Audubon's Crested Caracara [Florida DPS]
(Caracara plancus audubonii)

5-Year Review:
Summary and Evaluation

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

April 2025

5-YEAR STATUS REVIEW
Audubon's Crested Caracara [Florida DPS] (*Caracara plancus audubonii*)

GENERAL INFORMATION

Current Classification: Threatened

Lead Field Office: Florida Ecological Services Field Office, Emarie Ayala

Reviewers:

Lead Regional Office: Atlanta Regional Office, Carrie Straight

Cooperating Service Program(s):

Science Applications and Migratory Bird Program, Dean Demarest

National Wildlife Refuges: Chuck Hunter

Date of original listing: August 5, 1987 (52 FR 25229; July 6, 1987)

Methodology used to complete the review: In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a status review is to assess each threatened species or endangered species to determine whether its status has changed and if it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants (50 CFR 424.11). The U.S. Fish and Wildlife Service (Service) evaluated the biology, habitat, and threats of Audubon's crested caracara to inform this status review. Our sources for this 5-year review include: the species' recovery plan; the last 5-year review for the species completed in 2009, the listing rule (52 FR 25229); peer reviewed scientific publications; unpublished field observations by Service, State, and other experienced biologists; unpublished survey reports; and notes and communications from other qualified biologists or experts. Literature and documents used for this review are on file at the Florida Ecological Services Field Office. We announced initiation of this review and requested information in a published Federal Register notice with a 60-day comment period in 2019 (84 FR 14669). In response to this announcement, we received four comments. We evaluated and incorporated the comments as appropriate in this review. All recommendations resulting from this review are a result of thoroughly reviewing the best available scientific information on the Audubon's crested caracara.

FR Notice citation announcing the species is under active review:
April 11, 2019 (84 FR 14669)

Species' Recovery Priority Number at start of 5-year review (48 FR 43098):
8C. Audubon's crested caracara is a species with a low degree of threat, major threats are well understood, and a high degree of recovery potential. The "C" indicates that the subspecies recovery is, or may be, in conflict with construction or other development projects or other forms of economic activity.

Review History: The Service has conducted 5-year reviews for Audubon's crested caracara in 1991 (56 FR 56882) and 2009 (Service 2009). Both reviews recommended that the status of the species remain threatened.

REVIEW ANALYSIS

Listed Entity

The Distinct Population Segment of Audubon's Crested Caracara (*Caracara plancus audubonii*) is limited to Florida (50 CFR 17.11).

Taxonomy and nomenclature

As summarized by the Service (1987, 1998), what is now named the crested caracara was originally described by John James Audubon in 1834, who discovered the caracara and published an account under the name *Polyborus vulgaris*. It was renamed in 1865 by John Cassin to *Polyborus audubonii* and has had several other scientific names since that time, including *Caracara cheriwayi* (AOU 1957). The genus was changed back to *Polyborus* (AOU 1983), but Banks and Dove (1992) recommended that the genus be changed to *Caracara*. The taxonomic relationship between populations in North America and northern South America ("crested caracara," all subspecies within the "cheriway" group) with those in southern South America ("southern caracara," all subspecies in the "plancus" group) has vacillated to the present day. Dove and Banks (1999) presented evidence to support crested and southern caracaras as separate species, which was adopted soon after, but then was reversed twenty years later (Chesser et al. 2021). Presently, all crested caracaras in the western hemisphere are considered to be one species (with southern caracara taking precedent over northern caracara; AOU 1998) and renamed *Caracara plancus* (Chesser et al. 2021).

Specifically, when the Florida Distinct Population Segment of crested caracara was listed in 1987, it was considered one population within *Polyborus plancus audubonii*, a subspecies with an otherwise wide range from Arizona and Texas south to western Panama, as well as Cuba and the Isle of Pines (Service 1987, 2009). Other subspecies from eastern Panama into northern South America when combined with *P. p. audubonii* are considered the "northern *cheriway* group" for crested caracara (AOU 1998). The most recent American Ornithological Society Checklist in 2021 continued to support the change in genus from *Polyborus* to *Caracara* (Dove and Banks 1999, Chesser et al. 2021). The scientific name of Audubon's crested caracara was formally corrected in the List of Endangered and threatened wildlife (50 CFR §17.11) in July 2023 from what it was when originally listed as "Caracara, crested (Audubon's) [FL DPS *Polyborus plancus audubonii*" to "Caracara, crested (Audubon's) [FL DPS] *Caracara plancus audubonii* (88 FR 49310, Service 2023).

Payne et al. (2023) conducted a genetic study to assess the crested caracara's genetic relationship between populations in Florida, Texas, and Arizona. This study found the Florida population of crested caracara exhibit no indications of gene flow with these geographically closest populations of crested caracara and contain genetic variation that is unique to the Florida population. Results of this study provide substantial genetic evidence that Florida's crested

caracaras represent a distinct evolutionary lineage possibly warranting distinction as an Evolutionarily Significant Unit or subspecies.

Distinct Population Segment (DPS) (61 FR 4722)

The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate wildlife. The listed entity is currently included in the Code of Federal Regulations (50 CFR §17.11: Endangered and threatened wildlife) as a Distinct Population Segment occurring in Florida. Taxonomic information described above supports the continuation of assessing the listed entity as distinct from other populations of the species.

Recovery Criteria

Recovery Plan or Outline

Recovery plans are not regulatory documents and intended to provide guidance to the Service, States, and other partners on methods of minimizing threats to listed species and on criteria that may be used to determine when recovery is achieved. If the recovery criteria defined in the plan are still valid, meeting recovery criteria can indicate that the species no longer requires protections under the Act. However, when recommending whether a listed species should be delisted, the Service must apply the factors in section 4(a) of the Act (84 FR 45020). Recovery criteria for the Audubon's crested caracara were defined in the South Florida Field Office's Multi-Species Recovery Plan (Service 1999). The single criterion presented in the 1999 Recovery Plan is comprised by seven components separated by semicolons in the text of the plan. These seven components are discussed individually below using corresponding reference numbers [*1*] through [*7*].

> **Recovery Criteria**
>
> This objective will be achieved when [*1*] any further loss, fragmentation, and degradation of habitat in south-central Florida has been prevented; [*2*] when the number of Audubon's crested caracara territories in the historic range increases from 200 to 300; [*3*] when Audubon's crested caracara have maintained or exceeded this number of territories for at least 10 years; [*4*] when these territories are well-distributed throughout the core counties of Glades, DeSoto, Highlands, Okeechobee, and Osceola; [*5*] when additional breeding pairs have established territories on unoccupied or restored habitat; [*6*] when those lands have been protected through land acquisition, conservation easements, or cooperative agreements; and [*7*] when the Audubon's crested caracara population in Florida 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." (Service 1999)

Recovery criterion [*1*]: "… any further loss, fragmentation, and degradation of habitat in south-central Florida has been prevented…"

This recovery criterion may not reflect what is truly necessary to ensure the survival of the species. When Audubon's crested caracara (caracara) was listed most of the historic literature and contemporaneous records of the species indicated it was a specialist known primarily for nesting in dry prairie habitat with adjacent wetter areas and scattered cabbage palms (*Sabal*

palmetto), although it was recognized some individuals occurred in improved pasture lands (Service 1987). Because of this, the Service attributed the decline of the species to loss and degradation of this habitat via its conversion to citrus production, residential development, and other uses (Service 1987). At the time of listing, the species was restricted to a five-county area (Glades, DeSoto, Highlands, Okeechobee, and Osceola). The species now occurs within 28 counties (listed below). However, the majority of habitat used by the species across the 28 counties still occurs on private lands, which may or may not be protected from conversion to habitats incompatible with caracara use.

