Florida Population of the

Audubon's Crested Caracara
(Polyborus plancus audubonii)

= Northern Crested Caracara
(Caracara cheriway)

5-Year Review:
Summary and Evaluation

U.S. Fish and Wildlife Service
Southeast Region
South Florida Ecological Services Field Office
Vero Beach, Florida

5-YEAR REVIEW
Northern Crested Caracara (*Caracara cheriway*)

I. GENERAL INFORMATION

A. Methodology used to complete the review: This review is based on monitoring reports, surveys, and other scientific and management information, and is augmented by conversations and comments from biologists familiar with the species. The review was conducted by the lead recovery biologist with the South Florida Ecological Services Field Office (SFESO). Literature and documents on file at the SFESO were used for this review. All recommendations resulting from this review are a result of thoroughly reviewing the best available information on the Florida population of the Northern crested caracara (CRCA), previously known as Audubon's crested caracara (see section II.C.1.c. for more detail). We reviewed the status of the caracara as currently listed and recommended that the taxonomy of the species reflect the best available information. A *Federal Register* notice announcing the review and requesting information was published on April 16, 2008 (73 FR 20702). Comments and suggestions regarding the review were received from peer reviewers from outside the Service (see Appendix A). No part of the review was contracted to an outside party. Comments were evaluated and incorporated as appropriate.

B. Reviewers
Lead Region: Southeast Region, Kelly Bibb, 404-679-7132
Lead Field Office: South Florida Ecological Services Field Office, Sandra Sneckenberger, 772-562-3909

C. Background

1. FR Notice citation announcing initiation of this review:
73 FR 20702 (April 16, 2008)

2. Species status: Uncertain (Recovery Data Call 2008). Most occupied territories are inaccessible to surveyors (occur on private land). Consequently, monitoring the CRCA population or detecting changes in habitat, population size, or distribution is difficult. Results from continuing research initiated in 2006 suggest all territories identified in the 1990s remain occupied, but breeding success has not been evaluated and CRCA may exhibit site fidelity regardless of degraded habitat quality and low nesting success. Impacts to CRCA habitat have increased due to development and land use changes, and these impacts are expected to continue.

3. Recovery achieved: 1 (1 = 0-25 percent recovery objectives achieved).

4. Listing history:
Original Listing
FR notice: 52 FR 25229
Date listed: July 6, 1987
Entity listed: Subspecies
Classification: Threatened

5. Associated rulemakings: None.

6. Review History: The Service conducted a 5-year review for the CRCA in 1991 (56 FR 56882). In this review, the status of many species was simultaneously evaluated with no in-depth assessment of the five factors or threats as they pertain to the individual species. The notice stated that the Service was seeking any new or additional information reflecting the necessity of a change in the status of the species under review. The notice indicated that if significant data were available warranting a change in a species' classification, the Service would propose a rule to modify the species' status. No change in status was found to be warranted for the CRCA.

Recovery Plan: 1999
Recovery Data Calls: 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, and 2008

7. Species' Recovery Priority Number at start of review (48 FR 43098): 8C (moderate threat/high recovery potential/some degree of conflict)

8. Recovery Plan
Name of previous plan: Audubon's Crested Caracara Recovery Plan
Date issued: November 14, 1989

Name of plan: South Florida Multi-species Recovery Plan (MSRP)
Date issued: May 18, 1999

II. REVIEW ANALYSIS

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

1. Is the species under review listed as a DPS? Yes. While the CRCA was listed prior to the 1996 DPS policy, the entity listed was restricted to the Florida population.

2. Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 policy standards? No.

3. Does the DPS listing meet the discreteness and significance elements of the 1996 DPS policy?

Yes. In light of the taxonomic change (see II.C.1.c. *Taxonomic classification or changes in nomenclature*), a subspecies of the crested caracara with a range limited to Florida is no longer recognized. The originally protected entity (Audubon's crested caracara) is now considered a discrete segment of the Northern crested caracara, a species which also inhabits portions of Texas and Arizona in the U.S. As the Florida population persists in a unique ecological setting for the taxon, and loss of this population would result in a significant gap in its range, listing this species as a DPS should be evaluated.

