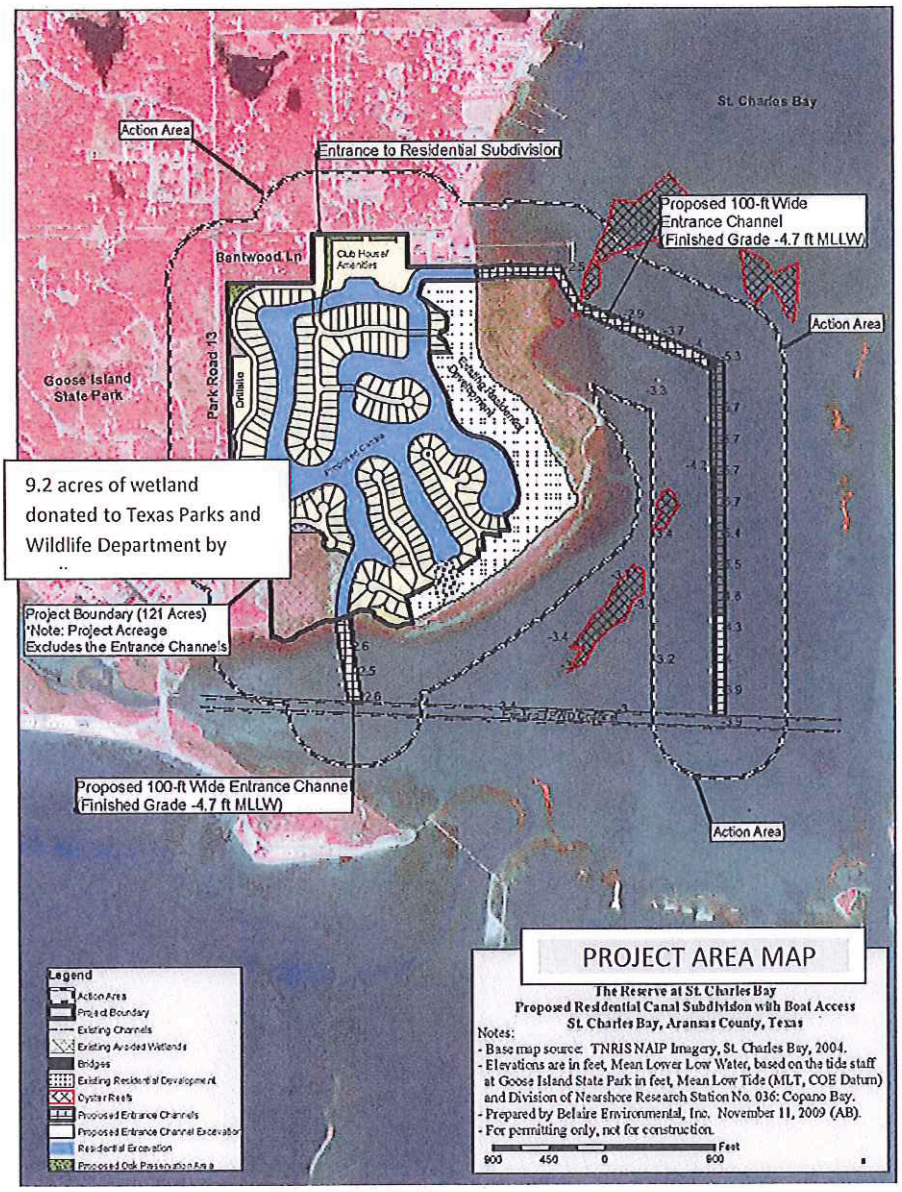
Seadrift, Texas, Calhoun County, Texas. This portion of the action area includes all designated critical habitat on Falcon Point A residential community is northwest of this portion of the action area, a dredge material placement site is located west of the action area, and undeveloped wetlands extend north and east of the project site along the Gulf Intracoastal Waterway (GIWW).

B. Project Design

A residential canal subdivision (Project) is proposed for construction on 121 acres (48.97 hectares) with water access to nearby bays as shown on Figure 1. Approximately 540,000 cubic yards (412, 859 cubic meters) of primarily sand based material will be mechanically excavated above the Annual High Tide line to build the Project. This material will be placed on-site and used as fill material for the proposed residential lots and streets. Material placement will raise the elevation of the subdivision above floodplain elevation. Canals will have a minimum bottom width of approximately 100-feet at a depth of approximately -4.7 feet (-1.43 meters) Mean Low Low Water (MLLW). The project will also consist of a 100-foot-wide (30.48-meter-wide) entrance channel for access to St. Charles Bay and a second 100-foot-wide (30.48-meter-wide) entrance channel for access to Aransas Bay. Approximately 45,000 cubic yards (1,274.26 cubic meters) of material will be mechanically or hydraulically excavated below the Annual High Tide line for creation of the entrance channels. Total excavated material associated with the project involves approximately 585,000 cubic yards (16,565.36 cubic meters). Material from the entrance channels will be placed within the development. A 2-acre (0.081 hectare) upland area within the northwest corner of the project site will be avoided and is reserved for the subsurface mineral rights owner to use to access mineral interests if desired (USACE 2011).

The Project would involve direct impacts to 22.73 acres (9.2 hectares) of "waters of the United States" ("jurisdictional" waters or areas), including approximately 0.08 acres (0.032 hectare) of tidally-influenced estuarine wetlands (0.01 acres [0.004 hectare] of fill and 0.07 acres (0.028 hectare) of excavation, 14.61 acres (5.91 hectares) of non-tidal palustrine wetlands, 10.34 acres (4.18 hectares) of fill and 4.27 acres (1.73 hectares) of excavation, 1.92 acres (0.776 hectare) of shoalgrass, *Halodule wrightii,* (0.12 acres [0.048 hectare] of fill and 1.80 acres [0.728 hectare] of excavation), and 0.0013 acres (0.0005 hectare) of oyster reefs. Approximately 6.12 acres (2.476 hectares) of jurisdictional unvegetated bay bottom will also be impacted by excavation. The applicant proposes to provide compensatory mitigation for 16.61 acres (6.72 hectares) of the 22.73 acres (9.2 hectares) of jurisdiction impacts. The remaining 6.12 acres (2.476 hectares) of impacts is to unvegetated bay bottom. Of these 6.12 acres (2.476

Figure 1: Project Area Map for proposed canal housing development, The Reserve at St. Charles Bay (USACE2011).



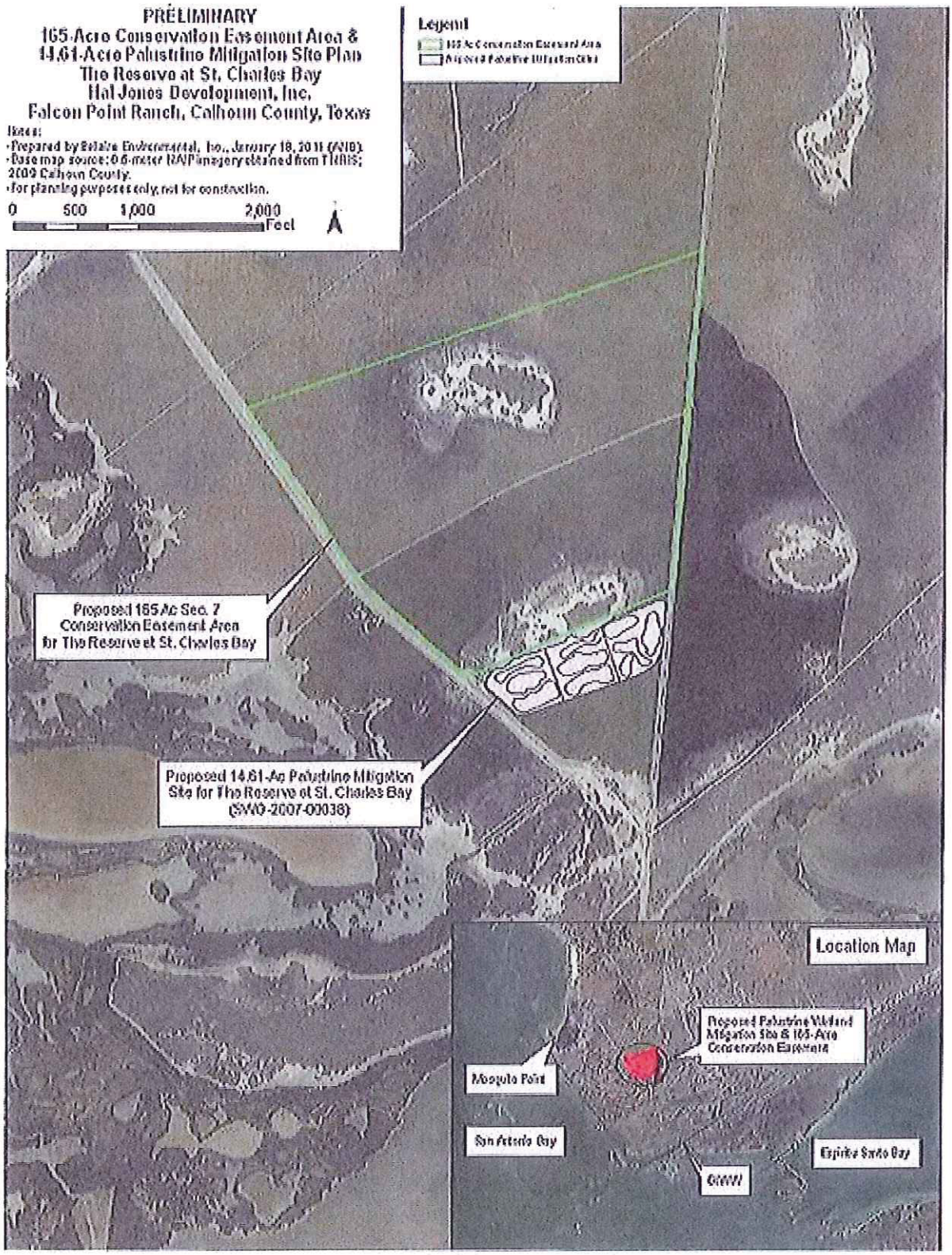


Figure 2: Proposed conservation easement and wetland enhancement at Falcon Point Ranch, Calhoun, County, Texas (USACE 2011).