Within a decade of listing the species, there have been accounts of caracara using novel habitats including areas used for cattle ranching containing open grasslands and areas with "improved pasture" containing limited native grasses (Morrison and Humphrey 2001, Morrison and Dwyer 2024). With most of Florida's native prairie habitat converted to other land uses, breeding and non-breeding caracaras increasingly utilized improved cattle ranches for nesting and foraging (Morrison and Humphrey 2001, Morrison 2006, Dwyer et al. 2013). The occupancy of this habitat type is likely due to the structural similarities of improved pastures to Florida's original prairies (Morrison 2006, Smith et al. 2017), the resemblance to evolutionary habitats created by large herbivores, and fire, (Dwyer 2010), and philopatry (Figure 1).

In recent years the Service has confirmed numerous accounts of caracara successfully nesting or roosting in busy residential communities, on communications towers, and billboards (Dwyer and Dalla Rosa 2015) while foraging along roadsides, in restaurant parking lots, in residential neighborhoods, on buildings, and in citrus orchards (Figure 2). These observations appear to represent a genuine trend in changing habitat use by nesting and non-nesting Audubon's crested caracara. Morrison and Dwyer (2024) suggest that the caracaras' generalist and opportunistic nature makes them adaptable to challenges encountered in artificial landscapes, as seen by the species' use of man-made structures as nest sites (Dwyer and Dalla Rosa 2015) in cities and consumption of unfamiliar prey.

Using the 2016 National Land Cover Dataset (NLCD) (Dewitz 2019) and productivity reports sent to the Service from various sources within an area of central Florida (Service, unpublished data), we found that 70% of nests documented between 1997-2001 were located in Hay/Pasture habitat types and 30% nested in other habitat types, such as Cultivated Crops, Developed (all intensities), Emergent Herbaceous Wetlands, Evergreen Forest, Scrub/Shrub, and Wood Wetlands. By 2019, caracaras in the study area had increased their use of non-Hay/Pasture habitat types such that 51% of known nests occured in land classes other than Hay/Pasture, including but not limited to Developed-Open Space and Developed-Low Intensity land classes (Table 1, Figure 3). As discussed below, the species continues to increase in number despite the change in habitat use, which indicates that even though these newer habitats are not traditional, individuals using these newer habitats appear to be nesting successfully.

Figure 1. Improved pasture with scattered cabbage palm within a known Audubon's crested caracara nesting territory. Photo Credit: Kenneth McDonald, US Fish and Wildlife Service.

Figure 2. Recently fledged juvenile Audubon's crested caracara perched on a residential fence in Belle Glade, FL. Photo Credit: Daniela Tabilo, Florida Fish and Wildlife Conservation Commission.

Based on these data it appears that Audubon's crested caracara is capable of successfully nesting and foraging in a more diverse range of habitats than were initially believed possible. Though it is unknown if these habitats may be less productive than habitat types historically used by the species, the fact that individuals are able to successfully adapt to areas of commercial and residential development and successfully reproduce, relaxes concerns the species might be threatened by habitat loss. Based on the species' adaptability to human-modified landscapes and successful reproduction in those habitats, availability of hay/pasture/cabbage palm habitats may not be as limiting to the recovery of the species as previously thought.

Table 1. Known Audubon's crested caracara nesting by National Land Cover Dataset (NLCD) land class by time period.

NLCD Landcover	*1997-2001*	*2004-2008*	*2009-2013*	*2015-2019*
Hay/Pasture	70.00%	55.40%	61.70%	48.20%
Developed, Open Space	3.30%	7.70%	7.80%	22.10%
Woody Wetlands	13.30%	15.40%	13.90%	13.00%
Cultivated Crops	4.40%	3.10%	12.20%	9.80%
Developed, Low Intensity	1.10%	15.40%	0.90%	3.60%
Emergent Herbaceous Wetlands	4.40%	3.10%	2.60%	2.50%
Developed, High Intensity	0.00%	0.00%	0.00%	0.40%
Evergreen Forest	1.10%	0.00%	0.90%	0.40%
Scrub/Shrub	2.20%	0.00%	0.00%	0.00%

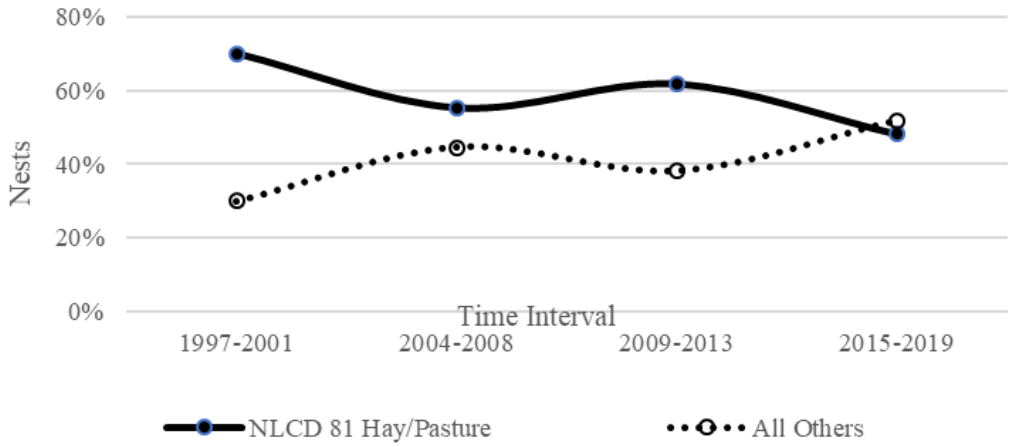

Figure 3. Percent of a subset of Audubon's crested caracara nests by Hay/Pasture habitat and all other habitat types from 1997-2019, showing a general increase of nesting in other types through time.

Recovery criterion [*2*]: "… when the number of Audubon's crested caracara territories in the historic range increases from 200 to 300…**"**

This recovery criterion has been met. The population has grown substantially since listing and now meets this recovery criterion. The Service noted at listing that based on naturalists' notes, published accounts, and museum specimens Audubon's crested caracara began to decline in the early 1930s. In the early 1950s the total population was estimated to be about 250 birds (Sprunt 1954). Funderburg and Heinzman (1967) voiced concern over the decline of the Florida population. Heinzman (1970) subsequently published the results of a 4-year survey (1967-1970) which indicated that fewer than 100 individual caracaras at 58 localities remained in Florida. Stevenson (1976) concurred with this estimate. Based on preliminary data, Layne (1978) estimated the true population was likely larger, with a minimum abundance of 350 breeding and non-breeding adults in Florida between 1973 and 1975. Relying on further analysis by Layne

(1985), the Service estimated there were approximately 150 active breeding territories (all or at least most being occupied by 2 birds each, denoted as a breeding pair) on the landscape in 1987, and an additional 100 unmated adults (i.e., 400 total adult individuals; Service 1987). Analysis of data collected between 1972 and 1991 by Layne (1995) confirmed the population was stable over this timeframe and consisted of a minimum of 300 adults on 150 territories, with a non-breeding adult population of between 100 and 200 individuals (i.e., 400-500 total adult individuals). Root and Barnes (2007) estimated there were 400 breeding pairs in Florida (i.e., approximately 800 total adult individuals). Payne et al (2023) conducted a population genomic study of the caracara and estimated the threshold for long-term maintenance of genetic diversity and evolutionary potential to be 565.4 individuals (95% CI: 458.2, 671.2). If the population decreases further, the population is likely to lose genetic diversity (Payne, pers. comm. 2024). Non-breeding individuals would not be incorporated into this estimate. At least one project estimated roost use revealed more than 300 non-breeding individuals together at a single communal roost (Dwyer and Fraser 2018).

