

# U.S. FISH AND WILDLIFE SERVICE SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

**Scientific Name:**

Amazona viridigenalis

**Common Name:**

red-crowned Parrot

**Lead region:**

Region 2 (Southwest Region)

**Information current as of:**

05/01/2012

**Status/Action**

Funding provided for a proposed rule. Assessment not updated.

Species Assessment - determined species did not meet the definition of the endangered or threatened under the Act and, therefore, was not elevated to the Candidate status.

New Candidate

Continuing Candidate

Candidate Removal

Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status

Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species

Range is no longer a U.S. territory

Insufficient information exists on biological vulnerability and threats to support listing

Taxon mistakenly included in past notice of review

Taxon does not meet the definition of "species"

Taxon believed to be extinct

Conservation efforts have removed or reduced threats

\_\_\_ More abundant than believed, diminished threats, or threats eliminated.

## **Petition Information**

\_\_\_ Non-Petitioned

X Petitioned - Date petition received:

90-Day Positive:07/14/2009

12 Month Positive:10/06/2011

Did the Petition request a reclassification? **No**

### **For Petitioned Candidate species:**

Is the listing warranted(if yes, see summary threats below) **Yes**

To Date, has publication of the proposal to list been precluded by other higher priority listing?  
**Yes**

Explanation of why precluded:

We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions (including candidate species with lower LPNs). During the past 12 months, the majority our entire national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements; meeting statutory deadlines for petition findings or listing determinations; emergency listing evaluations and determinations; and essential litigation-related administrative and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of Progress on Revising the Lists, in the current CNOR which can be viewed on our Internet website (<http://endangered.fws.gov/>).

### **Historical States/Territories/Countries of Occurrence:**

- **States/US Territories:** Texas
- **US Counties:**County information not available
- **Countries:** Mexico, United States

### **Current States/Counties/Territories/Countries of Occurrence:**

- **States/US Territories:** Texas
- **US Counties:** Cameron, TX, Hidalgo, TX
- **Countries:** Mexico, United States

### **Land Ownership:**

Primarily privately owned land. Approximately 95 percent of Texas is privately owned (Jahrsdoerfer and Leslie 1988, p. 1), and although there are State-owned parks and wildlife management areas and Federal

wildlife refuges in Cameron and Hidalgo Counties, the primary land ownership is private in both counties. In foraging for food or finding more suitable sites with larger quantities of food resources, red-crowned parrots are mobile and can use city, state, and private areas in cemeteries, backyards, and within the city limits (Hagne 2012, pers. comm.) where habitat is available. Precise ownership status of land in Mexico is not known however most land is also privately owned

### **Lead Region Contact:**

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### **Lead Field Office Contact:**

## **Biological Information**

### **Species Description:**

The red-crowned parrot (*Amazona viridigenalis*) is a mid-sized parrot, measuring approximately 33 centimeters (cm) (13 inches (in)) in length and weighing approximately 316 grams (g) (0.70 pounds) (Enkerlin and Hogan 1997, unpaginated). Average male and female wing length measures approximately 20.75 centimeters (cm) (8.2 in) and 20.04 cm (7.9 in), respectively. Average tail lengths for males and females measure 10.86 cm (4.3 in) and 10.24 cm (4.0 in), respectively (Forshaw 1989, p. 603). Adults have a bright green overall plumage distinguished by bright yellow-green cheek areas, bright red on the crown (top of head) and lores (area between eye and bill), and a violet-blue band extending from behind each eye down each side of the crown and neck (Figure 1, McKinney undated). The back of the head and neck is scaled with black-tipped feathers. The flight feathers are bluish-black overall, with the outer secondary flight feathers also bearing a red patch. The tail feathers are tipped with yellowish green. The bill is cream-yellow colored, the iris is yellow, and the orbital ring and feet are pale gray. Juveniles are similar to adults except that the bright red feathers on the head are limited to the forehead and lores, and the violet-blue band on the sides of the crown tends to form a broad band over and behind the eye (Enkerlin and Hogan 1997, unpaginated; Forshaw 1989, p. 603).



Figure 1. Photo of red-crowned parrot at the World Birding Center, Texas. Photo credit: Brad McKinney, World Birding Center.

### **Taxonomy:**

The red-crowned parrot was originally named as *Chrysotis viridigenalis* Cassin 1953 (Le Conte et al. 1852-1853, p. 371), however it was reorganized and assigned under the genus *Amazona* Sharpe 1900 making its' complete scientific name *Amazona viridigena*. Synonyms for the species include Green-cheeked Amazon, Mexican Red-head (California Parrot Project 2012), Green-cheeked Parrot, and Red-crowned Amazon (Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 2012). A morphologically-similar species and one that is difficult to distinguish from the red-crowned parrot in its habitat when in the wild is the Lilac-crowned parrot (*Amazona finschi*). Both species occupies similar habitat in Mexico, however there are no known reports of hybridization between these two species (Froese 1981).

### **Habitat/Life History:**

The red-crowned parrot generally occurs in tropical lowlands and foothills, inhabiting tropical deciduous forest, gallery forest, evergreen floodplain forest, Tamaulipan thornscrub, and semi-open areas. It generally occurs between sea level and 500 meters (m) (1,640 feet (ft)) elevation, with most birds found within 200–500 m (656–1,640 ft) (Macias and Enkerlin 2003, p. 10; Enkerlin and Hogan 1997, unpaginated). In winter, it sometimes visits dry pine and pine-oak forests up to 1,200 m (3,937 ft) elevation to forage (Macias and Enkerlin 2003, p. 10; Clinton-Eitniear 1986, p. 22; Clinton-Eitniear 1988, p. 28; Martin et al. 1954, p. 46). Enkerlin and Hogan (1997, unpaginated) describe typical habitat as being diverse deciduous tropical forest with a relatively open, 15–20 m (50–65 ft) high canopy layer, and dominant canopy vegetation that includes *Ficus cotinifolia* (strangler fig), *Bumelia laetevirens* (coma or woolly buckthorn), *Pithecellobium flexicaule* (Texas ebony), *Bursera simaruba* (gumbo-limbo), *Phyllostylon brasiliensis* (ceron), *Brosimum alicatrum* (ojite), and *Helietta parvifolia* (barreta). Gelbach et al. (1976, pp. 54–55) described a floodplain

forest habitat as evergreen forest dominated by *Pithecellobium flexicaule* with *Ehretia anaqua* (anacua), *B. laetevirens*, and *Condalia* subdominant. Altered habitats are also used. The species is known to occur in partially cleared and cultivated landscapes with woodlots and woodland patches (Collar et al. 1992, p. 425), and, in reduced numbers, in agricultural areas where a few large trees remain standing for nesting and roosting (Ridgley 1981, p. 351). In the Lower Rio Grande Valley (LRGV), red-crowned parrots occur primarily in urban (town) areas (Hagne 2011, pers. comm.). Although little information on urban habitat use specific to the LRGV is available, in cities where the species is introduced it is reported to prefer areas with large trees that provide both food and nesting sites (Froke 1981, Hall 1988, in Enkerlin and Hogan 1997, unpaginated).