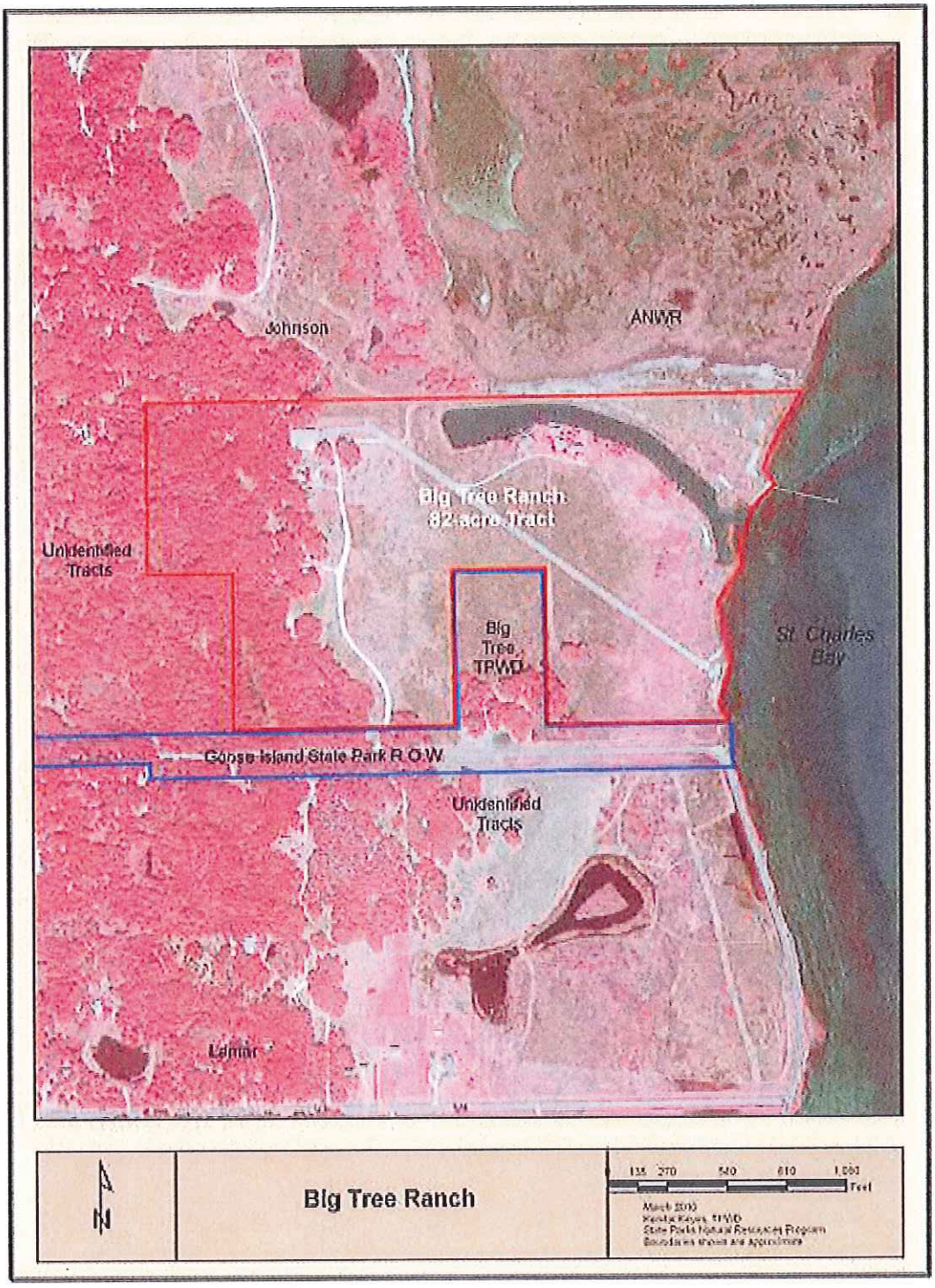


Figure 3: Proposed acquisition area known as Big Tree Ranch, Aransas County, Texas (USACE 2011).

A

B

Figure 4: Action area for "The Reserve" a propose development in Aransas County, Texas. (A) Action area in Lamar Peninsula (B) Action area in Calhoun County (polygons are approximation of action area).

hectares), approximately 1 acre (0.4 hectare) would be considered useable whooping crane habitat at the fringe of the shoreline. Proposed mitigation for impacts to deep unvegetated bay bottom by dredging would be excavation of approximately 42 acres (17 hectares) of deep, wide canals at the project site. This mitigation is proposed to fulfill requirements of Section 404 of the Clean Water Act and is not proposed as potential offset for loss of whooping crane habitat.

The project avoids direct impacts to approximately 9.2 acres (3.72 hectares) of on-site estuarine wetlands which has been donated to TPWD for their management (Figure1). It is unclear if drainage patterns in the project area and the addition of bulkheads adjacent to the wetlands will preserve the wetlands in their present state. An additional 15.01 acres (6.074 hectares) of nearby estuarine wetlands (Figure1) utilized by whooping cranes has also been avoided by direct impacts from the proposed project. Streets, lots and infrastructure, including bulkheads, have been constructed in 27 acres (10.92 hectares) of uplands for the project known as "The Boardwalk" immediately adjacent to the 15.01 acres (6.074 hectares) wetland. "The Boardwalk" development adjacent to the proposed project is currently under construction. The Boardwalk is considered a separate project by USACE and is located entirely within uplands. The applicant proposes to compensate for the 27 acres (10.92 hectares) of uplands within the conservation measures proposed for the current Reserve Project.

Although the applicant proposes to preserve the 15.01 acres (6.074 hectares) in perpetuity, impacts from the previous construction and eventually building of residential homes, storm water drainage, etc...may indirectly impact the present condition of the wetland. The proposed compensatory mitigation for unavoidable Section 404 Clean Water Act impacts to the 16.61 acres (6.72 hectares) involves the offsite in-kind creation of 21.35 acres of palustrine, estuarine, and seagrass habitat that may also offset some impacts to whooping crane habitat (USACE 2011).

C. Project Timing and Duration

Should a permit be issued, construction of the canals and marina basin would be completed in approximately 18 months (1.5 years), and housing would be completed in approximately 36 months (3 years). Maintenance dredging would be done as necessary and will require re-coordination with the USACE and an amendment to the permit if authorized. The life of the project is considered to be 50 years.

D. Conservation Measures

Due to the potential of this project to impact critical habitat, occupied and suitable whooping crane habitat, as well as, alter current foraging and roosting behaviors, or injure a whooping crane, the applicant has proposed the following conservation measures to avoid and/or minimize potential adverse affects to the wintering whooping cranes. The applicant considers the following measures feasible:

a. The applicant has purchased a 165-acre (66.77 hectares) conservation easement within existing critical habitat of the whooping crane (Figure 2) for perpetual conservation. The conservation easement is located south of Seadrift, on Falcon Point Ranch, Calhoun County, Texas. The conservation easement will be transferred to the Nature Conservancy for management of

the easement for whooping crane recovery within 30 days of USACE permit issuance.

b. Enhancement and restoration of a 14.61 acre (5.91 hectare) wetland site just south of the 165-acre (66.77 hectare) conservation easement mention "a" above. The applicant proposes to construct and enhance palustrine wetlands for use as whooping crane habitat.

c. The applicant has donated approximately 9.2 acres (3.72 hectares) of estuarine wetlands adjacent to the development to TPWD in fee title (Figure 2). The donation will be used as non-federal match for TPWD to purchase 82 acres (33 hectares) of the Big Tree Ranch, north of the Project, Lamar, Aransas County, Texas (Figure 3). Big Tree Ranch is partially included in critical habitat for the whooping crane and is currently degraded. The site would have to be restored to be fully useable by whooping cranes and would be held in fee title by TPWD and managed by TPWD for whooping crane recovery.

d. The applicant proposes preservation of 15.01 acres (6.074 hectares) of estuarine wetlands on-site.

e. The applicant will install and maintain signage prohibiting human or domestic animal entry into the TPWD wetland and the preserved estuarine wetlands adjacent to "The Boardwalk".

f. The applicant will educate contractors and all other personnel working at the site regarding methods to avoid and minimize impacts to the whooping crane. The applicant will train the contractor regarding whooping crane identification and construction avoidance measures prior to the commencement of breaking ground on this project.

g. The applicant will include educational information in deed restrictions and home owners association documents regarding the avoidance of human activities which might directly or indirectly affect whooping cranes. A leash law for dogs as well as a prohibition of airboats within the development will be included and enforced by the home owners association. Deed restrictions will also prohibit hunting activities within preserved wetlands adjacent to "The Boardwalk".

h. The construction supervisor will monitor and maintain a log of any sighting dates and locations of whooping cranes during construction (Appendix B). If a whooping crane is identified in the project vicinity the person observing the crane will notify the construction supervisor. Personnel will not disturb the cranes by approaching them. All construction and other human activity

carried out by or at the direction of the applicant will immediately cease within 1,000 feet of the crane. Activity will not resume until the crane has departed the project area. During construction between October 15th and April 15th, a whooping crane sighting log will be sent to Corpus Christi Ecological Services Field Office once per week via email. The monitoring log will contain the time, date, and location of sighting, length of time cranes remained in the area, construction activity ongoing at time of sighting, action taken, and how long construction activity was ceased.

i. All utilities within the housing development will be buried to avoid potential whooping crane collisions with overhead utilities.

j. Between October 15 and April 15, all equipment will be staged in the area located near the intersection of Palmetto Street and East Main Street, as far inland as possible (Figure 5). Also, between October 15 and April 15 all construction materials will be located as far landward as possible.

k. From October 15 through April 15, use of all equipment over 15 feet (4.57 meters) in height and all lighting associated with the project will be coordinated with USFWS to reduce the possibility of collisions and disorienting the whooping cranes during flight, foraging or roosting.

l. Drilling or other oil and gas exploration activities will not be conducted from October 15 through April 15. Based on the drilling history at the property and nearby area, there is a low probability that such activities may occur.

m. If future maintenance dredging for the canals or entrance channels is to be conducted, it will occur outside the wintering season (October 15 through April 15) for the whooping crane. Dredged material will be disposed of on the upland area of the project in which the applicant has reserved space for the mineral owner to access subsurface minerals and/or used beneficially to improve whooping crane habitat. As it is extremely unlikely that any exploration activities would be conducted in the project area, the proposed upland disposal area will be maintained as green space and utilized for temporary upland maintenance dredge material placement.

Figure 5. Proposed staging area for construction during whooping crane wintering season (USACE 2011).

II. Status of the Whooping Crane/Critical Habitat Description

Whooping cranes are large, distinctive birds (Figure 6) and are the tallest birds in North America, reaching approximately 5 feet (1.5 meters) in height. Their average wingspan is 7.5 feet (2.28 meters). Males are generally larger than females. Whooping cranes are white with red-colored patches on top and back of head, yellow eyes, black legs and bills, and lack feathers on both sides of the head. Their primary wing feathers are black but are usually visible only in flight. Whooping crane chicks are rust-colored at hatching and in about four months start getting white feathers. Juveniles turn brown and white by the end of their first migration, and by spring their plumage changes to predominantly white with black wing tips (TPWD 2006).

The whooping crane has been named for its call, which can be described as a shrill, bugle-like trumpeting. Whooping cranes are sexually monomorphic (Walkinshaw, 1973). The guard call vocalization and visual components of the unison call is sexually distinct (Archibald, 1975).

Whooping cranes breed, migrate, and winter in marshes and estuaries, lakes, rivers, and agricultural fields (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). Nesting areas occur only within or near Wood Buffalo National Park (WBNP), Canada. Nesting wetlands vary considerably in size, shape and depth, and most are separated by narrow ridges that support an overstory of tamarack (*Larix laricina*), white and black spruce (*Picea glauca* and *P. mariana*), and willows (*Salix* spp.). Bulrush (*Scirpus validus*) is the dominant emergent vegetation in the potholes and is used for

Figure 6: Adult whooping crane (http://ecos.fws.gov/docs/species_images/doc3703.jpg)

nesting, although cattail (*Typha* sp.), sedge (*Carex aquatilis*), and musk-grass (*Chara* sp.) are also used (Bent 1926, Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). Breeding whooping cranes' diets include mollusks, crustaceans, aquatic insects, minnows, frogs, and garter snakes found in the ponds occupied by nesting pairs (Allen 1956).

During migration whooping cranes also use a variety of habitats, including large marshy palustrine wetlands for roosting and croplands for foraging (Howe 1987, 1989, Lingle 1987, Lingle et al. 1991). Whooping cranes also utilize riverine habitat in Nebraska; Oklahoma; and the Red River in Texas (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). In riverine habitats, submerged sandbars in wide unobstructed channels that are isolated from human disturbance are used by the cranes primarily for roosting (Armbruster 1990).