Population assessments conducted using various methods range from 100 individuals (estimated in 1970) to 800 individuals (estimated in 2007). Despite loss and degradation of habitat, the species has tripled its range and increased its population size since 1987 (Morrison 2006, Smith and Dwyer 2024). Given the challenges associated with accessing all the potential habitat within the caracara's range, conducting a reliable range-wide survey of the population, and obtaining an accurate estimate of the caracara's current population size remains difficult (Humphrey and Morrison 1997).

Recovery criterion [*3*]: "… when Audubon's crested caracara have maintained or exceeded 300 nesting territories for at least 10 years…"

This recovery criterion has been met. The caracara population in Florida appears to be relatively stable under current conditions and relatively resilient and expanding in range (Root and Barnes 2007; Payne et al. 2023; Smith and Dwyer 2024). The population viability analysis conducted by Root and Barnes (2007) found zero probability of extinction over the next 50 years at baseline population size (300 breeding pairs) and carrying capacity. Despite fluctuations of the estimated population assessments, it is likely that caracara has been near or above the 300 nesting territories since 2007 and is expected to show stability based on models of species expansion (Root and Barnes 2007; Bateman et al. 2020a, 2020b; Payne et al. 2023; Smith and Dwyer 2024).

Recovery criterion [*4*]: "…when these territories are well-distributed throughout the core counties of Glades, DeSoto, Highlands, Okeechobee, and Osceola…"

This recovery criterion has been met. Since listing in 1987, the species expanded its range from five original counties (DeSoto, Glades, Highlands, Okeechobee, and Osceola counties) to 15 counties in 1999 (Charlotte, Collier, DeSoto, Glades, Hardee, Hendry, Highlands, Indian River, Martin, Monroe, Okeechobee, Osceola, Palm Beach, Polk, and St. Lucie counties; Service 1999; Figure 4). By 2020, sightings of individual birds from October through March had been documented in all 67 counties in Florida during the typical breeding season. If we narrow down the summary of eBird (an online database of bird sightings) information from 2017-2020 during January and February, the main months of the breeding season, 37 counties have more than 500

observations each (totaling over 1,000 observations), indicating there is likely breeding in those counties (www.ebird.org, Figure 4).

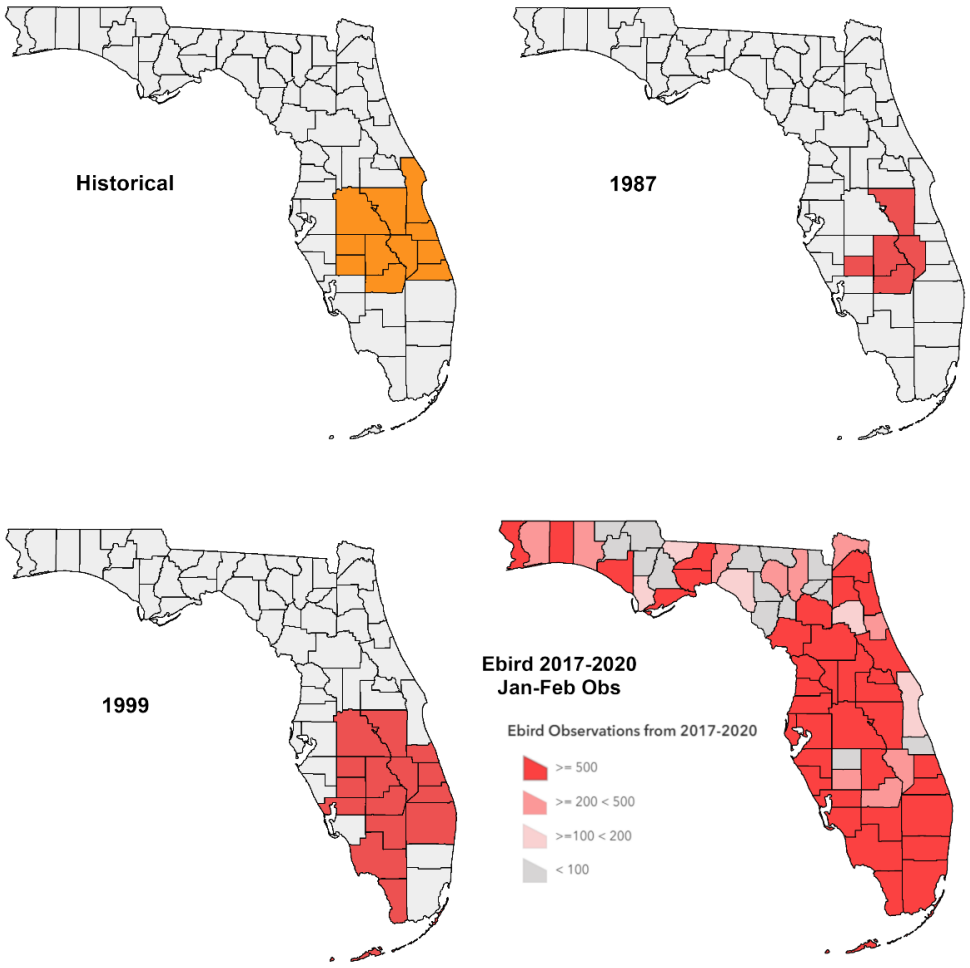

Figure 4. Records of Audubon's crested caracara presence in Florida by county, from listing (1987) to 2020. Source: Historical and 1987 (Service 1987), 1999 range described in Service (1999), and eBird records for January and February only, from 2017-2020 (www.ebird.org, accessed April 15, 2024). eBird records from 2017-2020 are displayed by categories of the number of observations in each county for both January to February (gray: <100, lightest pink: 100-200, moderate pink: 200-500, or darkest red: 500 or more).

According to eBird records from 2017-2020 only 15 of Florida's 67 counties, had fewer than 100 records in each month, between 2017-2020 (Baker, Bradford, Calhoun, Dixie, Gilchrist, Hamilton, Hardee, Holmes, Indian River, Jackson, Lafayette, Liberty, Madison, Union, Washington). In these 15 counties, breeding may not be happening or is less common. Please note that counties where birders spend more time may have artificially inflated numbers because of increased reporting. To date, nesting has been documented in 22 counties (Brevard, Broward, Charlotte, Collier, DeSoto, Glades, Hardee, Hendry, Highlands, Hillsborough, Indian River, Lee, Manatee, Martin, Okeechobee, Osceola, Palm Beach, Pinellas, Polk, Sarasota, Seminole, and St. Lucie counties; Service, unpublished data).