The red-crowned parrot usually forages in the crowns of trees, but will occasionally feed on low-lying bushes. Foraging appears to be opportunistic including a variety of seeds and fruits and buds and flowers (Enkerlin and Hogan 1997, unpaginated; Sutton and Pettingill 1942, p. 14). Mexican populations of red-crowned parrots were observed feeding on the seeds and fruit of 9 plant species (Enkerlin 1995, p. 113) including *P. flexicaule*, *F. cotinifolia*, *B. laetevirens*, the fruit of *Myrcianthes fragans* (twinberry), *Pinus* sp. (pine) seeds (Martin et al. 1954, p. 46), *E. anaqua* berries (Gehlbach 1976, p. 55), *Melia azederach* (Chinaberry) berries, and acorns (Clinton-Eitniew 1988, p. 28). Red-crowned parrots have been reported to be pests in corn fields (Martin et al. 1954, p. 46). In Texas, red-crowned parrots have also been observed eating the seeds, fruits, leaves, or flower buds of a variety of other plant species (Brush 2005, p. 99), as well as seeds from *P. flexicaule* and *E. anaqua*, however they do not seem likely to forage in agriculture fields (Hagne 2012, pers. comm.). Insects have been found in crop (a structure in the digestive tract where food is stored) samples taken from chicks (Enkerlin and Hogan 1997, unpaginated).

Red-crowned parrots are nonmigratory (Enkerlin and Hogan, unpaginated), but are apparently nomadic during the winter (non-breeding) season when large flocks range widely to forage (Collar et al. 1992, p. 426; Clinton-Eitniew 1986, pp. 22–23). Regional movements spanning up to “tens of kilometers” have been reported from Tamaulipas, Mexico (Aragon-Tapia 1986, in Enkerlin and Hogan 1997, unpaginated). The species within Texas is thought to move between urban areas in search for food and other available resources (Hagne 2012, pers. comm.).

Nesting by red-crowned parrots occurs from March to August (Enkerlin and Hogan 1997, unpaginated). As with other Amazona species, red-crowned parrots nest in pre-existing tree cavities, including those created by other birds or resulting from tree decay. They have been reported nesting in a variety of tree species, including *Taxodium mucronatum* (Montezuma cypress), *Bumelia laetivirens*, and *Brosimum alicastrum* (breadnut) (Gehlbach 1987, Perez, and Equiarte 1989, in Collar et al. 1992, p. 426), as well as in *Pithecellobium flexicaule*, *Ficus cotinifolia*, *Bumelia laetivirens*, *Helietta parvifolia*, *Bursera simaruba* (Enkerlin 1995, p. 35) and *Arecaceae* (palm family) members including *Washingtonia* sp. and *Sabal* sp. (Hagne 2012, pers. comm.; Keyes 2012, pers. comm.; Ohaver 2012, pers. comm.). Trees in which red-crowned parrot nests occurred ranged from 39–229 cm (15–90 in) in diameter at breast height and nest cavities were located 3.8–13.5 m (12.46–44.29 ft) above the ground (Enkerlin 1995, p. 36). Red-crowned parrots may preferentially select nest sites in open and wooded pastures rather than in heavily forested areas (Enkerlin 1995, pp. 43–44), with nests of the same species generally clumped at a nesting site (Enkerlin 1995, p. 42). Fidelity to specific nest sites is lower than in other Amazona (Enkerlin 1995, p. 75), although individuals show attachment to a general area when selecting nests (Enkerlin 1995, p. 66). Nests in which more than one young fledge have a greater likelihood of being reused (Enkerlin 1995, p. 69). Clutch size ranges from 2 to 5 (average = 3.4) eggs and eggs hatch after an average of 27 days, with young fledging an average 53 days after hatching—second clutches are not known (Enkerlin 1995, pp. 65, 86, 104). Young may stay with the parents at the nest for up to 3–4 months before fledging (Enkerlin and Hogan 1997, unpaginated). Red-crowned parrots in Mexico were documented to have only a 43 percent fledging rate of young, suggesting that like most other parrot species, there is low reproductive success of the species (Enkerlin 1995, p. 96). This contributes to their low capacity to recover quickly from pressures to which they are subjected (Macias and Enkerlin 2003, p. 16). A low reproductive success rate due to egg and chick mortality were attributed to nest abandonment from unknown causes, brood reduction, and predation during

the earlier parts of their nesting season (Enkerlin and Hogan 1997, unpaginated; Enkerlin 1995, pp. 89–93).

### **Historical Range/Distribution:**

Historically, red-crowned parrots were known from central and southern Tamaulipas, central Nuevo Leon, eastern San Luis Potosi, northern and central Veracruz (Collar et al. 1992, p. 423; Enkerlin and Hogan 1997, unpaginated; Forshaw 1989, p. 603; Ridgely 1981, p. 351), small portions of eastern Queretaro, Hidalgo, and north-northeast Puebla (Howell and Webb 1995, p. 342) in Mexico, and from the LRGV in Texas.

### **Current Range Distribution:**

The current range of naturally-occurring red-crowned parrot populations is limited to northeastern Mexico and portions of the Lower Rio Grande Valley in Texas; however, several introduced or escaped captive populations occur in urban areas of the United States, Puerto Rico, and Mexico. Evidence suggests populations in the Lower Rio Grande Valley consist, at least partly, of naturally occurring populations (Walker and Chapman 1992, pp. 38–39; Neck 1986, entire; Brush 2005, pp. 97–99; Arvin 1982, p. 872). It is unknown if these populations in Texas are transient birds or escaped captive birds.

Within Mexico, the species' distribution is confined to the lowland plains (Atlantic coastal plain) and the low eastern slopes of the Sierra Madre Oriental mountain range (Macias and Enkerlin 2003, p. 4; Collar et al. 1992, p. 423). A study to determine the current status of populations throughout the species' range in Mexico was conducted during 2002 and 2003 and found that red-crowned parrots occur at only 19.2 percent of surveyed locations where they formerly occurred (Macias and Enkerlin 2003, p. 17). The species was present in Tamaulipas, eastern San Luis Potosi, and northern Veracruz, and absent in Nuevo Leon and central Veracruz (Macias and Enkerlin 2003, p. 3). The authors estimate the current range of the species in Mexico to be 32,500 square kilometers (km<sup>2</sup>) (12,548 square miles (mi<sup>2</sup>)), representing a 77 percent decrease from the species' estimated original range of 140,000 km<sup>2</sup> (54,054 mi<sup>2</sup>) (Macias and Enkerlin 2003, p. 14). Most of the species' current distribution occurs in Tamaulipas followed, in order of importance, by Veracruz and San Luis Potosi and has been confirmed in northeast Queretaro (Macias and Enkerlin 2003, p. 12), with habitat within this range fragmented. As a result, the species occurs in only small, isolated populations across its range (Macias and Enkerlin 2003, p. 3).

Within Texas' Lower Rio Grande Valley, the red-crowned parrot occurs in Hidalgo and Cameron Counties, from the cities of Hidalgo, Mission, McAllen, and Edinburg east to Brownsville, Los Fresnos, and Harlingen (Hagne 2011, pers. comm.; Brush 2011, pers. comm.; McKinney 2011, pers. comm.). The species also occurs in some towns on the Mexican side of the Rio Grande (Hagne 2011, pers. comm.), although specific locations have not been documented. There are also reports of birds in Bexar and Hays Counties, Texas, although their origins are unknown (Collar et al. 1992 and Walker and Chapman 1992 in Enkerlin-Hoeflich and Hogan 1997, p. 2).

Escaped pets and “released” birds in illegal transit are the driving force behind the establishment of additional introduced populations in southern California, Texas, Puerto Rico, Hawaii, and Florida, where the species numbers in the hundreds if not thousands of birds (Enkerlin and Hogan 1997, unpaginated).