Wintering habitat for whooping cranes consists primarily of marshes and salt flats, and whooping cranes use about 22,500 acres of the ANWR and adjacent privately and publicly owned wetlands. Salt grass (*Distichlis spicata*), saltwort (*Batis maritima*), smooth cordgrass (*Spartina alterniflora*), glasswort (*Salicornia* sp.), and sea ox-eye daisy(*Borrichia frutescens)* dominate the marshes preferred by whooping cranes. Inland margins of the flats used by whooping cranes are often fringed by Gulf cordgrass (*Spartina spartinae*). Whooping cranes also use upland areas containing oak mottes, grasslands, swales and ponds. Within the critical habitat unit in Texas the upland vegetation typically includes live oak (*Quercus virginiana*), redbay (*Persea borbonia*), and bluestem (*Andropogon* spp.) species (Stevenson and Griffith 1946, Allen 1952,

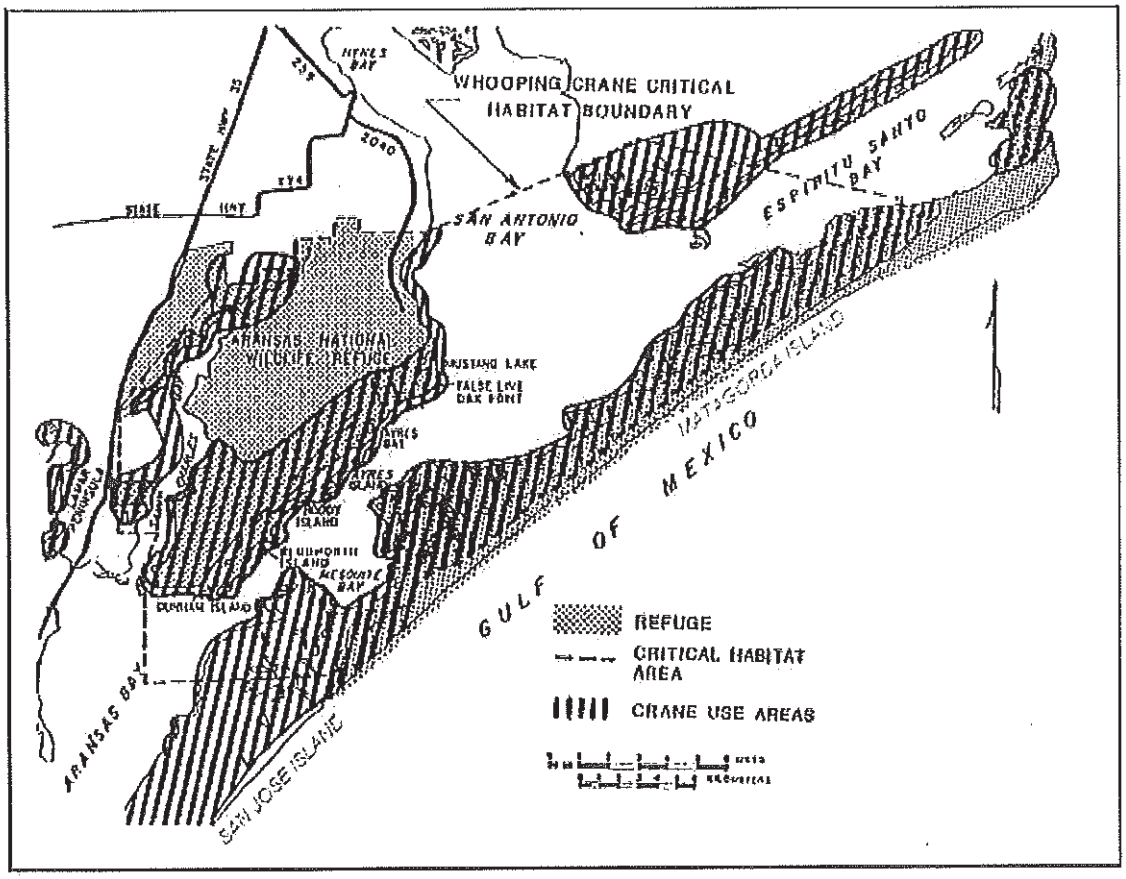


Figure 7. Wintering Area of the Aransas Wood Buffalo Population, Aransas National Wildlife Refuge and Critical Habitat Boundary (43 CFR 20938-20942).

Labuda and Butts 1979). Diets of whooping crane during the wintering season includes: crabs, clams, fish, frogs, acorns and berries (TPWD 2006).

Critical habitat in the United States is defined in the Act as habitat that contains those physical or biological features, essential to conservation of the species, which may require special management considerations or protection. Federal agencies may not fund, authorize, license, permit, or carry out an action that would destroy or adversely modify critical habitat. Primary constituent elements essential for conservation of wintering whooping cranes are those habitat components that support foraging, roosting, and sheltering and the physical features necessary for maintaining the natural processes that support these habitat components (Federal Register 2000). In 1978, critical habitat for migration was designated in the U.S in three states (Fed. Reg. Vol. 43, Number 94). Migration areas, within the U.S., designated as critical habitat are the Platte River bottoms between Lexington and Denman, Nebraska; Cheyenne Bottoms State Waterfowl Management Area and Quivira National Wildlife Refuge, Kansas; and Salt Plains National Wildlife Refuge, Oklahoma.

In Canada, critical habitat is pending and will be officially designated upon publication of a final Canadian Species at Risk Act (SARA) Recovery Strategy or Action Plan on the SARA Public Registry. Proposed critical habitat areas consist of the nesting grounds in and adjacent to WBNP and migration staging and stopover areas in Saskatchewan (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007).

Aransas National Wildlife Refuge and surrounding areas were designated by the Service (43 CFR 20938-20942) as critical wintering grounds for conservation of the species (Figure 7). The critical habitat for Texas as described in the Federal Register is as follows:

> *An area of land, water, and airspace in Aransas, Calhoun, and Refugio Counties with the following boundaries: Beginning at the point where the north boundary of the Aransas National Wildlife Refuge intersects the shore of San Antonio Bay at Webb Point; thence, from this point along a straight line across San Antonio Bay through the westernmost tip of Mosquito Point and inland to a point of intersection with surfaced road; thence eastward along a straight line across Espiritu Santo Bay to the intersection of the bay shore and a road at the east end of Pringle Lake on Matagorda Island; thence sought along this road to the intersection with the main Matagorda Island Road; southwestward along this main road to Cedar Bayou; thence due west across Cedar Bayou, Vinson Slough, and Isla San Jose to Gulf Intracoastal Waterway platform channel number 49 marker No. 25; thence north to the southwest corner of the proclamation boundary into S. Charles Bay to a line drawn as an eastward extension of Twelfth Street on Lamar Peninsula; thence westward along this line*

to intersection with Palmetto Avenue; thence northward along a straight line to the southwest corner of the Aransas National Wildlife Refuge at Texas State Highway 35 and the north shore of Cavasso Creek; thence northeast on a straight line to the corner of the Aransas National Wildlife Refuge north boundary adjacent to triangulation station "Twin"; thence along the north boundary of said refuge to the starting point Webb Point.

Life History

Whooping cranes breed in the wetlands of WBNP in northern Canada and spend winters on the Texas coast at ANWR, Austwell, Calhoun County Texas and surrounding areas. Whooping cranes migrate more than 2,400 miles (3.862 kilometers) a year from northern Canada to the Texas Gulf Coast (Figure 8) and begin their fall migration south to Texas in mid-September and begin the spring migration north to Canada in late March or early April (TPWD 2006). Typically whooping wintering season is considered to be from October 15 to April 15 along the Texas coast. Whooping cranes mate for life, but if one dies the other will accept a new mate. These cranes can live up to 24 years in the wild (TPWD 2006), however; current estimates suggest a maximum longevity in the wild of at least 30 years (Mirande et al. 1993). Mated pairs share the duties of brooding; either the female or the male is always on the nest. Usually only one chick from the brood survives. Chicks may leave the nests while quite young, but they are protected and fed by their parents. Juveniles will stay with their parents usually at or near the end of the spring migration which begins in April or early May (TPWD 2006). The sub-adults travel together, but cranes live in families made up of the parents and 1 or 2 offspring. Wintering whooping cranes perform courtship displays (wing flapping, calling, and leaps) during the spring prior to migrating to their breeding grounds (TPWD 2006).

Fossilized remains of the whooping crane date back about 1.8 million years. Evidence from the Pleistocene Epoch shows that whooping cranes extended from central Canada and from Utah to the Atlantic coast (International Crane Foundation, November 16, 2005). The only remaining self-sustaining flock of whooping cranes breeds in Wood Buffalo National Park in the Northwest Territories, Canada and winters in Aransas National Wildlife Refuge in Texas. The population migrates during both spring and fall through a relatively narrow corridor between Aransas and Wood Buffalo. The migration corridor basically follows a straight line, with the cranes traveling through A 200 miles wide as cranes are pushed east or west by unfavorable winds, and to Mexico, Nebraska, Kansas, Oklahoma and Texas. The primary migration corridor can be over occasionally have been documented in Minnesota, Iowa, Missouri, and one bird over Illinois. They migrate primarily during daylight hours, relying heavily on tailwinds and thermal currents to aid their flight. They stop nightly to roost in shallow wetlands and may fly out from wetlands during the day to feed in agricultural fields. If weather is unfavorable for migration, the cranes will stay in place for multiple days until conditions

improve. Whooping cranes can travel between 200-400 miles a day, as high as 6,200 feet in the air, and can glide downward at speed of as much as 62 mph. Whooping

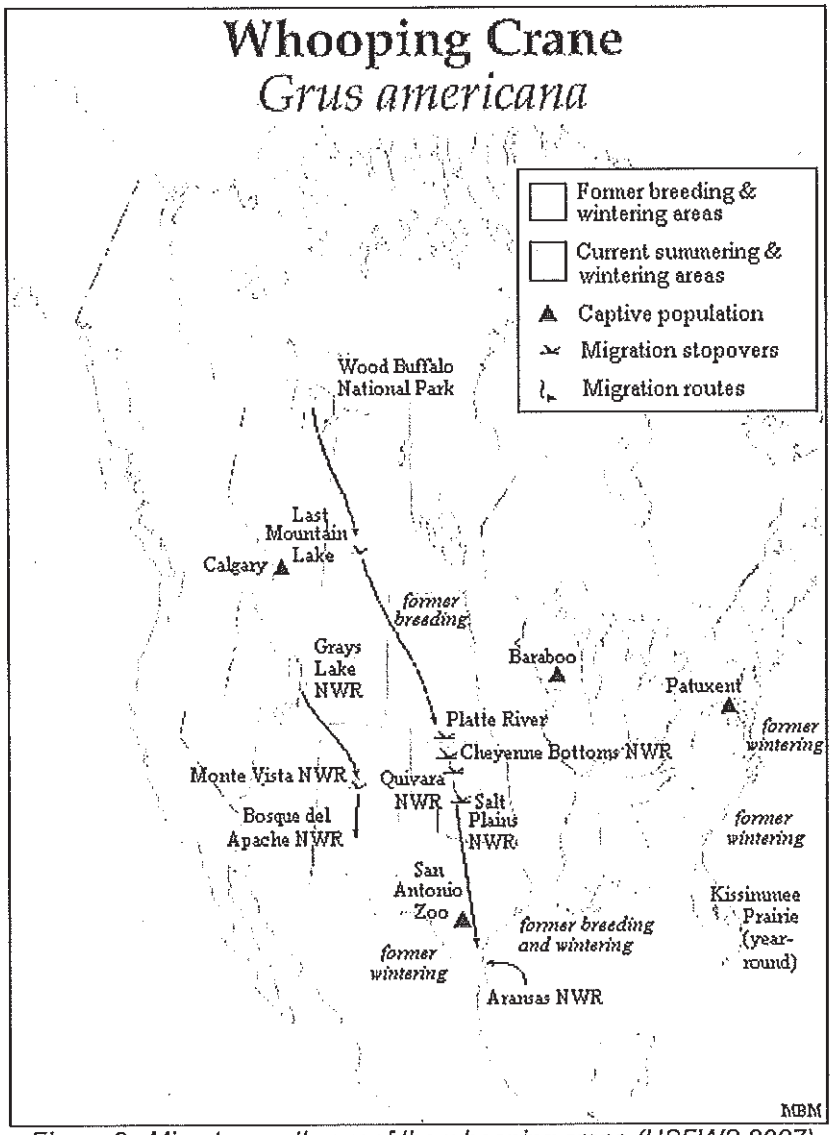


Figure 8: Migratory pathway of the whooping crane (USFWS 2007).

cranes migrate as singles, pairs, in family groups, or as small flocks of 3 to 5 birds. Alberta, Saskatchewan, extreme eastern Montana, North Dakota, South Dakota,

Large groups of up to 20 sometimes use the same stopover location (USFWS 2007a). In winter, whooping cranes establish distinct territories that are used year after year, which include shallow bays, salt marsh, sandflats, upland habitats, and sources of freshwater. Each whooping crane territory must have access to all of these habitats or else the territory becomes unsuitable to support crane use. Adult whooping cranes remain within their territories most of the time, but must leave the territory to seek out fresh water to drink when marsh salinities exceed 23 parts per thousand (ppt). Usually use of fresh water in upland swales, dugouts, or at windmills in upland areas occurs

when salinities exceed 18 ppt (Stehn 2011). Whooping cranes will leave their territories to forage on upland areas, especially following prescribed fire or when a food source on the uplands is particularly abundant. As mentioned previously, cranes will make daily flights up to 5 miles to utilize freshwater sources and areas after they have been burned (Stehn, personal communication 2006). They are omnivorous eating insects, minnows, crabs, clams, crayfish, frogs, rodents, small birds and berries. When foods in the salt marsh are scarce, particularly in winters when blue crab populations are low, they range more widely to nearby uplands where they presumably are foraging on acorns, berries, insects, rodents and snakes. During winters of drought with high salinities cranes must have ready access to upland areas. Whooping cranes will normally utilize uplands and freshwater sources closest to their salt marsh territories. The availability of these upland habitats is an essential element of any territory. Without such upland areas, their adjacent salt marsh territories in certain winters would not be able to support as many whooping cranes (Stehn 2006, Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007).