Recovery criterion [*5*]: "…when additional breeding pairs have established territories on unoccupied or restored habitat…"

This recovery criterion has been met. The Service used data from the U.S. Geological Survey's Breeding Bird Survey[1] (BBS), the Audubon Society's Christmas Bird Count [2] (CBC; National Audubon Society 2020) and eBird to estimate the number of nesting pairs in Florida from 2009 to 2018 (Table 2). The Service estimates the nesting population has grown from approximately 150 pairs in 1978 (Layne 1978, 1985 and 1995) to approximately 550 pairs in 2018; note that pairs has been estimated from total number of birds and this number may over represent actual breeding pairs. Growth of the population into previously unoccupied or restored habitat is also evidenced by range expansion (Smith and Dwyer 2024). As of 2020, the species was documented in all 67 counties in Florida (www.ebird.org, accessed April 15, 2024), compared to 15 counties in 1999 (Service 1999). As of the 2022 breeding season, the species has been documented nesting in 22 counties, according to various unpublished monitoring reports submitted to the Service. As previously described, bird information from 2017-2020 during the core breeding season, 37 counties have more than 500 observations in each January and February (totaling over 1,000 observations) indicating there is likely breeding in additional counties, but breeding in those counties are unconfirmed (www.ebird.org, Figure 4).

Table 2. Estimated number of nesting pairs by source (BBS, CBC and eBird).

Year	BBS	CBC	eBird	Average
2009	472.2	440.1	553.7	488.7
2010	319.3	491.3	556.2	455.6
2011	254.6	405.7	581.5	413.9
2012	381.9	390.9	551.2	441.3
2013	737.9	624.3	610.9	657.7
2014	478.7	553.2	643.0	558.3
2015	460.8	520.9	629.8	537.1
2016	529.0	565.8	563.3	552.7
2017	559.8	666.2	543.2	589.7
2018	553.8	614.6	486.7	551.7
Average	475	527	572	525

Recovery criterion [*6*]: "…when those lands have been protected through land acquisition, conservation easements, or cooperative agreements…"

The intention of this recovery criterion has been met. This recovery criterion did not set an explicit goal for the amount or proportion of lands utilized by Audubon's crested caracara that should be protected through these means. This criterion also assumed that natural habitats were

[1] The BBS is performed by approximately 2,500 amateur and professional birders that have expertise in bird identification. Information is collected annually during the breeding season at thousands of randomly established roadside survey routes in the United States and Canada. The BBS data has limitations, including that surveyors are limited to roadsides, individuals could misidentify species, the records do not positively identify nesting, nor give any estimate of nesting success, along with other limitations in trend analysis (Sauer et al. 2003).

[2] The CBC is performed by amateur and professional birders that have expertise in bird identification. Numbers of individual birds are cataloged for a given locality on a designated day between December 14 to January 5. These counts have occurred for over 100 years and provide general trend information about species. Trends provided report annual percent change in relative abundance (Meehan et al. 2022).

required for the caracara's recovery. A majority of available caracara habitat is privately owned and much of that habitat is also in non-natural condition, as described above. Despite the difficulties in surveying private lands, many nest sites are found on private lands, and some studies indicate these nests may be more successful than those on public lands (Morrison 1996; Morrison and Humphrey 2001). Managed pasture lands have been shown to be compatible with caracara; in fact, the population has been and currently is dependent on such areas and has remained stable or increasing using those lands for more than ten years. The Service used landcover types from the 2021 National Land Cover Dataset (https://www.mrlc.gov/data, Accessed May 29, 2024): cultivated crops, pasture/hay, developed open space, and woody wetland, designated as preferred habitat based on productivity reports as explained in criterion 1 above. We discovered that the preferred habitat types for nesting caracara cover approximately 52 percent (18.1 million acres) of the state of Florida. Of that 52 percent, approximately 28 percent are within protected areas (Table 3, Figure 5).

Table 3. Number of acres and percentage of land covered by caracara preferred habitats/landcover types (hay/pasture, developed, open space, woody wetlands, and cultivated crops) within and outside protected areas in Florida.

Selected landcover types	***Hectares (ha)***	***Acres (ac)***	***Percent (%)***
Within protected habitats	2,020,101.84	4,991,780.35	27.6
Outside protected habitats	5,307,458.09	13,115,014.55	72.4
Total in the State of Florida	7,327,559.92	18,106,794.90	

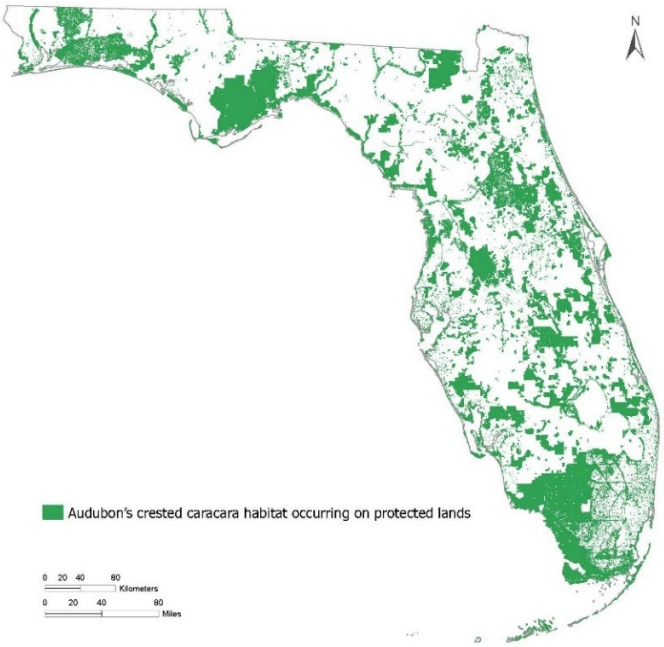

Figure 5. Audubon's crested caracara habitat (e.g., land use types of cultivated crops, pasture/hay, developed open space, and woody wetland) within protected lands in the state of Florida.

Because the species has been successfully nesting in human-modified landscapes such as pastures, fields, orchards, and even low-density urban areas, we believe that the current conditions meet this criterion, providing the species with a mix of protected natural and appropriately managed human-modified habitats for the future.

Recovery criterion [*7*]: "…when the Audubon's crested caracara population in Florida 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."

This recovery criterion has been met. The Service used data from BBS, CBC and eBird to calculate the average yearly growth rate ($r < 1$ indicates population decline, $r > 1$ indicates population growth). To calculate relative abundance, the Service generated an estimate of the reported count based on survey effort (abundance= count/survey effort). The results were scaled to the population size estimates provided by Layne (1978 and 1995), Service (1987), and Root and Barnes (2007). Our analysis of abundance data indicates population growth with r_{10} =1.04. The population's average annual growth rate based on the mean of all these estimations is 1.05 (Table 4), suggesting that the population has maintained a sufficient growth rate during the last ten years (2009-2018) with a complete record to meet this recovery criteria.

Table 4. Estimated average annual population and growth rate by source (BBS, CBC and eBird).