Figure 2. Range map of red-crowned parrot in North America (Ridgely et al. 2003).

### Population Estimates/Status:

Historic numbers of red-crowned parrots are believed to have exceeded 100,000 individuals (Enkerlin 1998, p. 8). Records through the 1950's indicate the species was relatively common in appropriate habitat from central Tamaulipas south to eastern San Luis Potosi and northern Veracruz, even being described in some areas as a “pest” species (Collar et al. 1992, p. 424). By the 1970's, Ridgely (1981, p. 351) noted that, although locally common, the consensus among long-term observers was that a large overall decline in the species' numbers over the previous several decades had taken place and that much of its' range had been, or was being, modified for agricultural use. Ridgely (1981, p. 351) also reported that, where formerly hundreds of red-crowned parrots could be seen, the bird was now only seen in scattered pairs or, at most, small flocks. The Mexico population in 1994 was estimated to be between 3,000–6,500 birds (UNEP–WCMC 2002, in Macias and Enkerlin 2003, p. 15).

Density estimates of red-crowned parrots in Tamaulipas, Mexico between the 1970's–1990's differ by an order of magnitude and have been cited as evidence for population declines (Birdlife International (BLI) 2011, unpaginated; Castro 1976, in Enkerlin 1995, p. 117). Populations have been estimated at a density of 25.2 birds per 100 hectares (ha) (247 acres (ac)) during the 1970s (Castro 1976, in Enkerlin 1995, p. 117); 11.5 birds per 100 ha (247 ac) during 1985 (Perez and Eguiarte 1989, in Enkerlin 1995, p. 117); 4.72 birds per 100 ha (247 ac) in 1986 (Aragon-Tapia 1986, in Enkerlin 1995, p. 117); and 5.7 birds per 100 ha (247 ac) during the period 1992–1994 (Enkerlin 1995, p. 117). Variance in population numbers may be attributed to different methodologies (Enkerlin 1995, p. 117) or the abilities of different researchers to distinguish red-crowned from red-lored parrots (*Amazona autumnalis*) in the field (Enkerlin 1995, p. 124).

Partners in Flight (PIF), an international coalition of Federal and State agencies and non-government groups, uses a peer-reviewed process to assess the status of bird species (Rich et al. 2004, entire; Panjabi et al. 2005, entire). They base these assessments on species' “wild” populations, which do not include populations known to be introduced (Panjabi 2011, pers. comm.) and their assessment includes populations within the species' historic range in Mexico and in the LRGV, Texas. The PIF assessed the status of the global red-crowned parrot population, as well as the portion of the global population occurring within a defined “Bird Conservation Region.” Bird Conservation Regions (BCR's) are ‘ecologically distinct regions in North America with similar bird communities, habitats, and resource management issues’ (North American Bird Conservation Initiative (NABCI) undated, unpaginated). The red-crowned parrots' Tamaulipan Brushland BCR is comprised of the plain that extends from southern Texas

into northeastern Mexico (NABCI 2000, p. 22) and includes the LRGV and northern portions of the Mexican states of Tamaulipas, Nuevo Leon, and Coahuila. The PIF estimates the global population of red-crowned parrots to be fewer than 5,000 individuals and the recent population trend as having decreased greater than or equal to 50 percent over 30 years (Berlanga et al. 2010, pp. 38–39; PIF 2007, unpaginated; PIF 2005a, unpaginated). They estimate that red-crowned parrot individuals within the Tamaulipan Brushlands BCR comprise 43 percent of the global population (PIF 2005b, unpaginated). Numbers and trends of the species within the Texas portion of this BCR are largely unknown, and speculative (Hagne 2011, pers. comm.; Brush 2011, pers. comm.; McKinney 2011, pers. comm.), although an earlier PIF assessment (Rich et al. 2004, p. 70) estimated that approximately 50 percent of the rangewide population, not including introduced populations (Panjabi 2011, pers. comm.), occurred in the United States.

## Threats

### **A. The present or threatened destruction, modification, or curtailment of its habitat or range:**

Habitat destruction and modification is one of the main threats to the red-crowned parrot (Macias and Enkerlin 2003, p. 4). As a result of extensive deforestation, red-crowned parrot habitat has changed substantially since the early 1970s (Macias and Enkerlin 2003, p. 14). Further, according to Partners in Flight, extreme deterioration in the future suitability of conditions in the species' breeding and nonbreeding ranges is expected (Berlanga et al. 2010, pp. 38–39).

Mexico has suffered extensive deforestation (conversion of forest to other land uses) and forest degradation (reduction in forest biomass through selective cutting, etc.) over the past several decades. In recent decades, Mexico's deforestation has been rapid (Blaser et al. 2011, pp. 343–344). Deforestation can be measured by net forest loss, which factors in natural regeneration of degraded forest and planting of forest in areas that previously did not have forest. Between 1990 and 2000, Mexico experienced an annual net forest loss of 344,000 ha (850,043 ac) (Food and Agriculture Organization 2010, p. 21). Between 1990 and 2010, Mexico lost approximately 6 million ha (approximately 15 million ac) of forest and experienced one of the largest decreases in primary forests worldwide (Food and Agriculture Organization 2010, pp. 56, 233).

Mexico's rate of forest loss has slowed in the past decade, but it still continues. The current rate of net forest loss in Mexico is 155,000 ha (383,013 ac) per year, with an estimated 250,000–300,000 ha (617,763–741,316 ac) degraded each year (Government of Mexico 2010b in Blaser et al. 2011, p. 344; Food and Agriculture Organization 2010, p. 233). Currently, Mexico has 64.8 million ha (160.1 million ac) of forest (Food and Agriculture Organization 2010, p. 228), and 50 percent of these forests are considered degraded (Masek et al. 2011, p. 9). By 2030, forest area in Mexico is projected to decrease; it is estimated both that approximately 10 to 60 percent of mature forests will be lost and that approximately 0 to 54 percent of regrowth forests will be lost (Commission for Environmental Cooperation (CEC) 2010, pp. 45, 75).

As stated above, the current range of the red-crowned parrot in Mexico occurs primarily in Tamaulipas, Veracruz, and San Luis Potosi. The Mexican State of Tamaulipas contains the largest number of recent records of the red-crowned parrot locations (Macias and Enkerlin 2003, p. 12). These Mexican States have experienced deforestation and forest degradation at similar rates to Mexico as a whole. Between 2003 and 2007, Tamaulipas experienced a net loss of 0.1–0.3 percent of its forest area per year. Over 80 percent of the red-crowned parrot's lowland habitat in Tamaulipas, Mexico, has been lost (CITES 1997, p. 2; Macias and Enkerlin 2003, p. 14), and Rio (2002, in Macias and Enkerlin 2003, p. 14) estimates the species has lost 31 percent of its rangewide habitat. The habitat that remains is fragmented, occurring only in isolated patches in different parts of the species' range (Macias and Enkerlin 2003, p. 3). Veracruz and San Luis Potosi have also experienced a net forest loss of greater than 0.6 percent, and a net gain of 0.1–0.3 percent of forest area, respectively, during this period (Masek et al. 2011, pp. 9–10).

Deforestation and forest degradation occur in all forest types in Mexico (Government of Mexico 2010, p. 22). Their main drivers are conversion of forest to pasture, slash and burn agriculture, and uncontrolled logging (overexploitation and illegal logging) (Government of Mexico 2010, pp.22–24). Factors that put lands at greatest risk are favorable to topographic conditions, road access, and proximity to human settlements (Munoz et al. 2003, in Government of Mexico 2010, p. 23). These drivers of deforestation and forest degradation are discussed below.