4. Is there relevant new information regarding application of the DPS policy to this DPS (i.e., is there new information since the original (either pre- or post-1996) DPS listing that indicates a need for splitting out, combining or otherwise re-configuring DPSs, or that the listed entity is no longer consistent with the DPS policy)?

Yes. While the currently listed entity is consistent with the intent of the 1996 DPS policy, we recommend a change to the listing to reflect the new taxonomic information (Dove and Banks 1999) and an evaluation of formally listing the Florida population of the CRCA as a DPS.

B. Recovery Criteria

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

2. Adequacy of recovery criteria.

a. Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat?
No. The recovery criterion that addresses the number of territories (an increase from 200 to 300) needs to be modified. This recovery goal was based on sparse information and territory counts may not be appropriate indicators of the species' status (see II.B.3.). Furthermore, the recovery criteria do not address the importance of communal roosts to the species. These gatherings of non-breeding CRCA have been identified since the 1999 plan, but are now recognized as essential to recovery. The focus on core counties may also be problematic and should be reevaluated.

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

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

The criteria included in the approved recovery plan (Service 1999) to delist the CRCA are:

1) Further loss, fragmentation, and degradation of habitat in south-central Florida has been prevented;
2) the number of territories in the historic range increases from 200 to 300;
3) this number of territories has been maintained or exceeded for at least 10 years;
4) the territories are well-distributed throughout the core counties of Glades, DeSoto, Highlands, Okeechobee, and Osceola;
5) additional breeding pairs have established territories on unoccupied or restored habitat;
6) those lands have been protected through land acquisition, conservation easements, or cooperative agreements; and
7) the Florida population exhibits an intrinsic rate of increase (r) equal to or greater than 0.0, sustained as a 3-year running average over at least 10 years.

None of these criteria have been met. Habitat degradation and loss has continued through the urbanization of ranchlands. Abundance and distribution of CRCA are difficult to monitor since most occupied territories are inaccessible to surveyors (occur on private land). Territory estimates from limited surveys exist, but yield no information to suggest that recovery criteria have been met. As CRCAs may remain faithful to nesting sites when the habitat quality is too degraded to produce offspring, counts of territories may not provide a valid means to assess recovery of the species (Dwyer 2009). Sufficient monitoring has not been conducted to determine population growth rate.

C. Updated Information and Current Species Status

Information regarding CRCA biology and habitat can be found within the recovery plan (Service 1999). A summary, with the addition of updated information, is provided below.

1. Biology and Habitat

a. Abundance, population trends (e.g., increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate), or demographic trends:

CRCAs have a relatively long lifespan. Annual survival estimates suggest a lifespan of 8 to 10 years (Morrison 2003), and banding records indicate wild

individuals living over 20 years (Morrison 2009). Adult survival has a significant impact on population persistence (Root and Barnes 2007). Annual adult (greater than 3 years of age) survival rates averaged 0.876 for males and 0.906 for females during a 1994 to 2000 study (Morrison 2003). Annual survival rates from juveniles averaged 0.694, with a 33 percent chance of surviving to 3 years of age (Morrison 2003).

The age at first breeding is approximately 3 years (Morrison 2009); many birds over 3 years of age, if unable to find breeding sites, remain as non-breeders (Dwyer 2009). Clutch size averages two eggs (Dickinson and Arnold 1996; Layne 1996; Morrison 1999 [2.23 eggs]), and young fledge after 8 weeks (Layne 1978). Double-brooding has been documented, but second clutches are generally not as successful as first attempts (Morrison 1996; 1998).

Abundance estimates have been dubious and continue to be problematic due to the bird's low detectability and surveyors' limited access to suitable habitat on private lands (Humphrey and Morrison 1997). Population trends are also difficult to interpret because of the bird's long lifespan, site-fidelity, and the lack of data on recruitment rates of young (Morrison 1996). Based on current knowledge of over 150 nest sites within a limited portion of the bird's range in Florida, over 500 individuals inhabit Florida (Morrison 2009). It is unlikely that the CRCA population can withstand the accelerated rate of habitat loss since 1991 without a population decline, but, due to challenges just mentioned, this decreasing trend may not be immediately detected (Morrison 1996).