Table 4.a. Estimate number of nesting pairs, 3-year average.

Year	BBS	CBC	eBird	Average
2009	372.2	419.1	454.0	415.1
2010	401.9	427.1	512.9	447.3
2011	348.7	445.7	563.8	452.7
2012	318.6	429.3	563.0	437.0
2013	458.1	473.6	581.2	504.3
2014	532.8	522.8	601.7	552.5
2015	559.1	566.1	627.9	584.4
2016	489.5	546.6	612.0	549.4
2017	516.5	584.3	578.7	559.9
2018	547.5	615.5	531.0	564.7
Average	454	503	563	507

Table 4.b. Estimated nesting pair population growth rate based on a 3-year average.

Year	BBS	CBC	eBird	Average
2009	1.18	1.04	1.19	1.13
2010	1.08	1.02	1.13	1.08
2011	0.87	1.04	1.10	1.00
2012	0.91	0.96	1.00	0.96
2013	1.44	1.10	1.03	1.19
2014	1.16	1.10	1.04	1.10
2015	1.05	1.08	1.04	1.06
2016	0.88	0.97	0.97	0.94
2017	1.06	1.07	0.95	1.02
2018	1.06	1.05	0.92	1.01
Average	1.07	1.04	1.04	1.05

The Service's analysis of population growth using BBS, eBird, and CBC datasets reveals that the average annual growth rate of the population for ten years (2009-2018) is (r_{10}) =1.07, 1.04, and 1.04, respectively (Table 4.b). The BBS trend data from 1966 to 2019 for the Florida Region of caracara (corresponding to the Florida DPS), indicate an overall positive trend 9.9 (2.5% CI: 7.65 to 97.5% CI: 12.44) as shown by an overall increase in relative abundance through time (Figure 6; Sauer et al. 2020). The CBC data also show an annual increase (annual % change per year) in Florida: trend from 1970 to 2021: 7.54% (6.61-8.49); trend from 1993-2021: 7.51% (6.56-8.46); trend from 2009-2021: 7.16% (4.49-8.90) (Meehan et al. 2022).

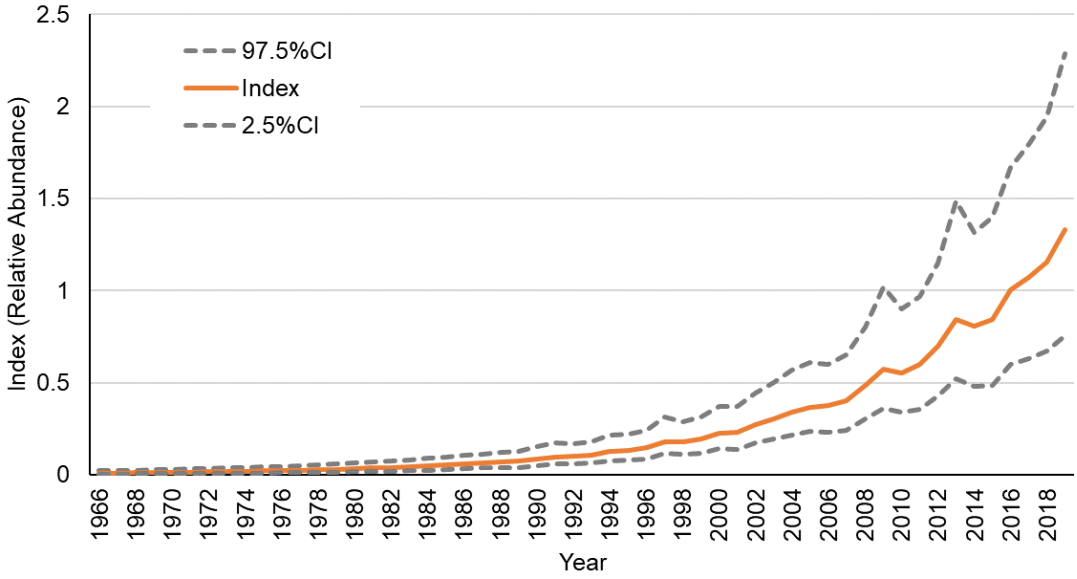

Figure 6. Breeding Bird Survey annual indexes (Index) for the Florida Region of caracara from 1966 to 2019, Indexes are relative abundance estimated as yearly predicted abundances from the hierarchical model analysis (Sauer et al. 2020).

Recovery Criteria Summary

The Service believes that the number of caracara territories in the historic range is now at or above 300, that these territories have been maintained for more than ten years, and that they have spread from what were once thought to be the species' core counties to virtually all counties in Florida. In addition to the well-known areas, the species has been confirmed to successfully reproduce in 22 Florida counties. Loss of natural preferred breeding habitat remains the primary threat to the caracara, and urban growth is rapidly converting ranchland pastures to residential developments. However, the species' use of a variety of human-modified landscapes minimizes these threats. Although if excessive amounts of natural or pastureland is converted to higher density urban this could become problematic.

Biology and Habitat Summary

General information on the biology and life history of Audubon's crested caracara is presented in the Service's Multispecies Recovery Plan (Service 1999), and the previous status review (Service 2009). A summary of relevant biology and life history information can be found below, and additional information is found in the Recovery Criteria review above.

Genetics

The genetic relationship between caracara populations within and between North and South America have been unknown until recently, with taxonomic relationships within and between populations typically inferred from comparative morphology. The American Ornithological Society (Chesser et al. 2021) and International Ornithologists' Union (Gill et al. 2021) merged the Northern crested caracara (*Caracara cheriway*) and southern crested caracara (*Caracara plancus*) under a single taxon designated Crested caracara (*Caracara plancus*).

To investigate the population genetics of the Florida population relative to other populations of North American caracara, Payne et al. (2023) sampled DNA from caracaras in Florida (n = 273), Arizona (n = 10), and Texas (n = 6). The team analyzed over 9,000 single nucleotide polymorphisms (SNPs) with double-digest restriction site associated DNA sequencing (ddRADseq) and sequenced mitochondrial DNA. Their analyses of population structure suggest two major clusters within North America are best supported, one containing Florida individuals and another containing Arizona and Texas individuals. Based on the results of their analysis Payne et al. (2023) concluded that the Florida population of crested caracara is highly differentiated genetically and represents a distinct evolutionary lineage. See additional discussion in Taxonomy section above.

Distribution

Audubon's crested caracara currently breed in peninsular Florida with no apparent genetic exchange with other populations of the species (Service 1999, Morrison 2006, Payne et al. 2023). It is believed this population arrived in Florida during the Pleistocene Epoch (Humphrey and Morrison 1997) when grasslands and savannas reached their maximum extent, creating a corridor of suitable habitat for the species from present-day Mexico, around the northern Gulf coast, and into Florida (Humphrey and Morrison 1997). Subsequent changes to temperature and precipitation led to a corresponding decline in grassland and savanna habitat along the Gulf Coast, isolating the Florida population from the rest of the species (Layne 1996, Humphrey and Morrison 1997). Today, Audubon's crested caracara remains a reproductively isolated population which is genetically distinct from other populations of the species (Payne et al. 2023).