#### *Agriculture (Livestock and Crop Production)*

The National Institute of Ecology has estimated that 82 percent of deforestation that has occurred in Mexico is a result of land-use change to agriculture or grazing purposes (Government of Mexico 2010, p. 24). As with most parrots, the red-crowned parrot requires trees for nesting, feeding, and roosting; conversion of lands to agriculture directly eliminates forest habitat by removing the trees that support the species' biological and reproductive requirements. Red-crowned parrots are known to use partially cleared or cultivated landscapes (Collar et al. 1992, p. 425), but only if the landscape maintains enough large trees to support the species' nesting, feeding, and roosting requirements. If the number of large trees needed by the red-crowned parrot is reduced across the landscape, the species' population could decrease. Additionally, clearing of land for agricultural use also provides easier access by humans to the forests and trees the species uses, and thus increases the vulnerability of the species to illegal poaching (Enkerlin and Hogan 1997, unpaginated).

Within Mexico, agricultural-related threats to red-crowned parrot habitat are primarily due to conversion of forests to cultivated land, as described above, and expansion of livestock grazing areas (Berlanga et al. 2010, pp. 38–39; Enkerlin and Hogan 1997, unpaginated; Enkerlin 2000, in Macias and Enkerlin 2003, p. 18). Mexico's lowland area in which the large majority of the species' range occurs is within the Gulf of Mexico coastal plain, one of the most productive regions of intensive agricultural use in Mexico (Vázquez and Aragón-Tapia 1993, in Enkerlin 1998, p. 79; Government of Mexico 2010, p. 22). In northern Mexico, large and mechanized farms clear and convert forest to agricultural lands for production of cash crops such as sorghum (Rochin 1985, entire). The density of large trees left standing in pastures varies between farms and pastures with few ranchers managing the land for maintenance of tree density or regeneration (Enkerlin 1995, pp. 20–21; Enkerlin and Hogan 1997, unpaginated).

In Texas, Hidalgo and Cameron Counties are in the South Texas Plains area where native plant abundance and distribution has been reduced over time by extensive farming (Texas State Historical Association 2012a, p. 1). In fact, 41–50 percent of Cameron County and 51–60 percent of Hidalgo County is considered prime farmland (Texas State Historical Association 2012a, p. 1; Texas State Historical Association 2012b, p. 1). Agriculture has increased dramatically in the Lower Rio Grande Valley with the production of corn, sorghum, cotton, citrus, aloe vera, and other row crops.

For both Mexican and Texas populations of the red-crowned parrot, deforestation via forest conversion to agriculture uses remains a major driver of land transformation (CEC 2008, p. 25), fragmenting habitat and isolating red-crowned parrot populations (U.S. Agency for International Development (USAID) 2009, p. 48; Macias and Enkerlin 2003, pp. 3–4).

#### *Logging*

The harvest of trees, whether legal or illegal, in the red-crowned parrot's suitable habitat in Mexico can reduce the availability of nest and forage sites while simultaneously making areas more accessible to humans, thereby increasing the species' vulnerability to illegal poaching (discussed below) and increasing the likelihood of deforestation and forest degradation (described above).

Five percent of Mexico's forests are designated as production forest (forest area designated primarily for production of wood, fibre, bio-energy, or non-wood forest products) (Food and Agriculture Organization 2010, p. 244). Commercial harvesting involves the use of shelterwood techniques; this harvest method allows for partial cutting of up to 40 percent of standing volume while providing temporary maintenance of some

canopy trees in order to protect the development of understory trees until an even-aged stand is produced (Masek et al. 2011, p. 4). These logging practices reduce the number of large trees in harvested areas (Putz et al. 2000, p. 40). It is likely that this change reduces the availability of suitable nest sites for the red-crowned parrot. In addition, the remaining smaller trees may not possess cavities large enough for the species to nest in. Another result of these logging practices in Mexico's production forest is a change in forest structure and composition through the selective extraction of certain tree species (CEC 2008, p. 24). This may reduce the availability of food for the red-crowned parrot. Thus, forests degraded by logging may result in a reduction in the number of individuals of the species the forest can support and, therefore, a further reduction in the overall population.

It should be noted that the intensity of logging in tropical forests varies widely with a variety of techniques applied, some carefully or in ways that result in extensive collateral damage (Putz et al. 2000, p. 7). While logging, if conducted according to a well-designed forest management plan, can potentially protect ecosystem services and biodiversity, the compatibility of logging with biodiversity conservation is complicated (Putz et al. 2000, pp. 11, 7). Therefore, it is unknown to what extent logging practices directly affect the red-crowned parrot and its habitat.

Indirectly, increased access to forests associated with commercial harvest impacts the red-crowned parrot's habitat. The construction of roads to provide access to logging sites may directly eliminate habitat and increase human access to these areas. Increased access to the species' habitat may increase the vulnerability of the species to illegal poaching, one of the leading threats to the species (See Factor B discussion, below). Further, increased access to forests is also often followed by full deforestation as lands are cleared for agricultural use (Kaimowitz and Angelsen 1998, in Putz et al. 2000, p. 16).

In addition to effects resulting from production forests, part of the forest degradation in Mexico is the result of casual, unsustainable uses of forest products by communities in the vicinity of forests, for example for firewood or charcoal production, timber for local use and for grazing, rather than for large scale trade (Government of Mexico 2010, p. 32). Illegal logging is widespread in Mexico, accounting for approximately 8 percent of the country's deforestation (Government of Mexico 2010, p. 24; USAID Center for International Forestry Research 2010, p. 12; USAID 2009, pp. 56–57). It is likely that illegal logging results in similar impacts to habitat for the red-crowned parrot as commercial harvest described above.

### *Construction and Development Projects*

In South Texas, construction and development projects may impact the red-crowned parrot due to the loss or conversion of native habitat and nesting sites for urbanization. Examples of such projects include residential and commercial development; oil, gas, and water pipelines; alternative wind energy facilities; and U.S. Border Patrol activities. Specific information on development and alternative energy projects in Mexico are unknown; however, as urbanization increases, the need for more commercial and residential developments will necessitate the construction of roads, bridges, and water pipelines.

### *Urbanization*

In Texas, the human population within the red-crowned parrot's range in Hidalgo and Cameron Counties has increased by 36.1 and 21.2 percent, respectively, between 2000 and 2010 (U.S. Census Bureau 2012) and is projected to increase by about another 50 percent between 2010 and 2040 (Texas State Data Center 2008, unpaginated). Urban sprawl into remote areas and infill into city centers has increased demands for clearing or altering the red-crowned parrots' habitat for both commercial and residential developments, necessitating construction of roads, bridges, and water pipelines, as mentioned above. However, urbanization has been suggested as a potentially positive factor for the red-crowned parrots because these birds will colonize urban areas, as evidenced by their establishment in urban centers in Texas. However, there is no evidence to suggest that red-crowned parrots use urban structures as nesting sites; instead, they appear to restrict nesting sites to pre-existing or new cavities in palms, sugar hackberries, huisache, or mesquite (Hagne 2012, pers. comm.; Service 2011, p. 62021). Although red-crowned parrots are known to use palm trees for nesting and roosting sites, dead and drooping fronds are often removed to maintain the aesthetic appeal of trees within

city parks, cemeteries, and other public places (Hagne 2012, pers. comm.). Continuing these tree-grooming activities could negatively impact the species by reducing the availability of nesting and roosting sites in urban areas where suitable habitat is already sparse. Estero Llano Nature Center in Weslaco (Hidalgo County) and a site in Harlingen (Cameron County) have initiated an experimental nest box project in palms to entice red-crowned parrots' use (Ohaver 2012, pers. comm.; Hagne 2012, pers. comm.). It is unknown how long it will take these nest boxes to become productive for the red-crowned parrots or if this species will use manmade habitat structures at all.