Population dynamics

In the mid 1800's, as many as 1,400 whooping cranes migrated across North America, however; by the late 1930s, the ANWR population had declined to 18 birds. Since then the population has slowly increased due to conservation efforts, by 1986 the population reached 110 birds, and 18 years later the population had reached 217 (CWS and USFWS 2007). Today the ANWR population, in spring 2011, is estimated to be 279 (Stehn 2011). Four geographically distinct populations exist: migratory populations moving between Canada and Texas and between Wisconsin and Florida on or near ANWR, and non-migratory flocks in the Kissimmee Prairie of Florida and in southwestern Louisiana. In total, 407 wild whooping cranes are known to be in existence, with an additional 158 whooping cranes held in captivity (Stehn, personal communication, 2011.

The long-term recruitment rate of the whooping crane is 13.9% which is the highest of any other crane population in North America (Drewien et al. 1995). Since the late 1930's, the whooping crane population has been increasing at an average annual rate of more than 4% (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). Studies indicate that the whooping crane has a 10-year cycle in survivorship and has been correlated with that of boreal forest predator cycles by some researchers (Boyce and Miller 1985, Boyce 1987, Nedelman et al. 1987, Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). For example, the whooping crane population increased from 75 to a high of 146 birds from 1983 to 1989, and then dropped to a 10-year low of 132 individuals in the winter of 1991-1992 (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007).

Current estimates suggest a maximum longevity in the wild of at least 30 years (Mirande et al., 1993). Whooping cranes do not reach sexual maturity until they are at least 3 years of age, and the average age of first egg production is 5 years (Kuyt and Goossen, 1987). Delayed sexual maturity, small clutch size, and low recruitment rate preclude rapid population recovery (USFWS 2007a). Whooping cranes generally nest annually, but may skip a season when nesting habitat conditions are unsuitable, for instance if they are nutritionally stressed. Whooping cranes usually lay two eggs in late April to mid-May, with hatching occurring about one month later. The current northern breeding grounds have an ice-free season that is only 4 months long. During that time, crane pairs must incubate their eggs for 29-31 days, and rear their chicks to flight age in 3 months; therefore, cranes rarely have time to lay a second clutch and fledge the young. Survival is usually limited to one nestling.

Status and distribution

Reason for Listing:

Whooping cranes are the rarest of the 15 species of cranes in the world (Ricketts et al., 2005). It has been estimated that over 10,000 whooping cranes were present in pre-colonial times prior to extensive human expansion and alteration of wetland habitats. Historically, growth of human populations in North America resulted in significant whooping crane habitat alteration and destruction. Whooping cranes declined or disappeared as agriculture claimed the northern Great Plains of the U.S. and Canada and destroyed wetland habitats (Allen 1952). Conversion of potholes and prairie to hay and grain production made much of the historic nesting and migration habitat unsuitable for whooping cranes. (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). Disruptive practices included draining, fencing, sowing, and the human activity associated with these actions. The shooting of hundreds of whooping cranes was documented by Allen (1952). By the mid-1900s, only one small nesting population survived in the wilderness in Wood Buffalo National Park. The species declined to an all-time low of just 15 birds in the Aransas-Wood Buffalo Population (AWBP) in 1941 (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007, Stehn 2006).

The Whooping Crane Recovery Plan (2007) lists the following as current threats and reasons for listing: human settlement/development, insufficient freshwater inflows, shooting, disturbance, disease/parasites, predation, food availability/sibling aggression, severe weather, loss of genetic diversity, climate change, red tide, chemical spills, collisions with power lines, fences, and other structures, collisions with aircraft and pesticides.

Range-wide trend

The present form of the whooping crane appears to be the same as fossilized remains from the Upper Pliocene in Idaho (Miller 1944, Feduccia 1967), and from the Pleistocene in California, Kansas, and Florida (Wetmore 1931, 1956). The historical range extended from the Arctic coast south to central Mexico, and from Utah east to

New Jersey, South Carolina, Georgia, and Florida (Allen 1952, Nesbitt 1982). Distribution of these fossil remains suggests a wider whooping crane distribution during the Pleistocene.

The major nesting area during the 19th and 20th centuries extended from Illinois, Iowa, Minnesota, and North Dakota to southwestern Manitoba, Saskatchewan and into east central Alberta. Some nesting apparently occurred at other sites such as Wyoming in the 1900's, but documentation is limited (Allen 1952). Allen (1952) believed the whooping cranes' principal wintering range was the tall grass prairies, in Louisiana, along the coast of Texas, and near the Rio Grande Delta in Mexico. Other significant wintering areas were the interior tablelands in west Texas and the high plateaus of central Mexico, where whooping cranes occurred among thousands of sandhill cranes (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007).

Whooping cranes currently exist in the wild at four locations and in captivity at thirteen facilities. In July 2011, the total whooping crane population in the wild was estimated at 407 individuals, an increase of about 29.2% in a little over seven years (315 were recorded in December, 2003). This includes 279 individuals in the only self-sustaining wild flock from AWBP, 20 captive-raised individuals released in an effort to establish a non-migratory Florida Population (FP); 101 individuals introduced starting in 2001 that migrate between Wisconsin and Florida in an eastern migratory population (EMP), and 7 captive-raised birds surviving from an initial release of 10 birds at White lake, Louisiana in February, 2011. The July 2010 captive population of whooping cranes contained 152 birds, an increase of about 21.7% in seven years (119 were reported in December 2003) with annual hatchling production from the Calgary Zoo, International Crane Foundation, Patuxent Wildlife Research Center (PWRC), Species Survival Center and the San Antonio Zoo. The total population, wild and captive, in July 2010 was 535 individual birds (USFWS 2011). Currently, 75 nests have been reported for the 2011 breeding season.

Four projects to re-introduce whooping cranes into the wild show increased promise but to date remain unsuccessful in establishing a self-sustaining population. From 1975-1989, whooping cranes cross-fostered at Grays Lake NWR, Idaho by placing whooping crane eggs into sandhill nests failed to pair up and breed due to an apparent imprinting problem. Captive-raised whooping cranes placed in Florida from 1993-2005 suffered high mortality and low productivity and continuing habitat loss and efforts to establish this non-migratory flock were discontinued. Starting in 2001, captive-raised whooping cranes were placed at Necedah NWR in central Wisconsin and taught a migration to Florida by following ultra light aircraft. Mortality for this project has been reasonable, but production has been extremely low. The cranes are pairing up and nesting, but are abandoning their nests believed due to swarms of biting black flies. Efforts are being made to move the reintroduction into other parts of Wisconsin where black flies are less prevalent. In 2011, 10 captive-raised whooping cranes were re-introduced to White Lake, Louisiana where a wild non-migratory flock had existed up until 1950. Because none of these reintroductions have established a self-sustaining population of 25 nesting pairs, an objective stated in the Recovery Plan, it is imperative that efforts be maximized to increase the size of the AWBP (Stehn, personal communication, 2011).

Whooping cranes are currently listed as endangered (32 FR 4001, 1967 March 11) except where nonessential experimental populations exist (66 FR 33903-33917, 2001 June 26; 62 FR 38932-38939, 1997 July 21; and 58 FR 5647-5658, 1993 January 22; 76 FR 6066 6082, 2011 February 3) in 18 eastern states including the reintroduced population that migrates between Wisconsin and Florida. Critical Habitat was designated in 1978 in the U.S Federal Register (Vol. 43, Number 94) at 5 sites in 4 states. In the U.S., the whooping crane was listed as Threatened with extinction in 1967 (Fed. Reg. Vol. 32, Number 48, March 11), and as Endangered in 1970 (Fed. Reg. Vol. 35, Number 199, October 13). Both of these listings were "grandfathered" into the Act (U.S.C., 1531-1 543; 87 Stat. 884), which resulted in establishing the U.S. Whooping Crane Recovery Team and facilitated further conservation actions on behalf of the species. In Canada, the whooping crane was designated as endangered in 1978 by the Committee on the Status of Endangered Wildlife in Canada and listed as endangered under the SARA in 2003 (USFWS 2006).

For the whooping crane (*Grus americana*) to be reclassified to threatened (downlisted), the March 2007 International Recovery Plan for the Whooping Crane *(Grus americana)* has set forth 2 primary objectives and measurable criteria that would have to be met. The first objective involves establishing and maintaining, for at least ten years prior to downlisting, self-sustaining populations of whooping cranes in the wild while the second objective involves maintaining a genetically stable captive population. If additional wild sustaining populations are not established, then the AWBP must remain above 1,000 individuals (250 productive pairs) for downlisting to occur. During the 2010 to 2011 wintering season, 283 whooping cranes were verified in the Texas wintering area.

New Threats:

Many future threats to this species' continued existence, both natural and human-related, are present impacting summer, migration, and winter habitats. Threats mentioned in this section and/or listed in the Recovery Plan include loss of habitat, water diversions in rivers degrading habitat, reduced inflows to wintering area, erosion of winter habitat, increased development of shorelines and wetlands, collisions with power lines, fences, cell towers and wind turbines, collisions with aircraft, chemical spills, loss of genetics, disease, red tide, pesticides, increased human recreational pressures, increased human and domestic animal disturbance, shootings, sea level rise, climate change, and greater establishment of black mangrove (a plant) into the winter range. The young chicks also face many hazards including predation, disease and sibling aggression (Stehn 2006).

Whooping cranes are faced with various natural obstacles and problems during their annual 2,400 mile migration. Snow and hail storms, low temperatures, and drought can present navigational handicaps or reduce food availability. Migrating cranes are also exposed to a variety of physical hazards such as collision with obstructions such as power lines, predation of young cranes by Bobcats (*Lynx rufus*), disease, and illegal

shootings (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). Collisions with power lines have accounted for the death or serious injury of at least 49 whooping cranes since 1956 (Stehn, personal communication, 2011. Hurricanes and drought can also create problems on the wintering grounds. The active portion of the hurricane season usually ends by October 31, before most whooping cranes arrive. A late season hurricane could place the cranes at risk due to high wind velocities and storm surge. Drought also influences availability and abundance of the natural food supply by altering salinity of tidal basins and estuaries, and the cranes are forced to move to less than optimal uplands to forage for food and find freshwater (Blankinship 1976).

Currently, expanding human populations throughout the range of the whooping cranes continue to threaten survival and recovery of the birds. Impacts are particularly severe on the winter grounds. A major threat to the whooping crane is the decrease in the suitability of the species' habitat due to accelerating development within and adjacent to the designated critical habitat in Texas. In addition, human population growth along the United States coast creates an ever increasing demand for recreation in wetlands and tidal areas for fishing, crabbing, boating, and hunting.