Historically, Audubon's crested caracara was a common resident from northern Brevard County, south to Fort Pierce, Lake Okeechobee, and Hendry County (Service 1999) conforming closely to original major prairie ecosystems in southcentral Florida (Morrison 1996). The population and distribution of the species decreased because of habitat conversion to agriculture, residential, and commercial uses in the early to mid-20th century (Layne 1996; Humphrey and Morrison 1997; Morrison 1999; Service 1999; Barnes 2007, Dwyer 2010). By the time Audubon's crested caracara was listed in 1987 its range was reduced to a core of five counties (Glades, Desoto, Highlands, Okeechobee, and Osceola) with isolated records in three other counties (Charlotte, Hardee, and Polk) (Service 1987). However, between its listing in 1987 and 1999, records of Audubon's crested caracara grew to include 15 counties (Charlotte, Collier, Desoto, Glades, Hardee, Hendry, Highlands, Indian River, Martin, Monroe, Okeechobee, Osceola, Palm Beach, Polk, and St. Lucie; Service 1999). Presently, there have been breeding season occurrences of the species throughout the state.

Habitat Conditions

Historically, Audubon's crested caracara in Florida exclusively used dry or wet prairie areas with scattered cabbage palms (*Sabal palmetto*), pastures, and lightly wooded areas (Stevenson and Anderson 1994) scattered with saw palmetto (*Serenoa repens*), scrub oaks (*Quercus undulata*, *Q. minima*, *Q. pumila*), and cypress (*Taxodium* spp.) (Service 1999). Nesting territories of the species frequently occupy prairies and pastures with these structural characteristics along river channels intermixed with freshwater marshes associated with old river oxbows. Common marsh vegetation in wetter components of home ranges includes water lily *(Nymphaea odorata),* pickerel weed *(Pontederia lanceolata),* maidencane *(Panicum hemitomon),* arrowhead *(Sagittaria lancifolia),* smartweed *(Polygonum* sp.), beakrush *(Ryncospora inundata),* and rush *(Juncus effusus).* Grasses include wiregrass *(Aristida stricta),* torpedo grass *(Panicum repens),* and southern cutgrass *(Leersia hexandra)* (Morrison 1996).

Audubon's crested caracara have adapted to widespread changes in land use by using areas of habitat that are analogous in structure to those formerly occupied by the species, typically in areas created for water management, agriculture, or in developed open spaces. For example, channelization of the Kissimmee River basin in 1950s resulted in the conversion of many areas of marshland to dry upland pasture. Though this process has been problematic for many other species, these patterns of hydrological management may have provided new nesting habitat for the species even as some habitats have been lost to other land uses (Morrison 1996). Other studies have found caracara preferentially using pastures in areas that were formerly dry prairie, likely because they resemble the native dry prairie and savannah habitat that once occupied those spaces and because of philopatry (Dwyer 2010).

Overall, nesting territories of the species in Florida traditionally contain higher proportions of improved pasture and lower proportions of forest, woodland, oak scrub, and marsh (Service 2017). Analysis of more recent records indicate Audubon's crested caracara are using analogous, alternative habitats created by human activity. Humphrey and Morrison (1997) and Morrison and Humphrey (2001) found that nesting crested caracaras most preferred cattle ranches characterized by open expanses of short grasslands with scattered groups of cabbage palms, live oak (*Quercus virginiana*), and cypress with very little other herbaceous diversity. With respect to their terrestrial foraging habits, caracara's apparent preference for pastures containing little structural diversity may be driven by the caracara's common practice of foraging for prey while walking (Humphrey and Morrison 1997). This behavior likely contributes to caracara successfully foraging and breeding in habitats modified by human activity such as roadsides, low intensity or open developed spaces, row crops, and orchards.

Threats (Five-Factor Analysis) Summary

The status of a species is determined from an assessment of factors specified in section 4 (a)(1) of the Act. A summary of this assessment is detailed below.

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

Sea level rise (SLR)

Sea level rise and hotter water temperatures will likely not directly affect any significant portion of caracara habitat in Florida since it occurs primarily in non-coastal areas. However, using the

one range for caracara (12,705,707 acres), the estimated percentage of the range affected by sea level rise by 2100 is between 2% (1 ft SLR) and 7% (7 ft SLR) (NOAA 2024, Accessed July 17, 2024; Runkle et al. 2022). Sea level rise may also influence land use and population growth to the inland portions of the state within the primary range of the species. Because of the species' adaptive capability and increases already seen in their breeding range, we believe sea level rise will not be a significant threat to this species.

Human-related development

Future scenarios of development are based on the human population increase and land development predictions reported in Florida 2070 (Carr and Zwick 2016). The Florida 2070 Trend model would result in the change of land use type of approximately 94,608 acres of currently occupied nesting territories to development. This constitutes an approximate reduction of 13.5% of available nesting habitat historically utilized by the species but does not adjust for caracara utilizing atypical nesting sites such as developed spaces.

B. Overutilization for commercial, recreational, scientific, or educational purposes

Caracara in Florida has historically been perceived as a threat to livestock and was subject to illegal shooting. Anecdotal accounts conveyed to Service staff purported accounts of caracara preying on calves, though no such instance of depredation has ever been described in scientific literature or documented by a state or federal agency. Additionally, some landowners historically shoot caracara and vultures because they believed the birds were responsible for the death of livestock. Though relatively uncommon, the periodic encounter of these beliefs and anecdotal accounts among some landowners or their descendants by state biologists, federal biologists, and consultants in the field, as well as online forums dedicated to the subject, may indicate a previously underestimated historic risk to individuals of the species. Based on several landowner interactions with agency and consultant staff in the field, the impression emerges that prior to the listing of Audubon's crested caracara it was regarded as normal and prudent among some landowners to shoot caracara and other avian scavengers they encountered on their property.

We believe it is possible that subsequent education and outreach following the listing of the subspecies in 1987, coupled with the fear of prosecution for engaging in prohibited take of individuals, substantially decreased shootings of caracara over time. This may explain some portion of the population's steady growth since listing. But because attitudes and actions of private landowners (on whose lands the species most often occurs) are now largely confined to oral histories (which former practitioners and descendants may be reluctant to share with biologists), it is impossible to estimate the number of shootings in the past, or how much the species may be benefitting from the cessation or reduction of the practice in the present. The Service has not received any documentation of a deliberate killing of an individual attributed to concerns related to protection of livestock. Based on the available information, the Service finds that the current levels of utilization of the Audubon's crested caracara for commercial, recreational, scientific, and educational purposes or through targeted killing of individuals do not represent a threat to the survival and recovery of the species.

C. Disease or predation

The Service's last review of the Audubon's crested caracara in 2009 (Service 2009) noted the blood parasite, *Haemoproteus tinnunculi*, had been found in the species (Foster et al. 1998).

West Nile virus, St. Louis encephalitis, and Eastern equine encephalitis are also documented in caracara (Dwyer, pers. comm. 2009). The effects of these parasites and diseases on survival is not known.