### *Climate Change*

Changes in climate may also impact red-crowned parrots. The term "climate change" refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007a, p. 78). The terms "climate" and "climate change" are defined by the Intergovernmental Panel on Climate Change (IPCC). The term "climate" refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements (IPCC 2007a, p. 78). In general, scientific measurements spanning several decades demonstrate that changes in climate are occurring, and that the rate of change has been faster since the 1950s. Examples include warming of the global climate system, and substantial increases in precipitation in some regions of the world and decreases in other regions. Results of scientific analyses presented by the IPCC show that most of the observed increase in global average temperature since the mid-20th century cannot be explained by natural variability in climate, and is "very likely" (defined by the IPCC as 90 percent or higher probability) due to the observed increase in greenhouse gas (GHG) concentrations in the atmosphere as a result of human activities, particularly carbon dioxide emissions from use of fossil fuels (IPCC 2007a, pp. 5–6 and figures SPM.3 and SPM.4; Solomon et al. 2007, pp. 21–35).

There is strong scientific support for projections that warming will continue through the 21st century, with expected increases in temperature for the next two decades resulting in warming of 0.2°C (0.4°F) per decade (IPCC 2007, p. 6). Impacts of climate change on birds could include some or all of the following: earlier breeding, changes in timing and migration, changes in breeding performance (egg size, nesting success), changes in population sizes, and changes in population distributions (Crick 2004, p. 48). Phenological (timing of seasonal activities of animals and plants) changes could limit the amount of available food resources during nesting season. Species' range expansions toward either or both poles has occurred across a wide range of taxonomic groups (Crick 2004, p. 49), potentially bringing new predators; nonnative species that could cause community vegetation and animal shifts; and introducing species that may compete with the red-crowned parrot for food, nesting sites, and roosting sites (Walther et al. 2002, p. 391).

### *Summary of Factor A*

A significant stressor to the red-crowned parrot is the loss of its habitat due to clearing and land use change resulting from agricultural development, forest production, construction and development projects, urbanization, and climate change. Land conversion to grazing and farmland is still occurring within the range of the species, and the fact that (1) these activities are projected to increase in Mexico and (2) the Gulf of Mexico coastal plain, in which a large portion of the red-crowned parrot's historical range occurs, is one of the most productive regions of agricultural use in Mexico, indicates these activities will continue within the species' range into the foreseeable future. Land clearing and land use changes directly destroy habitat and add to habitat fragmentation across the landscape. Direct loss and degradation of habitat decreases the amount of available roosting and nesting sites; decreases the availability of food; and may increase species competition for food, shelter, and space. Therefore, based on the best available scientific and commercial data available, we find that the present and threatened destruction, modification, or curtailment of the red-crowned parrot's habitat is a threat to the species.

## **B. Overutilization for commercial, recreational, scientific, or educational purposes:**

Parrots have been traded commercially in Mexico for centuries and capture of adults and nestlings for the pet trade represents one of the main threats to the red-crowned parrot (Macias and Enkerlin 2003, p. 18). Mexico's proximity to the United States, the largest pet market in the world, resulted in extensive legal and illegal export of several Amazona species to the United States during the 1960s to 1990s. Capturing individuals for trade essentially mimics mortality in that it removes individuals from the wild population.

### *Legal Trade*

Legal trade of red-crowned parrots has been restricted through provisions of the international CITES agreement—an international treaty among 175 nations, including Mexico and the United States)—and the passage of the Wild Bird Conservation Act (16 U.S.C. 4901 et seq.). The international CITES agreement between governments, ensures that the international trade of CITES-listed plant and animal species does not threaten those species' survival in the wild. In 1981, international trade in general was restricted by the listing of the species in Appendix II of CITES, which includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival (CITES 2010, unpaginated; CITES 2011, unpaginated). Imports of red-crowned parrots into the United States were further restricted by passage of the Wild Bird Conservation Act in 1992 (See Factor D discussion). Then, in 1997, the red-crowned parrot was transferred to the more restrictive Appendix I of CITES, which requires the issuance of both an import and export permit.

Based on CITES trade data obtained from United Nations' Environment Programme—World Conservation Monitoring Center CITES Trade Database, from 1997 through 2009, there were 1,218 specimens of the species, including 261 live birds, 5 bodies, 6 eggs, 7 feathers, 1 skin, and 938 specimens, reported. Almost 78 percent of the red-crowned specimens reported in trade were scientific specimens traded for scientific purposes, with 58 percent of live birds being captive-bred, captive-born, or pre-Convention. Because the majority of the specimens of this species reported in international trade are generically labeled scientific specimens, or are captive-bred, captive-born, or pre-Convention birds, we have determined that legal international trade controlled via valid CITES permits is not a threat to the species. However, the 46 live wild birds red-crowned parrots reported as seized or refused entry into the United States due to lack of CITES certification or Wild Bird Conservation Act authorization suggests reason for concern with respect to the illegal trade of the species.

### *Illegal Trade*

Illegal trade in wildlife and wildlife products is extensive in Mexico because of the high demand and lucrative profits associated with trade, with the greatest percentage sold to customers in the United States (Valdez et al. 2006, p. 276). It is unknown how many red-crowned parrots have been illegally exported from Mexico to the United States and elsewhere. The Service inspects approximately 25 percent of declared wildlife shipments at the U.S. border, and, therefore, it is likely that the 46 wild red-crowned parrots that were reported as seized or refused entry into the United States represent only a portion of those smuggled out of Mexico. Also, as pre-export mortality of captured red-crowned parrots is estimated to be greater than or equal to 50 percent (Enkerlin and Packard 1993, in Macias and Enkerlin 2003, p. 20), it is also likely that smuggled birds represent only half (or less) of the number removed from the wild for illegal export. Although the overall illegal export of all parrot species from Mexico into the United States has reportedly decreased since 2000 (with only an estimated 4–14 percent of parrots now exported out of the country), the illegal exports of some species, including the red-crowned parrot, appear to be on the rise (Cantu et al. 2007, pp. 58–59).

With respect to domestic trade, commercial trade of red-crowned parrots has been illegal within Mexico since 1982 (CITES 1997, pers. comm.). The office of the Procuraduría Federal de Protección al Ambiente (Federal Prosecutor for Environmental Protection) is responsible for enforcing environmental laws, regulations, and legal standards in Mexico, including those pertaining to the parrot trade. The Office of the Federal Prosecutor for Environmental Protection lacks the funding and human resources to effectively enforce wildlife and other environmental laws (USAID Center for International Forestry Research 2010, p. 46; Government Of Mexico 2010, p. 24; Valdez et al. 2006, p. 276), and as a result, the laws and regulations

for controlling the parrot trade in Mexico have not been effective (Cantú et al. 2007, entire). Based on interviews with parrot trappers and trapper unions in Mexico during 2005 and 2006, Cantú et al. (2007, pp. 35, 57) estimated that 65,000–75,000 parrots were illegally captured each year in Mexico, mostly (86–96 percent) for Mexico's domestic market. Reports of looting of red-crowned parrot chicks from nests for the pet trade occurred in these communities at a rate of 1-10 chicks per year (Macias and Enkerlin 2003, p. 19). Cantu et al. (2007, p. 35) estimate that fewer than 600 red-crowned parrots are captured per year based on interviews with trappers, trapper unions, and others, although they indicate that their estimates for some species are very conservative and may be underestimates. Cantú et al. (2007, p. 59) report that illegal exports of the red-crowned parrot appeared to be increasing at the time of their study in 2007.