Freshwater inflows starting hundreds of miles inland primarily from the Guadalupe and San Antonio rivers that flow into whooping crane critical habitat at ANWR are needed to maintain the proper salinity gradients, nutrient loadings, and sediments that produce an ecologically healthy estuary (TPWD 1998). Inflows are essential to maintain the productivity of coastal waters and produce foods used by the whooping cranes. Coastal water with low saline levels that whooping cranes can drink rather than fly inland for freshwater are maintained by these freshwater in-stream flows. Upstream reservoir construction and water diversions for agriculture and human use reduce these inflows. In a report entitled *Bays in Peril,* a "Danger" ranking was given to San Antonio Bay because drought periods were predicted to increase by 250%, and years with low freshwater pulses in the spring were calculated to increase 26% from naturalized levels (National Wildlife Federation 2004). TPWD has made recommendations for target inflows needed to maintain the unique biological communities of the Guadalupe River estuary (TPWD 1998) that flows into whooping crane critical habitat. A simple inverse relationship exists between blue crab catch rates and mean salinity within an estuary (Longley 1994). By 2040, due to constructed diversions, a decrease of freshwater inflows into the crane's winter range is projected in an average year to cause an 8% decline in blue crab populations, the primary food of the whooping crane (Texas Department of Water Resources 1980). Inflows are already presumed to be insufficient and significantly reduced over historic levels. With projected losses, freshwater inflows would be insufficient to sustain the ecosystem in an average rainfall year. Long before the ecosystem collapsed for lack of inflows, significant adverse impacts to the primary winter food supply of the whooping crane would occur (Kretzschmar 1990). Texas Water Development Board data indicate natural droughts already threaten the Guadalupe ecosystem. Withdrawals of surface and groundwater for municipal and industrial growth will leave insufficient inflows to sustain the ecosystem in less than 50 years. The state water plan proposes a diversion at the mouth of the Guadalupe River, pumping at least 94,500 acre-feet annually back to San Antonio for municipal use

(Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). Recently, a nuclear power plant has been proposed near Victoria, Texas, which also may divert freshwater resources and the need to discharge contaminants that could affect whooping crane habitat quality.

Commercial vessels carrying dangerous, toxic chemicals travel the GIWW daily through the heart of whooping crane winter habitat. A spill or leak of these substances could contaminate or kill the cranes' food supply, or poison the cranes (Robertson et al. 1993). Spills that occur in summer, when whooping cranes are absent, could adversely affect survival by reducing productivity of the environment or leaving a toxic residue. Gulf Engineers and Consultants, Inc. (1992, as cited by Canadian Wildlife Service and U.S. Fish and Wildlife Service 2005) assessed threats to the whooping crane and its habitat from spills of vessel fuels and cargoes. They concluded that the hazard of spill exists, but the probability of occurrence is low. Catastrophic events such as a large spill are infrequent, and therefore, difficult to predict. It is impossible to provide full protection for the cranes as long as chemicals are transported on the GIWW through the heart of winter range. Spills of hazardous chemicals may limit human approach to only those personnel wearing special protective suits, and breathing apparatus. Also, an event could occur at night or in bad weather and further slow response. Spill of gaseous materials could directly impact any cranes downwind. High winds greatly reduce the effectiveness of containment booms for products floating on the surface. If crane habitat becomes contaminated, attempts would be made to haze cranes, away from the spill area and to capture individuals that become seriously contaminated (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). However, the response of whooping cranes to spilled materials, and to humans trying to haze the cranes away, is currently unknown. Adult cranes are territorial; therefore, it is likely not possible to haze them from their large territories. Oiled cranes would be captured when possible and cleaned, although wild cranes are very difficult to capture and susceptible to death from capture myopathy, especially when young. The only self-sustaining wild population remains vulnerable to destruction through a hurricane event or contaminant spill, due to oil and gas activity and transportation of chemical and petroleum products in critical habitat areas and through other areas utilized by of wintering whooping cranes (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007, Stehn 2006).

Global climate change may have numerous impacts to whooping cranes throughout the year (Chavez-Ramirez and Wehtje, In Press). The water regime of WBNP may be severely affected, with potentially severe impacts on whooping crane reproduction (Stehn 2006). Permanently lowered water tables, for example, would shrink wetlands, reduce the availability of quality nesting sites, reduce invertebrate food availability, and allow predators to access nests and young. A drying trend forecast for the Great Plains may reduce and degrade the amount of migration habitat available. At ANWR, the predicted warmer winters may allow black mangrove to extend its range northward into the crane area, shading out desirable crane forage plants including Carolina wolfberry (*Lycium caolinianum*). On the wintering area, a reduction in rainfall would reduce

inflows and reduce the blue crab population that is the cranes' primarily source of prey. Sea level rise combined with land subsidence are projected to be about 17 inches on the Texas coast over the next 100 years (Twilley et al. 2001, as cited by Canadian Wildlife Service and U.S. Fish and Wildlife Service 2005). This would reduce suitability of salt marsh and open water areas, making much of the present acreage too deep for use by whooping cranes (Stehn, personal communication 2006).

A catastrophic event could eliminate the wild, self-sustaining AWBP because this population is characterized by low numbers of individuals, slow reproductive potential, and limited genetic diversity. Therefore, the recovery strategy as stated in the Recovery Plan includes protection and enhancement of the breeding, migration, and wintering habitat to allow the AWBP wild flock to grow and reach ecological and genetic stability (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). The numerical population criteria for the species (1000 individuals) can only be achieved if threats to the species' existence are sufficiently reduced or removed (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007).

The Recovery Plan (2007) calls for evaluation of the need to expand critical habitat boundaries at ANWR and within the migration corridor to ensure protection of all important U.S. whooping crane habitats. Expanding the current area designated as critical habitat would be logical in the U.S, especially at ANWR and its vicinity where 8 crane distinct territories were located outside designated critical habitat in the winter of 2004-05 (Stehn 2006).

Analysis of whooping cranes /critical habitat likely to be affected

The main project site is located in Aransas County on the Lamar Peninsula, which is approximately 5 miles north of Rockport, Texas. The Project Site is bounded to the north by Main Street, to the west by Palmetto Street, to the east by St. Charles Bay and to the south by Aransas Bay. Goose Island State Park is west of the project site. Portions of the Project Site have historically been utilized for cattle grazing (USACE 2011).

The 121-acre site contains estuarine and freshwater wetlands as well as upland habitats. Estuarine wetland vegetation includes saltmarsh cordgrass, gulf cordgrass, keygrass (*Monanthochloe littoralis*) and other associated species. The freshwater wetland vegetation includes Drummond's rattlebush (*Sesbania drummondii*), sand spikerush (*Eleocharis montevidensis*), square-stem spikerush (*Eleocharis quadrangulata*) and other associated species. The upland areas contain cleared grasslands utilized for grazing with patches of live oak, mesquite, and hackberry trees. Upland pasture vegetation includes mesquite (*Prosopis glandulosa*), little bluestem (*Schizachryium scoparium*), Bermuda grass (*Cynodon dactylon*) and other associated species. Upland scrub/shrub vegetation includes mesquite, live oak, yaupon (*Ilex vomitoria*) with associated species (USACE 2011). Impacts to designated whooping crane critical habitat will not result at the canal housing construction site which is nearby but not within the canal subdivision footprint. Direct impacts to whooping crane habitat

are anticipated. Direct impacts include the removal of 122.7 acres (49.65 hectares) of uplands, 0.08 acres (0.032 hectare) of estuarine wetlands, and 14.61 acres (5.9 hectares) of non-tidal seasonal wetlands.

At the Falcon Point Ranch mitigation site, 165 acres (66.77 hectares) of uplands within critical habitat will be preserved through a conservation easement that will provide a beneficial effect. Additionally, 14.61 acres (5.9 hectares) of wetland swales will be enhanced to provide palustrine wetlands just south of the 165-acre (66.77-hectare) upland easement. These wetlands are also within critical habitat; therefore, a short-term adverse impact to the habitat is anticipated until the enhancements meet success criteria, at which time these enhancements will provide a benefit to the species and the critical habitat. Sources of freshwater, such as solar-powered windmill water pumps) are also proposed at both Falcon Point mitigation sites should the need arise to keep seasonal freshwater available especially in severe drought conditions.

At the Big Tree Ranch mitigation site, approximately 82 acres of uplands and wetland fringe would be acquired by TPWD and could be enhanced in the future. The area is presently degraded but the northern edge of the property is within critical habitat and is adjacent to other whooping crane conservation easements and the ANWR property. Acquisition of this property by TPWD with the goal of managing the area for whooping crane recovery in perpetuity would have a beneficial effect on whooping crane habitat and critical habitat.

Direct and indirect impacts due the project construction, maintenance and use as a residential facility are anticipated to be diverse and adverse, and are discussed below.

Environmental Baseline

Under section 7(a)(2) of the Act, when considering the effects of an action on Federally-listed species, The Service is required to take into consideration the environmental baseline. The environmental baseline includes past and ongoing natural factors and the past and present impacts of all Federal, State, or private actions and other human activities in the action area, including Federal projects in the action area that have already undergone section 7 consultation and the impacts of State or private actions that are contemporaneous with the consultation in process (50 CFR § 402.02).

The March 2007 International Recovery Plan for the Whooping Crane *(Grus americana)* sets forth 2 primary objectives and measurable criteria that will allow the species to be reclassified to threatened (downlisted). Delisting criteria have not yet been established. Objective 1 involves establishing and maintaining, for at least ten years prior to downlisting, self-sustaining populations of whooping cranes in the wild while Objective 2 involves maintaining a genetically stable captive population (153 cranes). Objective 1 population targets call for maintaining at least 160 whooping cranes (40 productive pairs) in the Aransas-Wood Buffalo Population (AWBP), establishing a minimum of 100 (25 productive pairs) in self-sustaining populations at both the Florida non-migratory population and the eastern migratory population. Alternately, if only one additional wild

self-sustaining population is re-established (such as the new Louisiana experimental population) then the AWBP must reach 400 individuals (100 productive pairs) and the new population must remain above 120 individuals (30 productive pairs). Both populations would have to be self-sustaining for 10 years at the designated levels before downlisting would occur. If the establishment of the 2nd and 3rd wild self-sustaining populations is not successful, then the AWBP must remain above 1,000 individuals (250 productive pairs) for downlisting to occur.

Status of the species and critical habitat within the action area

The ANWR located in Aransas, Calhoun, and Refugio counties is the wintering home of the last remaining wild migratory flock of whooping cranes. Their winter range includes the Aransas and Matagorda Island refuges and surrounding areas and stretches over 35 miles along the Texas coast (USFWS-ANWR, 2005).

In 2006, the AWBP population had grown to approximately 220 (72 FR 29544, May 29, 2007). As of February 1, 2011, through the implementation of the Endangered Species Act, aggressive conservation efforts, and preservation of habitat, the migratory AWBP whooping crane population consists of approximately 283 birds total. With 75 active nests in the 2011 summer on the breeding grounds, population estimates for the wintering grounds may reach 300 in Fall of 2011 (Stehn, 2011).

Service personnel at the ANWR conduct periodic aerial surveys sometimes as often as weekly between October and April in an attempt to determine total flock size, document presence of territories, note general habitat use, and look for mortality. These flights serve to alert the Service to hazards or harassment of cranes resulting from human activity (Stehn 2006). The Service granted the applicant's request for survey data on October 26, 2007 and those findings are described below. The wintering whooping crane range in the last 10 years has included the proposed project site. From the period of 1997 to 2011, the USFWS reports sightings of whooping cranes on over 17 occasions on the former Cabiness Ranch, and within the canal housing project site. Of those sightings, 13 occurred within the 15.01-acre wetland east to be preserved of the Project.

Whooping crane sightings in the Falcon Point/Welder Flats area are more numerous and consistent. Although, a whooping crane has not been sighted in the proposed conservation easement and wetland mitigation areas, cranes are yearly and regularly sighted during the wintering season south, east, west, and on occasion north of the proposed sites.

Whooping cranes are also sighted yearly and regularly during the wintering season in the vicinity of Big Tree Ranch, specifically on the conservation easement just north and east of the ranch property line and nearby marshes on the Lamar Unit of the ANWR.