Population viability analysis results suggest that CRCA are not likely limited by demographic factors described above, but rather more by habitat loss, fragmentation, and degradation (Root and Barnes 2007).

b. Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding):

Information concerning present levels of genetic diversity and variation in CRCA is not available.

c. Taxonomic classification or changes in nomenclature:

While listed as Audubon's crested caracara (*Polyborus plancus audubonii*), taxonomic research has revealed that the Florida population should be recognized as the northern crested caracara (*Caracara cheriway*) (Dove and Banks 1999; Integrated Taxonomic Information System 2008). Minor variations between populations do not warrant recognition of subspecies within *C. cheriway* (Dove and Banks 1999). This taxonomic change has been accepted by the scientific community.

d. Spatial distribution, trends in spatial distribution (e.g., increasingly fragmented, increased numbers of corridors), or historic range (e.g., corrections to the historical range, change in distribution of the species' within its historic range):

Caracara cheriway ranges from northern Brazil, through Central America and Mexico, north to the United States (except Guadalupe Island) (Dove and Banks 1999). Its historic range in Florida generally consisted of St. Johns River marshes in Brevard County and the major prairie ecosystem originally present within Highland, Glades, Polk, Osceola, Okeechobee, Hardee, Desoto, Indian River, St. Lucie, and Martin Counties (Davis 1967; Morrison 2006). The overall current range of CRCA in Florida remains relatively similar with sightings of individuals in other neighboring counties, but the fragmentation and degradation of habitat from land use changes has resulted in patchy suitable areas where CRCA occur in a clustered distribution (Morrison 2006; Root and Barnes 2007). Few territories are known on public or conserved land (Morrison 1996), and further loss of privately-owned upland habitat is expected to continue.

e. Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

The CRCA exists as a relatively small, isolated population in Florida. Isolation of small populations may reduce or preclude gene flow between populations and can result in the loss of genetic diversity. Demographic factors such as predation, diseases, and competition are intensified in small, isolated populations, which may be rapidly extirpated by these pressures. Especially when coupled with events such as flooding, reduced food availability, and/or reduced reproductive success, isolated populations may experience severe declines or extirpation (Caughley and Gunn 1996).

Habitat heterogeneity is necessary in maintaining suitable CRCA habitat (Root and Barnes 2007). Primary CRCA habitat in Florida consists of prairies interspersed with marshes and cabbage palm hammocks (Morrison and Humphrey 2001). Conversion of native prairie to agriculture or urban uses, and habitat degradation from disruption of the natural fire regime has led to a significant reduction in available habitat (Morrison 2006). Current habitat use of CRCA, based on habitat evaluations conducted proximal to nest sites, includes (ranked highest to lowest proportion): improved pasture, dry prairie, freshwater marsh, mixed upland hardwoods, shrub swamp, shrub and brushland, grassland, pinelands, bare soil, urban, other agriculture, citrus, and scrub (Morrison 2006). Core CRCA habitat (i.e., a 95 percent kernel of high density area) lies within the Kissimmee Prairie, located northwest of Lake Okeechobee, and includes less than 1000 km^2 of suitable habitat (Root and

Barnes 2007). Only 15 percent of the habitat in this core area is managed (Root and Barnes 2007).

Nesting habitat may be limiting CRCA population growth (Root and Barnes 2007). CRCA most frequently nest in cabbage palms within pasture or grassland habitat, but a few nests have been observed in cypress, live oak, pine, and other trees (Bent 1938; Sprunt 1954; Service 1989; Morrison et al. 1997; Morrison 2007). Nesting on private lands appears to be preferred over public lands, likely a consequence of more rigorous management of privately owned grasslands (Morrison and Humphrey 2001; Morrison 2007).

2. Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

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

Habitat loss, fragmentation, degradation - general. A population viability analysis demonstrated that while it may be stable under present conditions, the CRCA population in Florida is sensitive to even modest habitat loss (Root and Barnes 2007). Habitat loss modeled within core habitat was particularly devastating. Cattle ranching appears to be compatible with CRCA survival, but conversion of improved pasture to citrus, sugarcane, or residential development would clearly be unsuitable (Humphrey and Morrison 1997; Service 1999; Morrison 2006). Many changes in land use that occur are not associated with any regulatory review, but are detrimental to CRCA. The scope and severity of this threat are high. This threat also increases the severity of all other threats addressed subsequently.

Loss of habitat on private lands. It is likely that over 80 percent of CRCA habitat is privately owned. Despite the difficulties in surveying private lands, the majority of nest sites are found on private lands, and these nests are more successful than those on public lands (Morrison 1996; Morrison and Humphrey 2001). Managed pasture lands have been shown to be compatible with CRCA; in fact, the population is currently dependent on such areas. Consequently, recovery and long-term persistence of CRCA relies on these private lands. Creative conservation efforts should be developed to preserve habitat in these areas.

Overall, the threat of habitat loss, degradation, and fragmentation is expected to continue and increase. Analyses by Zwick and Carr (2006) indicate that the central Florida region is expected to experience “explosive” growth, with continuous urban development from Ocala to Sebring; virtually all of the natural systems and wildlife corridors in this region will be fragmented, if not replaced, by urban development. For example, Highlands County, with a population of 87,366 in 2000 is projected to increase to 170,038 by 2060

(Zwick and Carr 2006). Polk County, with a population of 483,924 in 2000, is projected to increase to 1,029,606 by 2060 (Zwick and Carr 2006). The scope and severity of this threat are high.

Hydrologic management. Just as water levels affect wading bird foraging (Kushlan 1990) and breeding cycles, rainfall and water level cues likely influence CRCA populations similarly. Timing of egg laying and the availability of CRCA food resources are similarly tied to rainfall cycles (Morrison 1999) and associated hydrologic management. Furthermore, future restoration projects focused on restoring historic hydrology are likely to construct large reservoirs in suitable CRCA habitat. Such projects should continue to carefully consider CRCA in the planning and post-construction phases, particularly concerning projects within core habitat. These hydrologic management projects pose a substantial threat to CRCA. Due to the size and location of these projects, the scope and severity of this threat are high.

Climatic changes and sea level rise. Climatic changes and sea level rise may potentially result in the loss of suitable CRCA habitat through inundation or vegetative species composition changes. The general effects of sea level rise within the range of the CRCA will depend upon the rate of rise and landform topography. However, the specific effects across the landscape will be affected by complex interactions between geomorphology, tides, and fluctuations in energy and matter. These effects have yet to be simulated and projected for the range of the CRCA. The scope of this threat is moderate, but the severity remains unknown.

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

Not known as a threat. Although scientific research does involve capturing, banding, radio-harnessing, and taking blood samples, no CRCA have died as a result of scientific research. (See Morrison and McGehee 1996 for safe, effective capture methods).

c. Disease or predation:

Diseases. The blood parasite, *Haemoproteus tinnunculi*, has been found in CRCA (Foster et al. 1998). The effect of this parasite on survival is not known. West Nile virus, St. Louis encephalitis, and Eastern equine encephalitis are also documented in CRCA (Dwyer 2009).

Predation. Detailed information regarding predators of CRCA is lacking, but fish crows (*Corvus ossifragus*) and raccoons (*Procyon lotor*) are known nest predators (Layne 1996), and fire ants (*Solenopsis invicta*) have killed young (Dickinson 1995).

d. Inadequacy of existing regulatory mechanisms:

Guidelines, conservation measures, and regulatory mechanisms are in place to avoid and minimize impacts to CRCA on military, State, federal, and privately owned lands. Pre-construction guidelines offer recommendations to avoid and minimize impacts. Recommended management practices provide ways to maintain or enhance CRCA habitat. Such measures include retaining pasture and grassland habitats, planting or retaining palm trees (*Sabal palmetto*), and avoiding the use of chemicals toxic to wildlife (Morrison 2001).