On July 29, 2022, the U.S. Geological Survey reported a mortality of Audubon's crested caracara in Broward County from H5N1 Highly Pathogenic Avian Influenza virus to the U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (USDA 2022). On September 9, 2022, representatives of the Miccosukee Tribe of Indians of Florida notified the Service of a confirmed mortality of a female fledgling in Broward County dying from highly pathogenic avian influenza (H5N1) (van der Heiden pers. comm. 2022). In total, 413 positive detections of H5N1 have occurred in Florida wild birds that overlap the range and habitat of Audubon's crested caracara. Of the 413 birds, 229 were black and turkey vultures, which are known to aggregate with Audubon's crested caracara while feeding on carrion or roosting. The Service is monitoring this event and its effect on the population of Audubon's crested caracara. To date, there has only been one confirmed fatality to H5N1 since September 2022. The overall impact of H5N1 on the species is currently unknown.

D. Inadequacy of existing regulatory mechanisms

Two federal statutes that offer protection for the crested caracara (including all subspecies) even if it were not directly protected under the Act are the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) and the Migratory Bird Treaty Act (MBTA). Audubon's crested caracara are included within the higher taxon of Falconiformes species in Appendix II of CITES, a treaty established to monitor international trade to prevent further decline in wild populations of plant and animal species. CITES permits may not be issued if import or export of the species may be detrimental to the species' survival, or if specimens are not legally acquired. Any trade of caracara requires a CITES export permit or re-expert certificate to be granted by the Service before the trade occurs.

The Migratory Bird Treaty Act of 1918 prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species, to include caracara, without prior authorization by the Service (see 50 CFR 10.13 for a complete list of species protected under the MBTA). The State of Florida requires anyone engaging in an activity which would result in take of migratory birds to obtain the appropriate permit to do so from the U.S. Fish and Wildlife Service Migratory Bird program. Under federal law, unauthorized taking of migratory birds that qualify as misdemeanor offenses may result in a maximum of $5,000 fine and/or imprisonment for not more than six months for individuals, or $10,000 fine for an organization. Felony offenses may be fined a maximum of $250,000 and/or result in imprisonment for not more than two years for an individual or $100,000 for an organization. Florida Wildlife Commission law enforcement officers regularly coordinate prosecution with their counterparts in the U.S. Fish and Wildlife Service.

In addition to federal protections, the State of Florida provides legal protection for Audubon's crested caracara within its boundaries. The State lists the status of Audubon's crested caracara as "Federally designated threatened" under Florida's Endangered and Threatened Species Rule. Chapter 372.0725 of the Florida Statutes state "it is unlawful for a person to intentionally kill or wound any fish or wildlife of a species designated by the Florida Wildlife Commission as endangered, threatened or of special concern or to intentionally destroy the eggs or nest of any

such fish or wildlife, except as provided for in the rules of the commission. Violation of these prohibited acts can be considered a third-degree felony and is punishable by up to 5 years in prison and a $10,000 fine (Florida Statutes 372.725, 775.082, 775.083 and 775.084). Enforcement activities associated with state-listed species are conducted by the Florida Wildlife Commission's division of Law Enforcement. If a species is not federally listed, they can also be protected as a state-designated Threatened or Endangered species under Florida's Endangered and Threatened Species Rule (https://www.flrules.org/gateway/ChapterHome.asp?Chapter=68A-27, Accessed July 17, 2024). The state will determine if the species warrants protections in Florida if it is not protected under the Endangered Species Act.

Based on the protections provided the Audubon's crested caracara, the Service finds that the current regulatory mechanisms are adequate to protect the species from current threats.

E. Other natural or manmade factors affecting its continued existence

Human Disturbance to Nesting

Residential development and energy infrastructure, particularly solar, is increasingly proposed near nesting and roosting sites of Audubon's crested caracara. The effect these activities have on caracara reproduction is unknown. Anecdotal evidence gained from recent field observations and telemetry indicate some nesting pairs may be more tolerant of human presence and activities than was previously assumed.

To address the impacts of solar arrays installed within a 300m (985 ft) buffer from an identified caracara nest, NextEra Energy submitted a Caracara Monitoring Plan (NextEra 2023) to the Service, which includes three years of nesting data collection prior to and after solar development and will be evaluated by the Service.

Road-related Mortality

The Service has documented instances of caracara death resulting from vehicle collisions. These incidents typically occur in areas with recent, rapid growth of the human population adjacent to areas still abundant in wildlife. The presence of increases in traffic and corresponding increases in road-killed carrion, coupled with caracara common consumption of carrion on roadsides, has increased the number of Audubon's crested caracara killed by motor vehicles. Continued growth of the caracara population along with increases in human population in the foraging areas of caracaras and near areas of abundant wildlife will further increase death of caracara from collision with motor vehicles. The continued growth of the population of caracaras in Florida despite these mortalities indicate that although unfortunate, the populations appear to be minimally impacted by road-related mortality at this time.

Contaminants

Audubon's crested caracara is routinely exposed to several contaminants known to affect terrestrial and aquatic avian species, such as herbicides, rodenticides, and pesticides. However, we presently don't know whether contaminants pose a significant threat to the species.

Sea Level Rise, Extreme Weather Events

In addition to sea level rise, discussed under Factor A, above, are other potential weather impacts include extreme storm events (e.g., hurricanes). Hurricanes can cause extreme impacts to the habitats and species, through flooding, high winds, and extreme precipitation. Florida has undergone several severe hurricanes in the last ten years (e.g., Hurricane Irma – 2017, Hurricane Michael – 2018, Hurricane Sally – 2020, Hurricane Ian – 2022). Even with these hurricanes impacting various portions of the state, population growth has continued to increase through that same time. We believe that this indicates the general ability of the species to withstand extreme weather events. It is also possible that some disturbance from hurricanes could create or maintain more open habitat the species prefers.

The continued expansion of the caracara is supported by modeling[3] (Audubon 2020; Bateman et al. 2020a, 2020b; see Map at https://www.audubon.org/field-guide/bird/crested-caracara). These predictive models do not take into consideration potential changes in land use or cover types caused by other activities like, sea level rise, or alterations in urban growth patterns. However, we predict that the species' adaptive capability will result in sustained current range and future species range expansion. This modeling estimated changes in range of species (*Caracara plancus*) within North America. We have summarized the predicted changes from these models below.

Summer Range: Modeling predicted that the summer range of crested caracara (all populations, including Florida's) by 2080 may change from its current summer range with 1.5° C of warming, expanding by 24% across the range.

- Florida population primarily expanding north and west into the southern half of Georgia, exanding further into portions of northern Florida, and into limited areas added in coastal South Carolina, Alabama, Mississippi, and Louisiana
- western population expansion to the north and east

Winter (Nesting) Range. Using similar models, the Audubon Society also projects the winter (nesting) range of caracara. With 1.5° C of warming beyond present, by 2080 the crested caracara wintering range could expand by 24 % across the range.

- Florida population primarily expanding into large portions of the southern half of Georgia and into portions of extreme northeast Florida
- western population expansion north and east

Species Status Summary (3 Rs)

The Species Status Assessment (SSA; https://www.fws.gov/project/species-status-assessment) Framework is an analytical approach developed by the Service to deliver foundational science for informing all decisions under the Act. Part of the SSA framework is to assess the listed

[3] Crested caracara was considered a resident (permanent, non-migratory) for the summer and winter analyses. The seasonal models for caracara predict vegetation projections (arid land changes) and considerations of species' natural history like their dispersal limitations in response to changes in temperature and weather patterns chosen and for two seasons: summer months (June-July) and winter (January-February) (Bateman et al. 2020a). Note that the winter period is the nesting period for caracaras in Florida.

entity's ability to sustain populations over time. To sustain populations over time, a species must have the capacity to withstand:

(1) environmental and demographic stochasticity and disturbances (Resiliency),
(2) catastrophes (Redundancy), and
(3) novel changes in its biological and physical environment (Representation).