To date, only one Biological Opinion with an incidental take permit has been issued by the Service in whooping crane wintering grounds. In that BO, a take through harassment of 2 adults and one chick was issued as well as the direct loss of 226.82

acres (91.79 hectares) of whooping crane habitat. Formal consultation with the USACE for indirect effects of erosion associated with the existence of the GIWW and the Channel to Victoria, Victoria County, Texas, and upon critical habitat was conducted in 1989 (Consultation Number 2-11-89-F-77). That BO concluded that the operation and maintenance of the GIWW resulted in destruction and adverse modification of whooping crane critical habitat and was likely to jeopardize the continued existence of the whooping crane. This conclusion was justified at the time due to the appreciably reduced survivability of whooping cranes because of the obvious and ongoing and significant reduction in the carrying capacity of the wintering area. The action also interfered with the crane's social, feeding, and reproductive behaviors, as well as making cranes significantly more vulnerable to environmental hazards. At the time the BO was finalized, over 200 acres of whooping crane critical habitat had been lost due to erosion along the GIWW. As an outcome, Reasonable and Prudent Alternatives were reached and implemented, therein eliminating the likelihood of jeopardy or adverse modification. Erosion control methods were instituted such as the placement of concrete mats along the shoreline of the GIWW (approximately 15.9 miles in total, primarily in Aransas County and 5.1 miles in the Falcon Point/Welder Flats area). A later study determined that 2,078 total acres have been lost due to habitat modification and/or erosion. Losses prior to the placement of concrete mats along the GIWW from 1998-2000 have been calculated at about 2.5-4 acres per year, mostly on the mainland side of the channel (USACE 2006). Even with the erosion control methods, erosion and ongoing traffic along and within the GIWW continue to affect the species and the habitat within the action area (Stehn 2006).

The proposed project will directly affect occupied habitat for the whooping crane. This includes direct loss of 0.08 acres of estuarine wetlands and 14.61 acres (5.9 hectares) of non-tidal seasonal wetlands that will be part of project construction. Additionally the 9.2-acre (3.7-hectare) wetland and 15.01-acre (6.07-hectare) wetland that are to be preserved will likely alter from their present state and may have a reduced value as whopping crane habitat. Based on information from the Service, approximately 95.7 acres of uplands that may potentially be used by the whooping crane will also be developed. The applicant is also considering the effects of the 27-acre adjacent existing development in uplands. Upland portions of the project (total of 122.7 acres) will become unusable by whooping cranes either from direct destruction of existing habitat or from disturbance of cranes by human activity. Increased boat traffic along with presence of houses and more residents may reduce whooping crane usage in the existing habitats within the Action Area.

Factors affecting whooping crane environment within the action area

The project will directly and indirectly affect areas of known whooping crane use. On occasions that cranes may use the habitat near the proposed project, construction activities may discourage such use. During residential occupation of the project, human activity and house pets may likewise disrupt crane usage of the immediate area.

Whooping cranes require areas primarily free from human disturbance. If habitats are altered and human disturbance increases, cranes may be unable to utilize an area. Development of wetland and upland habitats will decrease the suitability of whooping crane territories. The development of this project site is part of an increasing trend in and around the Rockport-Fulton area and the larger Texas Gulf Coast. Territories established by wintering whooping cranes contain a variety of habitats, including both wetland and upland and by necessity must contain highly productive areas to sustain the foraging cranes within the territory. Human-induced disturbance factors, as listed in the March 2007 Whooping Crane Recovery Plan, include whooping crane tour boats, boat and barge traffic along the GIWW, recreation and commercial traffic (including hunting, crabbing, and oystering), photographers, people on foot, and aerial overflights which may have limited adverse effects on whooping cranes. Also noted in the Recovery Plan, cranes are somewhat tolerant of people in **carefully** operated boats and land vehicles. Airboat activity will cause direct harassment and significant disturbance in behavior pattern.

Increased boat traffic from residents living in the proposed development going through the proposed entrance channels to the surrounding bays may reduce whooping crane usage in the adjacent preserved estuarine wetlands. Increased human population due to occupation of housing in the project area may increase demand for cell towers in the action area. Guy wires associated with telecommunication towers (radio, television, cellular, and microwave) present another collision obstacle to cranes. Such towers have been increasing nationally at an estimated 6 to 8% annually.

Hunting of whooping cranes was clearly one of the primary reasons for the whooping cranes' historical decline. Although hunting whooping cranes is no longer legal, shooting occasionally occurs (Lewis et al. 1992). Four documented shooting of AWBP whooping cranes occurred during migration or on wintering grounds from 1968-1991. One whooping crane was shot by a snow goose hunter in 1968 just north of the ANWR boundary; another was shot, reportedly mistaken for a snow goose, along the bay edge of San Jose Island in January 1989. A total of 12 documented shootings of whooping cranes in North America have occurred in the last 17 years (1989-2005). Other unexplained losses may also be due to shootings (USFWS Consultation No. 2-11-06-F-0024, 2006). The proposed subdivision is in the vicinity of prime waterfowl hunting areas. Residents of the subdivision may increase hunting pressure in the St. Charles Bay area possibly causing disturbance to the cranes.

Oil and gas activities effect the species and the habitat within the action area. These activities include the construction of drilling platforms, drilling and maintenance of wells, installation of flowlines and pipelines, and transportation of products. Within the last 5 years, the Service has reviewed approximately 6 USACE permit applications for oil and gas activities within and surrounding the action area. Additional Nationwide permits may have been issued during this time without Service review of the project specific locations. These activities can result in clearing of habitat, noise from drilling activities and automotive and vessel traffic, as well as, the potential for a gas release or oil spill. Generally, the recommendation is made by the Service and required by the USACE that

these operations are conducted outside the wintering season of the cranes, and that permanent structures do not exceed 15 feet (4.57 meters) in height. Potential drilling on the 2-acre (0:8 hectare) site set aside for the subsurface mineral rights owner could produce noise at decibel levels that would haze whooping cranes from 1800-foot (549 meters) radius around the drilling site.

The action area is also being affected by development pressure. On the west side of the Lamar peninsula, approximately 800 acres of Shell Point Ranch is being proposed for development, and the potential for Big Tree Ranch to be purchased by developers exists. At Falcon Point, a residential canal development is being proposed, a portion of which is within the critical habitat area. Development can and/or does contribute to the increase in human disturbances, vessel traffic and loss of habitat in the action area.

IV. Effects of the Action

The proposed action has the potential to adversely affect whooping cranes within the proposed project area. The proposed project will have short term direct impacts to "designated critical habitat"; however, the long term effects to "critical habitat" are anticipated to be beneficial.

a. Factors to be considered

Factors that were considered in analyses of effects of the proposed action on whooping cranes included, but were not be limited to, the proximity of the proposed project to other whooping crane habitat including designated critical habitat, the distribution of whooping cranes in the project area, timing of different project components, and the duration of each effect.

b. Analysis for effect of the action.

Beneficial Effects

The applicant Hal Jones Development, LCC, has proposed to provide a 165- acre (66.77- hectare) conservation easement and enhance wetlands (14.62 acres; 5.9 hectares) including sources of freshwater at Falcon Point Ranch, southeast of Seadrift, Calhoun County, Texas. This portion of the project area is located within critical habitat designated for the endangered whooping crane (Figure 2, USACE 2011).

The applicant has provided a donation of 9.2 acres (3.72 hectares) of land adjacent to the Project to Texas Parks and Wildlife Department (TPWD) to use as non-federal, matching resources in order to purchase the 82-acre (32.783- hectare) Big Tree Ranch, just north of the project area, adjacent to St. Charles Bay, Lamar, Aransas County, Texas. A portion of Big Tree Ranch is partially located within critical habitat designated for the endangered whooping crane (Figure 3, USACE 2011).

Additionally, the applicant proposes to preserve the 15.01 acres (6.074 hectares) wetlands adjacent to "The Boardwalk" in perpetuity. Impacts from the previous construction and eventually building of residential homes, storm water drainage, etc..., may indirectly impact the present condition of the wetland so the beneficial effect may be impaired.

Direct Effects

The project would directly remove 122.7 acres (49.65 hectares) of upland whooping crane habitat. Approximately 540,000 cubic yards (412,859 cubic meters) of primarily sand based material will be mechanically excavated above the Annual High Tide line to build the Project. This material will be placed onsite and used as fill material for the proposed residential lots and streets. Canals will have a minimum bottom width of approximately 100-feet at a depth of approximately -4.7 feet (-1.43 meters) MLLW. The project will also consist of a 100-foot-wide (30.48-meter-wide) entrance channel for access to St. Charles Bay and a second 100-foot-wide (30.48-meter-wide) entrance channel for access to Aransas Bay. Canals would not provide habitat for whooping cranes. The Project would directly remove 22.73 acres (9.2 hectares) of "waters of the United States" ("jurisdictional" waters or areas), including approximately 0.08 acre (0.032 hectare) of tidally-influenced estuarine wetlands (0.01 acre (0.004 hectare) of fill and 0.07 acre (0.028 hectare) of excavation), 14.61 acres (5.9 hectares) of non-tidal palustrine wetlands (10.34 acres (4.18 hectares) of fill and 4.27 acres (1.73 hectares) of excavation), 1.92 acres (0.776 hectare) of shoalgrass, (0.12 acre (0.048 hectare) of fill and 1.80 acres (0.728 hectare) of excavation), and 0.0013 acre (0.0005 hectare) of oyster reefs. Approximately 6.12 acres (2.476 hectares) of jurisdictional unvegetated bay bottom will also be impacted by excavation.

Indirect Effects

Human disturbance

The project may also indirectly affect areas of known whooping crane use. On occasion cranes may use habitat near the proposed project and construction activities will discourage such use. During occupation of the project area, human activity and domesticated pets will also disrupt crane use of the immediate area. Whooping cranes require areas primarily free from human disturbance. The cranes need buffer zones to avoid and minimize effect of human disturbance. Whooping cranes are more subject to disturbance and flush at greater distances when they are in upland habitat, including those areas with sources of freshwater, compared to when they are in saltmarsh or open bay. If the cranes are in the saltmarsh or open bay, approach can sometimes be made within 328.1 feet (100 meters) before the cranes flush or start moving away. On the wintering grounds, disturbance has been documented at distances of as much as 1804.5 feet or 550 meters (Lewis draft file report, as cited by Stehn 2006). At the other extreme, whooping cranes can get acclimated to the presence of humans and may occasionally be as close as 82 feet (25 meters) from a tour boat, vehicle on a road, or building. These minimal distances of cranes from human disturbance are the exception rather than the rule. Lewis (in preparation) writes that habituation to human disturbance

causes a decrease in vigilance that could make the cranes more susceptible to predation (Stehn 2006).

If habitats are altered and human disturbance increases, cranes may be unable to utilize an area. In addition to safeguarding wetlands, sufficient amounts of upland habitat adjacent to current whooping crane use areas needs to be protected. Whooping cranes are much more wary when using uplands and freshwater sources (Hunt 1987). Whooping cranes will generally flush from an upland area when a vehicle drives past at 984.3 feet or 300 meters (Stehn 2006). Therefore, such areas should be kept free from human disturbance.

Regular observations of foraging whooping cranes have been made within 0.25 mile (0.4 kilometer) of existing homes at the Holiday Beach subdivision on Copano Bay. Additionally, multiple boat tours have offered tourists regular trips for over 20 years from multiple departure points. These boat trips offer guests the opportunity to observe and photograph these rare birds. At times during these tours the boat can approach foraging whooping cranes as close as 150 feet (45.72 meters) for short durations of time (Stehn 2006). Again, these are examples of much lower density, lower intensity and shorter duration impacts to cranes and their habitat than the proposed development.

Increased boat traffic from residents living in the proposed development going through the proposed entrance channels will reduce whooping crane usage in the existing strip of wetlands adjacent to the project. In addition, oil and gas spills may occur due to increased use of the boats and storage of boats in the canal area.

To help reduce impacts of human disturbance, a Home Owners Association (HOA) will be formed for the proposed development. The HOA will enforce deed restrictions which should prohibit the use of airboats at the proposed development, prohibit hunting in adjacent wetlands, and also require a leash law for pets. The HOA will enforce the prohibition of airboats by property owners and their guests at the proposed development. The Homeowners Association will post signs advising of the prohibition on airboats by property owners and their guests at the proposed development and will sue or seek prosecution of homeowners who violated the deed restrictions. Also, adjacent Boardwalk development's deed restrictions will prohibit the use of airboats at that site.

Erosion

The construction of a bulkhead on the edge of wetlands planned for preservation may also impact this strip of salt marsh from reflective wave energy as boats pass, and during severe storm events through erosion.