In October 2008, Mexico passed Article 602 of its General Law Wildlife Law. The article bans the capture, export, import, and re-export of any species of the Psittacidae (parrot) family whose natural distribution is within Mexico. The law could potentially reduce the number of red crowned parrots illegally traded domestically and internationally by making it more difficult for smugglers to capture the species within Mexico and transport them to the U.S. border. Based on an increased number of citizen complaints to authorities about illegal parrot sales and a decreased number of seizures of parrots by authorities during 2008–2010, illegal trade in parrots in Mexico has decreased since the law took effect (Cantu and Sanchez 2011, entire). However, it is unknown if, or to what extent, law enforcement effort increased with the increased number of complaints filed. Without data on the relationship between filed complaints and enforcement, we are unable to determine whether a decrease in parrot trade actually occurred or, if it did, the extent of such a decrease. We also do not know whether or not such a decrease would necessarily pertain to the red-crowned parrot.

Also, according to USAID Center for International Forestry Research (2010, p. 46), there are areas in Mexico where government officials have limited access due to the presence of organized groups of illegal loggers, guerrilla groups challenging local and Federal authorities, and drug traffickers (USAID Center for International Forestry Research 2010, p. 46). The latter is particularly relevant to red-crowned parrots. The levels of narcotics-related violence in Mexico's northeast States have increased dramatically in the past 2 years (U.S. Department of State 2011, unpaginated; Ríos and Shirk 2011, p. 1). Considering that much of the red-crowned parrot's historical range, and many of the locations with recent records of the species, are within the northeastern State of Tamaulipas, and that smaller portions of the species' historical range occur in San Luis Potosi and Nuevo Leon, it is reasonable to conclude that levels of violence in these areas are likely hindering wildlife law enforcement efforts, at least to some degree. For all of these reasons, we consider the study by Cantu and Sanchez (2011, entire) to be inconclusive regarding the effects of Mexico's new parrot law on the levels of trade of red-crowned parrots. Further, we are unaware of any other evidence that may indicate the level of trade in the species has decreased in recent years, or will decrease in the foreseeable future, in Mexico.

Regarding the Texas population of red-crowned parrots, we are unaware of any information indicating that trade is a threat to the species. In the Lower Rio Grande Valley, Texas, there have been reports of residents being approached by individuals wanting to access their property to capture red-crowned parrots by knocking them out of roosting sites using water hoses (Hagne 2012, pers. comm.). However, the amount of these requests and the intensity and success rate of potential captures are unknown.

#### *Recreational, Scientific, or Educational Use*

We are unaware of any information indicating that scientific or educational use of the red-crowned parrot is a threat to the species.

### **C. Disease or predation:**

Infectious diseases can pose many direct threats to individual birds as well as entire flocks (Abramson et al. 1995, p. 287), but few studies on diseases affecting the red-crowned parrot have been done (Stone et al. 2005,

entire). Most of the available research on disease in parrots addresses captive-held birds, and information on the health of wild parrots is scarce (Karesh et al. 1997, p. 368). Diseases could include psittacid herpesvirus-1, polyomavirus, and avian influenza. External parasites could include adult lice (*Paragoniocolletes mexicanus*) on nestlings and adult hematophagous nest mites (*Ornithonyssus sylviarum*), but the effect of these parasites on nestling health is uncertain (Stone et al. 2005, p. 247). The limited studies conducted specifically on red-crowned parrots did not indicate disease may be limiting the population or affecting the status of the species as a whole at this time.

Snakes, red-tailed hawks (*Buteo jamaicensis*), roadside hawks (*B. magirostris*), gray hawks (*B. nitidus*), coatimundis (*Nasua narica*), and skunks (*Mephitidae* family) have been reported to prey on adults and young red-crowned parrots. Of these, only snakes, particularly the indigo snake (*Drymarchon corais*), appear to be a major source of natural predation during nesting (Enkerlin and Hogan 1997, unpaginated). During migration, Peregrine species, Cooper's hawks (*Accipiter cooperii*), red-tailed hawks, sharp-shinned hawks (*Accipiter striatus*), and merlins (*Falco columbarius*) (Clements 2012, pers. comm.), commonly occur and hunt within the city limits of South Texas towns. Predation by these species on red-crowned parrots is a potential, but it has not been recorded. Although red-crowned parrots are subject to predation, and indigo snakes may be a major source of that predation, we found no evidence that predation is occurring at a level which poses a threat to the species.

Based on our review of the best available scientific and commercial information, we find that neither disease nor predation is a threat to the species.

#### **D. The inadequacy of existing regulatory mechanisms:**

As discussed in Factor B above, the red-crowned parrot is protected by its listing in Appendix I of CITES and the passage of the Wild Bird Conservation Act. Within Mexico, the red-crowned parrot is considered an endangered species as per Norma Oficial Mexicana (Official Mexican Standard) NOM-059-ECOL-2001. Endangered and threatened species in Mexico are regulated under the general terms of the Ley General del Equilibrio Ecológico y Protección al Ambiente (General Law of Ecological Balance and Environmental Protection), the Ley General de Vida Silvestre (General Wildlife Law), and also under the CITES, to which Mexico is a Party (CEC 2003, unpaginated). As described in Factor B above, Article 602 of Mexico's General Wildlife Law bans the capture, export, import, and re-export of any species of the Psittacidae (parrot) family whose natural distribution is within Mexico. It allows for authorizations for removal of individuals from the wild to be issued only for conservation purposes or to accredited academic institutions for scientific research (Animal Legal & Historical Center 2008, unpaginated).

As stated above, parrots have been traded commercially in Mexico for centuries and capture of adults and nestlings for the pet trade represents one of the main threats to the red-crowned parrot (Macias and Enkerlin 2003, p. 18). Despite the passage of the laws and regulations described above that were intended to minimize Mexico's illegal trade of parrots, the laws and regulations for controlling this illegal have not been effective overall (Cantú et al. 2007, entire). Based on the analysis under Factor B, above, we consider illegal trade to be a threat impacting the red crowned parrot despite existing regulatory mechanisms.

In addition to those laws intended to protect the red-crowned parrot as a species, Mexico has passed other laws and regulations regarding forest management that are intended to protect red-crowned parrot habitat. The Ley General de Desarrollo Forestal Sustentable (General Law on Sustainable Forest Management) was passed in 2003 and governs forest ecosystems in Mexico. This law formalizes the incorporation of the forest sector in a broader environmental framework. Under this law, harvesting of forests requires authorization from the Secretariat of the Environment and Natural Resources and it also requires that authorizations given to forest owners for harvesting forests be based on a technical study and a forest management plan (Government Of Mexico 2010, p. 24).