Although this entity does not have a formal SSA, we have briefly assessed Resiliency, Redundancy, and Representation below.

Resiliency is the ability of a species to withstand environmental stochasticity (normal, year-to-year variations in environmental conditions such as temperature, rainfall), periodic disturbances within the normal range of variation (fire, floods, storms), and demographic stochasticity (normal variation in demographic rates such as mortality and fecundity).

The Audubon's crested caracara is long-lived, adaptable to new habitats, widely dispersed species currently found breeding in at least 22 counties in Florida. The temperatures and mild weather in Florida also allow the species to occasionally attempt to nest more than once in a season (Morrison 1998). The distribution of the species across much of Florida, their long-life span (longevity record in the wild documented a 24-year-old individual: Morrison et al. 2016), and their long natal dispersal (Nemeth and Morrison 2002, Smith and Dwyer 2024), limits the impact of stochastic events such as hurricanes, and there's no evidence to indicate exposure to events such as these have population-level effects. The species is adapted well to its natural and human-modified environment, has shown resiliency in the last several decades, and is expected to have resiliency into the future.

Redundancy is the ability of a species to withstand catastrophes. Catastrophes are stochastic events that are expected to lead to population collapse regardless of population health and for which adaptation is unlikely.

The caracara is currently extensively distributed (nesting in 22 counties), and its range is expanding and predicted to expand in the future (Audubon 2020, Bateman et al. 2020a, 2020b, Smith and Dwyer 2024). Because of the species' vast range, stochastic occurrences are predicted to have a limited influence. We believe caracara has sufficient redundancy because of its broad distribution in Florida, dispersal ability as indicated by species movements and expansion, and predicted future range increase.

Representation is the ability of a species to adapt to both near-term and long-term changes in its physical (temperature and precipitation conditions, habitat conditions, habitat structure, etc.) and biological (pathogens, competitors, predators, etc.) environments.

Audubon's crested caracara has been shown to be adaptable to new habitats and foods (Morrison and Humphrey 2001, Morrison 2006, Dwyer et al. 2013, Morrison and Dwyer 2024). The Service has confirmed numerous accounts of caracara successfully nesting or roosting in busy residential communities, on communications towers, and billboards while foraging along roadsides, in restaurant parking lots, in residential neighborhoods, on buildings, and in citrus orchards. We believe the species is appropriately represented based

on evidence of its adaptability to future prospective habitat. There is no indication the species faces constraints or obstacles to further population growth imposed by factors such as genetic diversity or barriers to gene flow within the population (Payne et al. 2023).

Please note that these predicted models do not account for potential changes in land use/land cover related to other activities, sea level rise, shifts in urban development; however, we believe that because of the adaptive capability of the species the increase in range and potential habitat will result in continued expansion of species range.

Synthesis

Audubon's crested caracara is an adaptable and genetically distinct falconid that occurs in suitable upland grassland and maintained agricultural and suburban upland habitats in Florida. Since its listing in 1987, the population has increased and expanded its range, effectively using human-made analogues of its natural and historical habitats. Caracara have expanded their range from a core of 5 counties of documented nesting in 1987 to 22 counties of documented nesting in 2022. Among these are observation records of caracara in the Florida panhandle indicating that caracara is expanding their range northward. The caracara population has increased from an estimated 100 adults in 1978 to an estimated 800 adults (400 breeding pairs) in 2007. Estimates of population growth is also supported by population expansion in numbers and range. The species demonstrates sufficient resiliency to loss of natural habitats by using a variety of human-modified habitats, including such as pastures, fields, orchards, and low-density urban. The species faces conservation challenges, including ongoing habitat changes and degradation as a result of commercial and residential development; individual mortality from vehicle collisions; the perception by some homeowners and landowners that they are a nuisance; exposure to contaminants; and human disturbance of nesting. Many of these stressors are already present and impacting Audubon's crested caracara but the continued range expansion and population increases show that these threats appear to not be significant impacts to the species in Florida. For this reason, we do not believe these challenges are sufficient to cause the species to become threatened with extinction, and that these can be addressed by other conservation mechanisms in place at the state level. We believe the species has demonstrated the redundancy, adaptability (representation), stability, and resiliency to sustain ongoing population growth and range expansion despite the described threats, and based on these observations, we find that Audubon's crested caracara no longer meets the definition of threatened or endangered species pursuant to the Act.

RECOMMENDED FUTURE ACTIVITIES

Although the species has improved on the landscape, the following activities can be beneficial for the species' continued conservation into the future:

1. Develop conservation activities for Florida's caracara population for both breeding and non-breeding individuals, including management to ensure the availability of natural habitats and habitat matrices in cattle pastures and citrus groves.
2. Research how caracara reproductive effort and success is affected by the presence of human activity.
3. Engaging in private lands conservation and acquisitions to mitigate the impact of activities likely to reduce the availability of large areas of caracara habitat.

4. Engaging in habitat conservation that results in the restoration and protection to habitats known to be compatible with the needs of Audubon's crested caracara.
5. Develop conservation activities that can be implemented near communal roosting areas, when occurring near residential areas and other developments.

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RESULTS / SIGNATURES

U.S. Fish and Wildlife Service
5-Year Status Review of Audubon's Crested Caracara

Status Recommendation:

On the basis of this review, we recommend the following status for this species. A 5-year review presents a recommendation of the species status. Any change to the status requires a separate rulemaking process that includes public review and comment, as defined in the Act.

____ Downlist to Threatened
____ Uplist to Endangered
__X_ Delist:
____ *The species is extinct*
_X_ *The species does not meet the definition of an endangered or threatened species*
____ *The listed entity does not meet the statutory definition of a species*
____ No change needed

New Recovery Priority Number (48 FR 43098):

Based on the information synthesized in this review, the Service is assigning 15 as a new recovery priority number (RPN) for the Audubon's crested caracara, indicating a low degree of threat and a high recovery potential for this subspecies/Distinct Population Segment. We believe that the species' biology and threats are well recognized, therefore rigorous management of the species or its habitat is unnecessary. Additionally, due to the species' ability to use both human-modified and natural landscapes, we have removed the "C" classification from the number, indicating that species recovery is no longer in conflict with construction, other development projects, or other forms of economic activity.

FIELD OFFICE APPROVAL:
Acting Division Manager, Florida Ecological Services Field Office, U.S. Fish and Wildlife Service

Approve NICOLE COLANGELO Digitally signed by NICOLE COLANGELO Date: 2025.04.30 11:56:55 -04'00'

LEAD REGIONAL OFFICE APPROVAL:
Assistant Regional Director – Ecological Services, Fish and Wildlife Service

Approve CATHERINE PHILLIPS CZARNECKI Digitally signed by CATHERINE PHILLIPS CZARNECKI Date: 2025.04.30 08:42:17 -04'00'