Collisions with Power Lines, Fences and Cell Towers

Collisions with power lines are a substantial cause of whooping crane mortality in migration (Brown et al. 1987, Lewis et al. 1992). Collisions with power lines are known to have accounted for the death or serious injury of at least 30 whooping cranes since 1956. In the 1980s, 2 of 9 radio-marked whooping cranes from AWBP died within the

first 18 months of life as a result of power line collisions (Kuyt 1992). Of 27 documented mortalities in the RMP, approximately 40% were from collisions with power lines. Eighteen individuals within the Florida populations and two individual in the migratory Wisconsin population have also died in collisions with power lines (Stehn 2006, Canadian Wildlife Service and U.S. Fish and Wildlife Service 2005). Although project plans indicate that utility lines will be placed underground, additional overhead power line construction near entrance roads or to connect to existing lines will increase the potential for collision mortalities in the action area.

Barbed wire fences also are a collision hazard for whooping cranes and in one study 5 whooping cranes were reported to have died from collision with fences. Within the project area, fences that cranes may hit or become entangled in (barbed wire or electric) can contribute to increase probabilities of crane collisions (Stehn 2006).

Guy wires associated with telecommunication towers (radio, television, cellular, and microwave) present another collision obstacle to cranes. Such towers have been increasing at an estimated 6 to 8% annually. Increased population due to occupation of housing in the project area may increase demand for cell towers in the action area.

Contaminants:-Pesticides/Herbicides/Fertilizers:

There is no evidence that current levels of pesticide contamination are a significant threat to whooping cranes. Whooping crane egg and tissue specimens examined for pesticide residues at PWRC have shown concentrations well below those encountered in most other migratory birds (Robinson et al. 1965, Lamont and Reichel 1970, Anderson and Kreitzer 1971, Lewis et al. 1992). Eggshell thickness, a measure of contaminant exposure, has been measured from the 1970s to date in eggs taken from the wild and those in captivity (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). Food items for whooping cranes; however, are exposed to contaminants associated with runoff from agricultural and industrial activities and subjected to risks associated with offshore and onshore gas and oil operations (Lewis et al. 1992, Canadian Wildlife Service and U.S. Fish and Wildlife Service 2005).

Water Quality and Red Tide:

Water quality in open water habitats in the proposed development and adjacent would be directly impacted by the proposed project. Insufficient water circulation, if canal design and alignment are not appropriate, typically leads to low dissolved oxygen problems. Although project plans indicate that some vegetated shallow shelf areas will be constructed within the canal system, and canals have been aligned approximately with prevalent wind direction, water quality problems could still arise. Also, contaminants are typically found in runoff from housing developments and marinas, and would decrease quality of water in the action areas. High ammonia levels from runoff of fertilizers or depleted dissolved oxygen due to lack of vertical mixing could cause fish kills and affect availability and quality of prey for whooping cranes foraging in the action area.

Red tide is a bloom of phytoplankton, a microscopic algae, that historically occurred infrequently on the Texas Coast. Blooms are occurring at a higher incidence, and factors causing the increased number of outbreaks of red tide along the Texas coast are not currently known. A toxin produced by the algae can concentrate in filter-feeding molluscs, including clams. It has been known to cause bird die-offs and could pose a significant threat to whooping cranes that in midwinter feed heavily on clams. Although red tide has been documented in critical habitat in recent years, no severe outbreaks have occurred (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). Potentially, the proposed canal development could serve as an area of red tide concentration, where red tide could develop and move through the adjacent bay systems.

Hunting

Hunting was clearly one of the primary reasons for the whooping crane's historical decline. Allen (1952) recorded 389 whooping cranes known to have died from gunshot or other causes from colonial times to 1948. A decline in human-caused mortality followed enactment of protective legislation. Although hunting whooping cranes is no longer legal, shootings occasionally occur (Lewis et al. 1992). Four documented shootings of AWBP whooping cranes occurred during migration or on wintering grounds from 1968-1991. One whooping crane was shot by a snow goose hunter in 1968 just north of the ANWR boundary; another was shot, reportedly mistaken for a snow goose, along the bay edge of San Jose Island in January 1989. A vandal shot an adult in Saskatchewan in April 1990, and another vandal shot an adult female in April 1991 as she migrated through Texas. Vandals shot 3 whooping cranes in Florida in 1999 and 2000. The most recently documented loss associated with hunting was an adult female shot in migration near Ennis, Texas in November 2003, and 2 (possibly 3) birds killed by sandhill crane hunters in central Kansas in November, 2004. A total of 12 documented shootings of whooping cranes in North America have occurred in the last 17 years (1989-2005). Other unexplained losses may also be due to shootings (Stehn 2006). The proposed subdivision is adjacent to prime waterfowl hunting area and residents of the subdivision are likely to increase hunting pressure in the area causing disturbance to the cranes, and stray shots could kill or injury a crane. Hunting will not be allowed at the proposed project site, the adjacent Boardwalk subdivision, or the privately owned 15.01-acre estuarine wetland adjacent to the Boardwalk and proposed for preservation.

Climate Change

The Service has indicated that the latest climate change estimates predict sea level rise could range between 24 and 42 inches along the Texas Coast by 2100, which would make all of the present salt marsh too deep for crane use. Losses of salt marsh might be offset by their expansion onto formerly low-lying uplands, unless those low-lying uplands are developed. The Service is concerned that whooping crane habitat would likely be confined between rising sea levels and coastal development and thus be decreased further. Although the topography of the land comprising the project site and the adjacent Boardwalk subdivision may have made it unlikely that habitat would have been gained as a result of sea level rise due to the drastic vertical difference between

the former bluff and the existing shoreline. Other low-lying uplands are present that could provide for expansion of marshes due to sea level rise within the action area.

Within the 50-year life of the project, one may expect to lose approximately 1-2 feet (0.3 -0.6 meters) of habitat across the 624 miles (1,004 kilometers) of coastal tidelands in Texas due to sea level rise. This impact, approximately 3 acres/year would further reduce the availability of habitat for flock expansion and along with loss of habitat for development may preclude recovery of the species unless additional habitat is created.

II Species' Response to the Proposed Action

Development of this tract of land near Goose Island State Park is part of an increasing trend of development in and around the south Texas coast. Territories established by whooping crane pairs contain a variety of wetland and upland habitats, and by necessity must contain highly productive resource elements to sustain foraging cranes within the territory. For this reason these territories must be of considerable size, some as large as, 800 acres. This 137.38-acre (55.58- hectare) tract consists of foraging habitats that have documented whooping crane use, but cranes infrequently use the area. The loss of this habitat could force the cranes to search for other foraging areas usually within 5 miles of the original site. Shell Point Ranch and surrounding areas, Big Tree Ranch, Goose Island State Park, private conservation easements adjacent to Big Tree Ranch, and the southern edges of the ANWR all have suitable habitat available within 5 miles of the canal subdivision site. Shell Point Ranch and Big Tree Ranch, however, are under threat of being developed. The loss of foraging habitat could affect propagation of the species. The cranes could skip a season in which they would normally raise a chick if they are unable to find enough food and/or have to fly further to find freshwater. With only 535 whooping cranes left in North America, propagation within the AWBP represents the species' primary chance for recovery. Any disturbance that causes a decline in propagation rate of the species could be considered adverse and detrimental to the species. Given the average size of other whooping crane territories, if cranes numbers at ANWR continue to increase, an additional territory may be expected to become established on the west side of the Lamar peninsula including Shell Point Ranch and nearby habitat (Stehn, personal communication 2011). If environmental conditions are such that they need to find freshwater, cranes may have to search for a new area of unknown distance and expend additional energy to find freshwater.

Whooping cranes wintering at the ANWR have been acclimated to boat traffic and barge traffic throughout their wintering range. The Reserve will likely significantly increase the amount of recreational boat traffic around the residential canal community, Goose Island State Park, and St. Charles Bay. This increased boat traffic and proximity of the project to Goose Island could cause the cranes that periodically use the project area, to search for another area with fewer disturbances. Cranes have been able to acclimate themselves to some human activity in and around their preferred foraging areas. The cranes have also shown tolerance to boat traffic along the GIWW, but no large scale development project has been completed (not even at 50% occupancy) within whooping crane habitat since the passage of the Endangered Species Act. The

potential of this project to disturb whooping cranes during construction and occupation of the subdivision is high.

V. Cumulative Effects

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

There is a growing demand for housing along the Texas coast, especially in close proximity to the water, to satisfy the population rise in the area. The Texas coast offers a unique environment which profits exponentially from ecotourism type activities on a state and local level. The proposed project is a result of the continual growth and development of Rockport and surrounding communities.

The Aransas County region consists of 528 square miles with an estimated population of 23,590 in 2005. According to the 2000 census Aransas County experienced a 25.7 increase from 17,892 persons in 1990 to 22,497 in 2000. The primary industry in the Rockport-Fulton area is sport fishing and tourism. Impacts to whooping crane habitat as a result of the development of Rockport-Fulton area include the loss of estuarine wetlands and the loss of upland and freshwater wetlands inland from surrounding bays (Aransas, Copano, St. Charles) and the GIWW. A Texas Parks and Wildlife Department project at Goose Island State Park, located adjacent to the proposed project, is currently creation of 24 acres (9.7 hectares) of estuarine marsh. This marsh restoration project involves construction of a breakwater, levee(s), placement of dredged material and planting of marsh vegetation. A 27-acre (10.9-hectare) upland development adjacent to the proposed project, The Boardwalk at St. Charles Bay, is currently under construction offering 61 lots to homebuyers. Buyers of second homes or vacation homes will travel from cities such as San Antonio, Austin, and Houston to reach their Lamar destination. Travelers will likely purchase fuel, food and other items during their trips. They will also contribute to traffic on area streets and highways. Locally, existing businesses will likely experience growth due to increased population at The Reserve at St. Charles Bay project. New businesses supplying goods and services may also develop during the 30 years after project construction. Increased fishing, birding and other outdoor recreational activities will also likely occur. The successful development of The Reserve at St. Charles Bay project may encourage other development within five to ten miles of the Lamar area. Such developments may result in direct and indirect impacts to actual or potential whooping crane habitat. Many developments, likely to occur in the future, would require CE approval. Approximately 2.4 miles (38.6 kilometer) north of Lamar in the vicinity of Holiday Beach, coordination with the resource agencies has recently begun for a proposed 702-acre (284 hectares) water access and waterfront residential development along the shoreline of Copano Bay, including canal homesites, a marina, hotel, and condominiums.

V. Conclusion

In the Biological Opinion issued in 1989 to the USACE, as mentioned above, the Service's opinion was that the GIWW dredging project would jeopardize the continued existence of the species and would adversely modify critical habitat. Since that time, the USACE has completed the reasonable and prudent alternatives including installation of concrete mats for erosion control in designated critical habitat areas significantly reducing the likelihood of jeopardy and/or adverse modification of critical habitat. Implementing such alternatives likely assisted in an increase in the wintering whooping crane population within Texas from approximately 140 individuals to 279 currently. Areas subjected to erosive forces were primarily wetlands consisting of optimal habitat, heavily utilized by whooping cranes.

The AWBP has met the Objective 1 population target at Aransas since 1996. As of April 2010, the Aransas-Wood Buffalo Population (AWBP) contained 279 individuals wintering in Texas (Stehn, 2011). However, because population targets set forth for the additional populations of whooping cranes have not been met, the whooping crane has not yet been downlisted. If the population targets for the additional populations of whooping cranes are not met, the AWBP must reach and maintain 1,000 individuals (250 productive pairs) for downlisting of the species. As the AWBP continues to expand, expansion into new wintering areas is likely to continue. Studies indicate territory sizes will stabilize as the population increases, with territories averaging 425 acres (172 hectares) where density is highest. The whooping cranes wintering habitat consists of about 71,017 acres (28,740 hectares) of marshes and salt flats on Aransas National Wildlife Refuge and adjacent publicly and privately owned wetlands (Stehn and Prieto 2010). Based on recent territory sizes, Stehn and Prieto (2010) calculated a similar value of 130 acres (52.5 ha) needed per adult crane. Based on the current crane range, nearby contiguous unoccupied areas, and existing non-contiguous marsh available in a 69 mile (111-kilometer) radius from Aransas NWR, there are 139,538 acres (56,469 hectares) of habitat for wintering whooping cranes between Corpus Christi and Brazoria, Texas (Stehn and Prieto, 2010).