Regarding the species' habitat in Mexico, most (53–80 percent) (Perron 2010, p. 5) natural forests are owned and managed by approximately 8,500 different communities (Blaser et al. 2011, p. 345). Use and management on community-owned property varies (Bray et al. 2005, in Masek pp. 14–15), and although some good examples of successful community forest management exist, most communities lack forest management plans (Sarukhan and Merino 2007, p. 1) and the organization and funding to implement sustainable forest management practices (Blaser et al. 2011, p. 351; Government Of Mexico 2010, p. 24). Although the General Law on Sustainable Forest Management, described in the paragraph above, requires a forest management plan for the authorization of timber harvest, the fact that most communities lack forest management plans (Sarukhan and Merino 2007, p. 1) brings to question the effectiveness of this existing law at the current time.

A number of additional laws complement the 2003 law in regulating forest use. Mexico's General Law of Ecological Balance and Environmental Protection regulates activities for protecting biodiversity and reducing the impact on forests and tropical areas of certain forest activities; Mexico's General Wildlife Law governs the use of plants and wildlife found in the forests; Ley General de Desarrollo Rural Sustentable (the General Law on Sustainable Rural Development) provides guidance for activities aimed at protecting and restoring forests within the framework of rural development programs; and Ley Agraria (the Agrarian Law) governs farmers' ability to use forest resources on their land (Anta 2004, in USAID 2011, unpaginated).

Another law regulating portions of the red-crowned parrot's habitat is the Sistema Nacional de Áreas Naturales Protegidas (National System of Protected Natural Areas). These Protected Natural Areas are created by Presidential decree, and the activities on them are regulated under Mexico's General Law of Ecological Balance and Environmental Protection, which requires that the Protected Natural Areas receive special protection for conservation, restoration, and development activities (Comisión Nacional de Áreas Naturales Protegidas 2011, unpaginated). These natural areas are categorized as Biosphere Reserves, National Parks, Natural Monuments, Areas of Natural Resource Protection, Areas of Protection of Flora and Fauna, and Sanctuaries (Comisión Nacional de Áreas Naturales Protegidas 2011, unpaginated). The red-crowned parrot is known to occur in two biosphere reserves: Reserva de la Biosfera El Cielo in Tamaulipas; and Reserva de la Biosfera Sierra Gorda in Querétaro (Macias and Enkerlin 2003, p. 22).

Evidence that 80 percent of red-crowned parrot habitat has been lost in Tamaulipas, Mexico, (CITES 1997, p. 2; Macias and Enkerlin 2003, p. 14), where a designated biosphere occurs, and Rio's (2002, in Macias and Enkerlin 2003, p. 14) estimates that the species has lost 31 percent of its rangewide habitat further suggest that existing regulations regarding habitat protection for the species are insufficient. The best habitat within the two Biosphere Reserves occupied by red-crowned parrots is above the elevation at which the species usually occurs. Further, at least one of these two Biosphere Reserves is not yet effective with respect to prevention of land-use change within its boundaries likely due to enforcement issues in the area.

In regards to the red-crowned parrot population in Texas, the City of Harlingen has instituted a city ordinance (City Ordinance No.11-55) for the green parakeet (*Aratinga holochlora*) and the red-crowned parrot that: prohibits the capture, kill, or injury of these species; prohibits the capture, injury, removal, or taking of their nestlings or unhatched eggs from their nesting site; and prohibits a person from deliberately destroying any roosting tree or nesting site located on any public property or public right of way, with approved exceptions. All actions are designated for locations within the corporate city limits of Harlingen, Texas. A penalty fine, not to exceed \$500.00, is instituted for a violation of this ordinance. We have no information about the effectiveness of this ordinance on the illegal taking of the red-crowned parrot. Other cities in the Lower Rio Grande Valley (i.e., Weslaco) may have similar ordinances.

The analysis in Factor A, above, shows that the destruction and modification of red-crowned parrot habitat continues to threaten the species despite the multitude of laws and regulations that have been passed to prevent this from occurring. The analysis in Factor B also shows that illegal trade also threatens the species despite multiple laws and regulations that should prevent this from occurring as well. Therefore, because there are existing regulatory mechanisms in place designed to prevent illegal trade of red-crowned parrots

and habitat destruction yet these activities continue to threaten the species, we consider the inadequacy of the existing laws and regulations discussed above to also be a threat to the red-crowned parrot. We are not aware of any information indicating that the regulatory mechanisms controlling illegal trade, or extent of enforcement of these mechanisms, will change in the future. Therefore, we consider the inadequacy of these regulatory mechanisms to be a threat to the red-crowned parrot now and in the foreseeable future.

### **E. Other natural or manmade factors affecting its continued existence:**

We are not aware of any scientific or commercial information that indicates other natural or manmade factors pose a threat to this species. As a result, we find that other natural or manmade factors are not threats to the red-crowned parrot now or in the foreseeable future.

### **Conservation Measures Planned or Implemented :**

Currently, conservation measures that have been planned or implemented largely address threats from modification, fragmentation, and destruction of habitat (under Factor A) but also address regulations (Factor D) and overutilization of the species (under Factor B) and include:

#### Conservation Measures in Mexico

*Payment for Ecosystem Services.* Mexico has initiated several Payment for Ecosystem Services programs that provide financial incentives to rural communities and private landowners for the design and implementation of carbon sequestration, biodiversity conservation, agroforestry, and watershed protection projects. These programs were designed to pay participating forest owners for the benefits of these environmental services where commercial forestry cannot compete, economically, with agriculture and ranching, the primary causes of deforestation in Mexico (Munoz et al. 2008, pp. 725–726; Corbera et al. 2011, p. 54). Programs for the payment of ecosystem services have yet to show substantive reductions in deforestation rates, but their effectiveness is likely to increase over time.

*Reduced Emissions From Deforestation and Forest Degradation.* Under this type of program, developing countries would be paid to protect their forests and reduce emissions associated with deforestation. Funds would come from foundations, governments, or financial agencies such as World Bank; industries in developed countries would receive credits for saving trees in developing countries (Chatterjee 2009, p. 557). Mexico has been very active in Reduced Emissions From Deforestation and Forest Degradation discussions under the United Nations Framework Convention on Climate Change, is developing a national Reduced Emissions From Deforestation and Forest Degradation strategy, and is working on the design and implementation of regional and local pilot projects (USAID Center for International Forestry Research 2010, p. 34; Corbera et al. 2011, p. 316). However, we do not yet know how successful Mexico's these efforts will be.

*Forest Certification.* The basis for certification is for consumers to be assured by a neutral third-party that forest companies are employing sound practices that will ensure sustainable forest management. Since February 2011, approximately 614,000 ha (1,517,227 ac) (9 percent) of Mexico's forest were certified, mostly outside the tropics (Blaser et al. 2011, p. 348). Only about 32,600 ha (79,074 ac) of tropical forest were certified, most of which was planted forest (Blaser et al. 2011, p. 348).

*Protected areas within Biosphere Reserves.* The red-crowned parrot is protected in or near two biosphere reserves: the Reserva de la Biosfera El Cielo, in Tamaulipas; and the Reserva de la Biosfera Sierra Gorda, in Querétaro (Macias and Enkerlin 2003, p. 22). However, the best conserved portions of habitat in these two reserves are at elevations greater than 500 m (1,640 ft), while the red-crowned parrot occurs primarily below 500 m (1,640 ft).

#### Conservation Measures in Texas

*Parrot Box Project:* Two projects, one in Estero Llano Nature Center in Weslaco (Hidalgo) and one in Harlingen (Cameron), were initiated in 2011 to provide nest boxes in palms for the red-crowned parrots (Ohaver 2012, pers. comm.; Hagne 2012, pers. comm.). The structures were constructed as recently as fall 2011 and therefore, red-crowned parrots have not occupied these sites. Construction of habitat and cavities could provide nesting sites for both the red-crowned parrot and woodpeckers (Picinae family).