The CRCA is listed by the Florida Fish and Wildlife Conservation Commission (FWC) as threatened (Chapter 39-27, Florida Administrative Code). This legislation prohibits take, except under a permit, but does not provide any direct habitat protection. Wildlife habitat is protected on FWC wildlife management areas and wildlife environmental areas according to Florida Administrative Code 68A-15.004. Florida Park Service regulations prohibit take of specimens and destruction of vegetation (i.e., habitat) on park property without a permit.

Urbanization of improved pasture and dry prairie habitat continues. However, development is subject to regulatory oversight by respective county authorities, the State, and the Service (e.g., species guidelines, ESA consultation). Regulatory mechanisms in place focus on CRCA nest sites, and many changes in land use that occur are not associated with any regulatory review, but are detrimental to CRCA. The SFESO is currently developing a tool to assess impacts to CRCA habitat, including juvenile gathering areas and communal roosts. A conservation strategy, providing options for offsetting impacts to CRCAs, is also under development at the SFESO.

The severity of this threat is currently high, but may lessen in the future when the conservation strategy and tool are implemented. The scope remains moderate.

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

Road-related mortality. Road-killed animals are an important source of carrion to CRCA (Layne 1996), but vehicle strikes are a major cause of mortality for fledglings and immature CRCA (Morrison 1996). Fifty-five percent of mortalities of radio-tagged CRCA in 1994 to 1995 were from collisions with vehicles (Morrison 1996).

D. Synthesis

Within Florida, the CRCA exists as an isolated population with a restricted range, within rapidly urbanizing habitat. This relatively small, isolated population is of great conservation importance to the species, as its loss would result in a significant range

contraction. Habitat loss remains the primary threat to the CRCA, and urban growth is rapidly converting ranchland pastures to residential developments. Projects associated with Everglades restoration may also pose a threat to CRCA, but will be evaluated by regulatory mechanisms already in place. Additional tools and strategies are currently under development at the SFESO that may assist with evaluating and offsetting potential impacts to CRCA. Despite continuing threats, this species has a high recovery potential if recovery tasks and actions become a priority and agencies and private and public landowners work together.

III. RESULTS

A. Recommended Classification:

__X__ No change is needed (However, listing this species as a DPS should be evaluated.)

IV. RECOMMENDATIONS FOR FUTURE ACTIONS

- Evaluate the effects of nest tree loss, quantify the effects of habitat conversion on adult and juvenile CRCA, and determine the threshold for a detrimental response.
- Develop and improve methods to assess population trends and breeding success rates.
- Continue work on juvenile and non-breeding individuals to better assess limitations to population growth and recruitment rates of young.
- Identify short-term and long-term priorities for management and recovery; establish quantitative objectives.
- Work with landowners to gain access so that monitoring on private lands can be improved.
- More clearly describe the range of the CRCA so that management actions can be most effectively targeted and range changes can be documented if they occur.
- Continue work on the CRCA tool and conservation strategy to better evaluate and offset impacts to the species.
- Actively work with owners of large ranches to enhance and maintain habitat for CRCA.
- Develop mechanism(s) to maintain CRCA habitat on private lands in cooperation with landowners.
- Minimize road-side mortalities of CRCA by posting signs and/or lowering speed limits in areas with high frequencies of mortality.
- Determine the availability of suitable breeding habitat; test habitat suitability models currently available.
- Develop a model to identify the most suitable parcels within the CRCA's range. Pursue conservation agreements and/or acquire land that includes these areas where CRCA are particularly successful.
- Revise the current listing to reflect the taxonomic change and evaluate formally listing the Florida population as a DPS.
- Revise the 1999 recovery plan, to reflect the current status and threats to the CRCA; develop or revise recovery criteria, objectives, and tasks.

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of the Northern Crested Caracara

Current Classification: Threatened
Recommendation resulting from the 5-Year Review

_____ **Downlist to Threatened**
_____ **Uplist to Endangered**
_____ **Delist**
__X__ **No change is needed** (However, listing this species as a DPS should be evaluated.)

Appropriate Listing/Reclassification Priority Number, if applicable __n/a___

Review Conducted By: Sandra Sneckenberger

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

for Approve _____ Date 4/15/09

The lead Field Office must ensure that other offices within the range of the species have been provided adequate opportunity to review and comment prior to the review's completion. The lead field office should document this coordination in the agency record.

REGIONAL OFFICE APPROVAL:

The Regional Director or the Assistant Regional Director, if authority has been delegated to the Assistant Regional Director, must sign all 5-year reviews.

Lead Regional Director, Fish and Wildlife Service

Acting, Approve _____ Date 8-14-09

The Lead Region must ensure that other regions within the range of the species have been provided adequate opportunity to review and comment prior to the review's completion. If a change in classification is recommended, written concurrence from other regions is required.

Summary of peer review for the 5-year review of Northern crested caracara (*Caracara cheriway*)

A. Peer Review Method: Three peer reviewers (avian/raptor biologists from the University of Florida, Florida State University, and Florida State Parks) were asked to participate in this review. Individual responses were requested and received from two reviewers. Unofficial reviewers provided suggestions and updated information that greatly improved the document.

B. Peer Review Charge: See attached guidance.

C. Summary of Peer Review Comments/Report
One reviewer recommended further clarification in regards to the entire range of the Northern crested caracara, and this document's focus on the Florida population.

One reviewer suggested adding information from the Morrison et al. 2007 final report to the FWC, particularly the viability of the Florida population, and the viability of the Florida population if limited to managed public lands.

One reviewer asked if any recovery objectives have been achieved since its listing or last review.

One reviewer suggested more emphasis being placed on maintaining CRCA habitat on private lands and stated that the cooperation of private landowners is vital to persistence.

One reviewer suggested the use of a publication currently in review for future decisions concerning hydrologic management.

One reviewer explained that the response of CRCA to the loss of a nest site or a portion of its home range is not known, and examining the effects of such actions would vastly improve the permitting process. This effort should include birds inhabiting areas of increasing urbanization, as these birds may continue to breed, but success may be so low that such areas may represent sinks.

D. Response to Peer Review:
The Service evaluated the comments and concerns received by peer reviewers. Comments were incorporated into this 5-year status review as appropriate.

Recommendations for future actions were modified to include further tasks or actions suggested by the reviewers.

Guidance for Peer Reviewers of Five-Year Status Reviews
U.S. Fish and Wildlife Service, South Florida Ecological Services Office

February 20, 2007

As a peer reviewer, you are asked to adhere to the following guidance to ensure your review complies with U.S. Fish and Wildlife Service (Service) policy.

Peer reviewers should:

1. Review all materials provided by the Service.

2. Identify, review, and provide other relevant data apparently not used by the Service.

3. Not provide recommendations on the Endangered Species Act classification (e.g., endangered, threatened) of the species.

4. Provide written comments on:
   - Validity of any models, data, or analyses used or relied on in the review.
   - Adequacy of the data (e.g., are the data sufficient to support the biological conclusions reached). If data are inadequate, identify additional data or studies that are needed to adequately justify biological conclusions.
   - Oversights, omissions, and inconsistencies.
   - Reasonableness of judgments made from the scientific evidence.
   - Scientific uncertainties by ensuring that they are clearly identified and characterized, and that potential implications of uncertainties for the technical conclusions drawn are clear.
   - Strengths and limitation of the overall product.

5. Keep in mind the requirement that the Service must use the best available scientific data in determining the species' status. This does not mean the Service must have statistically significant data on population trends or data from all known populations.

All peer reviews and comments will be public documents and portions may be incorporated verbatim into the Service's final decision document with appropriate credit given to the author of the review.

Questions regarding this guidance, the peer review process, or other aspects of the Service's recovery planning process should be referred to Paula Halupa, Acting Endangered Species Supervisor, South Florida Ecological Services Office, at 772-562-3909, extension 257, email: Paula_Halupa@fws.gov.