Considering that a minimum population of 1,000 whooping cranes at Aransas would require approximately 130 acres (52.5 ha) per bird or approximately 129,730 (52,500 hectares), there is sufficient acreage available to achieve the downlisting goal of the recovery plan. Stehn and Prieto (2010) estimated that 1,156 cranes could winter between Corpus Christi and Brazoria assuming the habitat remains unchanged. However, these habitat acreages allow for only 9,808 acres (3,969 hectares) for exceeding the downlisting criteria and eventually the recovery of the species, if no more of the available habitat is adversely impacted. To date, it is known that from the 9,808 acres (3,969 hectares) available to reach delisting goals, one incidental take permit has been given for the direct loss of 226.82 acres (91.79 hectares) of whooping crane habitat. This reduces the available habitat to exceed downlisting criteria to 9,581.18

acres (3,870 hectares) that could potentially support approximately 74 adults and 82 subadults. Delisting criteria have not been set to date, but range from sustained population between 1000 to 7000 individuals. If the Texas population can only be expected to increase to 1156 individuals, then no more than 13.0% of the available habitat could be lost before the minimum population needed for downlisting can be sustained (9581.18 acres X 0.13 = 1245.5 acres [504 hectares]. Therefore, with this project 9,443.8 acres (3,822 hectares) [9,581.18 – 137.38 acres = 9,443.8] would remain available to reach minimum recovery goals, and only an additional 1,108.17 acres (448.46 hectares) could be taken before recovery is precluded. Negative effects due to mangrove expansion and the positive and negative effects of sea level rise were also considered. However, due to the paucity of quantified data, it is not expected to add impacts to justify jeopardy at this time. Also, note wild whooping cranes in Florida and Louisiana should be included in any jeopardy analysis, but populations are unstable at this time.

After reviewing the current status of the above species and critical habitat, environmental baseline for the action area, effects of the proposed action, and cumulative effects, it is the Service's Biological Opinion that the proposed "The Reserve" Project, is not likely to jeopardize the continued existence of the listed whooping crane. Critical habitat for this species has been designated; however, this action does affect designated critical habitat, but no long-term destruction or adverse modification of that critical habitat is anticipated.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without 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 to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined 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 of 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 non-discretionary, and must be undertaken by the USACE so that they become binding conditions in the permit issued to The Reserve as

appropriate, for the exemption in section 7(o)(2) to apply. The USACE has a continuing duty to regulate the activity covered by this incidental take statement. If the USACE (1) fails to assume and implement the terms and conditions or (2) fails to require The Reserve to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the USACE or The Reserve must report progress of the action and its impacts on the species as specified in the incidental take statement (50 CFR § 402.14(i)(3)).

Amount or Extent of Take Anticipated

The Service, therefore, anticipates the take, in the form of harassment, of four whooping crane individuals considering project impacts areas at the Reserve and at Falcon Point, as well as intermittent use of habitat, and anticipates the permanent loss of approximately 137.38 acres (55.58 hectares) of whooping crane habitat because of subdivision construction for the life of the project (50 years). Based on the review of biological information and other information relevant to this action, take is anticipated in the form of:

1. Harassing, disturbing, or interfering with whooping cranes attempting to forage, rest, or roost within the project area or on adjacent wetlands and uplands as a result of construction, habitation, subsequent activities; placement of fill; and human, vessel and animal traffic.

2. Behavior modification of whooping cranes during the migrating and wintering seasons due to disturbances associated with construction activities and subsequent activities within the project area, resulting in excessive energy expenditures, displacement of individual birds and/or a territorial pair, disturbance of foraging behavior, or situations where they are forced to select marginal or unsuitable resting or foraging areas.

3. Decreased survivorship of wintering whooping cranes due to the possible diminished quantity and quality of foraging habitats.

4. Modification of the hydrology of the area utilized for feeding and roosting by the whooping crane due to the canal construction and differences in stormwater runoff patterns and content.

5. Excavation, filling and relocation of whooping crane habitat

The Service will not refer the incidental take of any migratory bird for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 USC § 703-712), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to whooping cranes or destruction or adverse modification of critical habitat.

Reasonable and Prudent Measures:

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of the whooping cranes:

1. The Reserve, in coordination with the USACE, will devise and implement plans, to ensure contractors, employees, homeowners, and others fully understand the protection measures detailed in this opinion to avoid and minimize impacts to cranes prior to, concurrent with, and following construction activities.

2. To the extent consistent with the location, scope, duration, and timing of the operations and construction, The Reserve and USACE will develop, in coordination with the Service, a whooping crane avoidance construction plan and a monitoring program to avoid and minimize impacts to whooping cranes in the project area prior to, concurrent with, and post construction, and to monitor success of mitigation areas.

3. A summary report prepared by the applicant as required by USACE describing the actions taken to implement the terms and conditions of this incidental take statement shall be submitted by USACE to CCESFO within 60 days of completion of the construction phase and following any future maintenance activities including dredging or other work in USACE jurisdictional areas, inclusive of the years between each operational event or other proposed work activity that has occurred for the life of the project (50 years).

TERMS AND CONDITIONS

In order to be exempt from prohibitions of section 9 of the Act, the USACE must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above, and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. Training Awareness:

The Service will approve training materials and receive a list of personnel attending the training. Training will be required for all persons prior to working on site at any time during construction and maintenance activities (see Reasonable and Prudent Measure Number 3 for definition of maintenance activity).

a. Hal Jones Development, LCC and the USACE shall arrange a meeting between representatives of the contractor, and Corpus Christi Ecological Services Field Office (CCESFO) staff for training at least 30 days prior to the commencement of work on this project. At least 10 days advance notice shall be provided to the Service prior to conducting training. This will provide an opportunity for explanation and/or clarification of the whooping crane protection measures which may include as needed or appropriate to be determined by CCESFO. Examples may include: identification of the species, notification methodology, marking of avoidance areas, and special construction criteria.

2. Weekly biological monitoring of construction site.

a. Once a week a biological monitor (qualified USACE staff or biological consultant) will visit the site and ensure that all conservation measures are being met, whooping crane monitoring logs are being kept, and transmitted to the Service, and identify to the Service any potential issues that may cause unanticipated impacts to whooping cranes.

b. Notify CCESFO (361-994-9005) and National Whooping Crane Coordinator (361-286-3559), of any whooping crane sightings immediately.

3. Construction Plans

a. Enhancement and creation of 14.61acres (5.9 hectares) as depicted in the wetlands mitigation plan at Falcon Point Ranch should be coordinated with the National Whooping Crane Coordinator and CCESFO, prior to final approval by the USACE. Mitigation

enhancements and creations will not occur during whooping crane wintering season, and will be completed within the first 6 month period outside wintering season after permit issuance. Within 3 months of permit issuance, the wetland will be protected by conservation easement and transferred to a certified land trust, approved by CCESFO, for management for whooping crane recovery.

b. Transfer of 165 acres (66.77 hectares) conservation easement to a certified land trust, approved by the CCESFO, for management for whooping crane recovery, prior to permit issuance.

c. Transfer of the 15.01 acre- (6.07 hectare-) wetland adjacent to "The Boardwalk" will be protected in perpetuity through a certified land trust organization or state natural resource agency prior to permit issuance.

d. Signage will include an educational exhibit on one of the piers to educate homeowners about whooping crane recovery issues. Signage will be approved by the Service prior to permit issuance and installed as soon as the piers are constructed.

e. Lighting will be limited to the immediate area of active construction only and will be the minimal lighting necessary to comply with safety requirements. Shielded low pressure sodium vapor lights are recommended to minimize illumination of the wetlands, jetties, and nearshore waters.

f. If future maintenance dredge disposal for the canals or entrance channels are to be conducted, it should occur outside the wintering season (October 15 through April 15) for the whooping crane. Dredged material will be disposed of on uplands that have no known use by whooping cranes, and/or used beneficially to improve whooping crane habitat.

4. Monitoring:

Monitoring for whooping cranes is important to compare crane use of habitats with varying degrees of manipulation and observe trends in how this species responds to the resulting impacts of the proposed project. Monitoring for whooping cranes may be limited to the project and mitigation areas including the avoided wetlands, preserved uplands and wetlands, and created wetlands.

a. The USACE and the applicant will coordinate with the Service on the timing of surveys and methodology for selecting areas to be monitored prior to permit issuance and prior to any activity at the project sites. If deemed appropriate, based on collected data or new information, the

Service can make the decision to end or modify the whooping crane monitoring program.

b. Monitoring periods will be evenly distributed throughout a day, including a wide range of tidal conditions and all habitat types. The amount of time necessary to survey each site will depend on the amount and type of habitat to be covered. Monitoring reports for preserved and created wetlands should include types of vegetation established, survival and percent cover of each vegetation type, surveys for food items available for whooping cranes, and water quality criteria (salinity, dissolved oxygen, etc..., at appropriate locations. Incidences or evidence of red tides, oil or chemical spills, or other environmentally damaging events should be included in the reports. Monitoring reports should also indicate if any inconsistencies with the construction plan are noted.

c. Data collection will include: 1) dates when monitoring began and ended; 2) the date, time, and location of each observation; 3) the number of whooping cranes sighted; 4) the microhabitat of the occurrence (e.g. marsh, freshwater wetlands, etc...); 5) the activity of the cranes (e.g. foraging, roosting); 6) locations of foraging areas.

d. If through the monitoring program, erosion is noted in the wetlands adjacent to bulkheads, an erosion control plan will be developed by The Reserve for review by the USACE and the Service and implemented once all necessary permits have been obtained.

e. The person(s) responsible for monitoring whooping crane presence shall develop specific procedures for notifying CCESFO (361/994-9005) in the event that construction activities result in the direct take (killing, harming, or maiming) of a whooping crane. Hal Jones Development, LCC and the USACE **must** follow procedures described in the *Federal-State Whooping Crane Contingency Plan* for responding to the discovery of a dead and/or injured crane.

5. Annual Reports

a. The applicant will prepare an annual report of the reasonable and prudent measures and terms and conditions outlined in this BO for the USACE to submit to CCESFO. The first report should be submitted one year following initiation of project construction and thereafter for 5 years. At the end of the fifth year, the Service will determine if reports continue to be necessary.

b. Reports should be sent to: U.S. Fish and Wildlife Service, Corpus Christi

Ecological Services Field Office, ATTN: Field Supervisor, c/o TAMU-CC, 6300 Ocean Drive, Unit 5837, Corpus Christi, Texas 78412-5837

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal action agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or develop information.

For the benefit of whooping cranes, the Service suggests the following conservation recommendations:

1. The USACE should consider assisting the Service in identifying potential conservation easements within a 5 miles radius of the project area. Purchase of conservation easements in this area would ensure that the cranes using the nearby territories would have ample habitat to utilize during drought years. The habitat within these conservation easements should be situated on or as close to a freshwater source to maximize usage by cranes and should consist of a mixture of habitats required by whooping cranes. as outlined in the whooping crane recovery plan (Task 1.5.1.1)

2. The USACE should encourage Hal Jones Development, LCC, other developers and local sponsors, to participate in a regional conservation management plan, perhaps through a Regional Habitat Conservation Plan (HCP) for development activities within Calhoun and Aransas County that would help insure protection of whooping crane critical habitat (Task 1.5.1.1).

3. The USACE should endeavor to create, restore, and/or maintain suitable whooping crane overwintering wetland habitat as restoration or other funds become available (Task 1.5.4). This could include habitat improvements made to existing lands on the west side of Lamar Peninsula, Goose Island State Park, or Big Tree Ranch near the project area.

4. The USACE should standardize creation of appropriate buffer zones (preferably 1000 feet [304.8 meters] or more) for projects that may affect whooping crane habitat areas (Task 1.5.4).

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in your request for formal consultation for the The Reserve Project as currently proposed by Hal Jones Development, LCC. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; (4) a new species is listed or critical habitat designated that may be affected by the action.

If you have any questions concerning this opinion, please contact Allan Strand or Dr. Larisa Ford at (361) 994-9005 or via email at allan_strand@fws.gov or larisa_ford@fws.gov .

Sincerely yours,

Allan M. Strand

Allan M. Strand
Field Supervisor

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Appendix A

The USACE has determined that the proposed Project

Conservation Measures for West Indian Manatee

Applicant will provide written information to educate all marine construction crews on the identification of manatees and avoidance of impacts to individuals that are sighted.