## **Summary of Threats :**

Currently, the population of red-crowned parrots is extremely small (less than 5,000 individuals) and fragmented, and a large portion (approximately half) of the population occurs within the species' historical range in Mexico. Activities causing or leading to deforestation in Mexico are likely to continue to result in red-crowned parrot habitat loss within the country. Habitat conservation measures within Mexico do not appear to be sufficient to stem future red-crowned parrot habitat losses at the current time. Conversion of native habitat is also likely to continue in the Lower Rio Grande Valley as continued urbanization is expected. With an increase in the human population in South Texas, the need for additional roads, bridges, water diversion projects, and irrigation canals built for farms will also likely increase. Although the red-crowned parrots are known from urban centers in Texas, they are not known to nest in artificial structures (buildings, roofs, other non-natural cavities) and, therefore, the loss of habitat could decrease its nesting, foraging, and roosting potential and cause an overall decrease in the red-crowned population in the Lower Rio Grande Valley. Therefore, threats from Factor A (destruction, modification, or curtailment of habitat) are a threat to the red-crowned parrot.

Capturing individual red-crowned parrots for trade essentially mimics mortality in that it removes individuals from the wild population. Red-crowned parrot populations do not have the capacity to respond quickly to increased levels of mortality which can out-pace the species' reproductive rate, causing reductions in the species' population. Evidence also indicates that illegal export of the species to the United States continues to occur despite efforts to stop this trade. Although we are unaware of information indicating that capture of wild individuals for trade is a threat to the red-crowned parrot in the Lower Rio Grande Valley of Texas, populations of the species in Mexico represent half or more of the species' small global population. Further, it is possible that the viability of the Lower Rio Grande Valley population may rely on occasional supplementation from populations in Mexico. For these reasons, we conclude that Factor B (overutilization for commercial, recreational, scientific, or educational purposes) is a threat to the red-crowned parrot.

As stated above, the destruction and modification of habitat is one of the largest threats impacting the red-crowned parrot. We consider the existing laws and regulations discussed above that address this threat to be inadequate regulatory mechanisms for protection of red-crowned parrot habitat and, consequently, a threat to the species. There is no evidence indicating that the regulatory mechanisms controlling habitat destruction or modification, or the extent of enforcement of these mechanisms, will change in the future in both Mexico and the United States. In addition, multiple laws and regulation have been passed in order to control illegal trade of parrots, including the red-crowned parrot. Despite these efforts, Factor B is a threat to the species due to the continuation of illegal parrot trade. Therefore, we consider the inadequacy of these regulatory mechanisms (Factor D) to be a threat to the red-crowned parrot.

Threats to the red-crowned parrot are attributable to Factors A, B, and D. The primary threats to the red-crowned parrot at this time include habitat loss, illegal capture for the pet trade, and the inadequacy of regulatory mechanisms that address those threats. On the basis of the best scientific and commercial information available, we find that listing of the red-crowned parrot is warranted. We will make a determination on the status of the red-crowned parrot as endangered or threatened when we complete a proposed listing determination. An immediate proposal of a regulation implementing this action is precluded by higher priority listing actions, and progress is being made to add or remove qualified species from the Lists of Endangered and Threatened Wildlife and Plants.

We have reviewed the available information to determine if the existing and foreseeable threats render the species at risk of extinction now such that issuing an emergency regulation temporarily listing the species in accordance with section 4(b)(7) of the Act is warranted. We have determined that issuing an emergency regulation temporarily listing the red-crowned parrot is not warranted for this species at this time because there are no impending actions that might result in extinction of the species that would be addressed and alleviated by emergency listing. If at any time we determine that issuing an emergency regulation temporarily listing the red-crowned parrot is warranted, we will initiate this action at that time.

**For species that are being removed from candidate status:**

\_\_\_\_\_ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions(PECE)?

**Recommended Conservation Measures :**

Recommended conservation measures for the red-crowned parrot include: more stringent ordinances prohibiting the injury, taking, and mortality of young and adults in rangewide cities in South Texas; restrictions on pesticide use in areas where agriculture lands abut potential nesting, roosting, and foraging sites; public outreach to educate private citizens about the habitat, nesting requirements, and status of the species; conduct annual monitoring of accessible sites to gain information on abundance and behavioral trends; and, provide education and/or the potential for restrictions on removal of dead and drooping palm fronds.

**Priority Table**

Magnitude	Immediacy	Taxonomy	Priority
<b>High</b>	<b>Imminent</b>	Monotypic genus	1
		<b>Species</b>	<b>2</b>
		Subspecies/Population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/Population	6
Moderate to Low	Imminent	Monotype genus	7
		Species	8
		Subspecies/Population	9
	Non-Imminent	Monotype genus	10
		Species	11
		Subspecies/Population	12

**Rationale for Change in Listing Priority Number:**

Not Applicable

**Magnitude:**

The primary threats to the red-crowned parrot (habitat loss and modification, capture for the illegal pet trade, and inadequacy of existing regulatory mechanisms) are affecting a large portion of the species' population throughout the historical range of the species in Mexico, and we have no information on population trends in the species' remaining range in the Lower Rio Grande Valley. For Factors A, B, and D, we consider the magnitude high because the current population is small, a large portion of the population is affected, and these factors may lead to extirpation in Mexico. Further, we have no information indicating the Lower Rio Grande Valley populations can persist in the absence of the Mexico populations. Because we find that threats under these three factors (A, B, and D) are high, we find the overall threats that the red-crowned parrot is facing to be high in magnitude.

### **Imminence :**

Threats associated with Factors A, B, and D (discussed above) are currently impacting populations and are expected to continue to occur in the future. Therefore, threats to the red-crowned parrot are considered imminent.

Yes  No Have you promptly reviewed all of the information received regarding the species for the purpose of determination whether emergency listing is needed?

### **Emergency Listing Review**

No  Yes Is Emergency Listing Warranted?

No; issuing an emergency regulation temporarily listing the red-crowned parrot is not warranted for this species at this time because there are no impending actions that might result in extinction of the species that would be addressed and alleviated by emergency listing. However, if at any time we determine that issuing an emergency regulation temporarily listing the red-crowned parrot is warranted, this action will be initiated.

### **Description of Monitoring:**

To our knowledge, annual monitoring of red-crowned parrot populations in the Lower Rio Grande Valley, Texas, has not been undertaken by any non-governmental organization (NGO) or the Service, unless to record anecdotal observations of the bird and its' behavior, abundance, or threats. Monitoring of parrot box sites will begin after the installation of boxes in Weslaco and Harlingen, but we are unaware of the specific protocols. Monitoring efforts of the red-crowned parrot in Mexico are unknown.

**Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment:**

none

**Indicate which State(s) did not provide any information or comment:**

Texas

### **State Coordination:**

In preparation of the Notice of 12-month finding published on October 6, 2011 (FR 76, pp. 62016–62034), local ornithologists and researchers were contacted. Additional researchers and Service staff were contacted prior to the completion of this species assessment for information on threats specific to the LRGV, Texas.

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### **Approval/Concurrence:**

Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve:



08/24/2012

Date

Concur:

11/06/2012

Date

Did not concur: \_\_\_\_\_

\_\_\_\_\_ Date

Director's Remarks: