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:

05/30/2014

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

_X_ 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, and continues to be, precluded by higher priority listing actions (including candidate species with lower listing priority numbers or LPNs). 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 past listing actions taken, see the discussion of Progress on Revising the Lists, in the current candidate notice of review (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:

The red-crowned parrot habitat occurs primarily on 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 the species' range in Mexico is not known; however, most land is also privately owned.

Lead Region Contact:

OK ESFO, Hayley Dikeman, 918-382-4519, hayley_dikeman@fws.gov

Lead Field Office Contact:

Biological Information

Species Description:

The red-crowned parrot 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-Hoeflich 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 2003). 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 (Forshaw 1989, p. 603; Enkerlin-Hoeflich and Hogan 1997, unpaginated).

Figure 1. Photo of red-crowned parrot at the World Birding Center, Texas. Photo credit: Brad McKinney, World Birding Center, 2003.

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* by Sharpe 1900 making its complete scientific name Amazona viridigena. Synonyms for the species include green-cheeked Amazon, Mexican red-head (The 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 occupy similar habitat in Mexico, however there are no known reports of hybridization between these two species (Froke 1981).

Habitat/Life History:

In Mexico, 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 200500 m (6561,640 ft) (Enkerlin-Hoeflich and Hogan 1997, unpaginated; Macias and Enkerlin-Hoeflich 2003, p. 10). In winter, it sometimes visits dry pine and pine-oak forests up to 1,200 m (3,937 ft) elevation to forage (Martin et al. 1954, p. 46; Clinton-Eitniear 1986, p. 22; Clinton-Eitniear 1988, p. 28; Macias and Enkerlin-Hoeflich 2003, p. 10). Enkerlin-Hoeflich and Hogan (1997, unpaginated) describe typical habitat as being diverse deciduous tropical forest with a relatively open, 1520 m (5065 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). Gelhbach et al. (1976, pp. 5455) described a floodplain forest habitat as evergreen forest dominated by *P. 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 Texas 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 now occurs it is reported to prefer areas with large trees that provide both food and nesting sites (Froke 1981, Hall 1988, in Enkerlin-Hoeflich 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 (Sutton and Pettingill 1942, p. 14; Enkerlin-Hoeflich and Hogan 1997, unpaginaged). Mexican populations of red-crowned parrots were observed feeding on the seeds and fruit of nine plant species (Enkerlin-Hoeflich 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 et al. 1976, p. 55), Melia azederach (Chinaberry) berries, and acorns (Clinton-Eitniear 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 it seems unlikely that they would forage in agriculture fields (Hagne 2012, pers. comm.). Insects have been found in crop (a structure in the bird digestive tract where food is stored) samples taken from chicks (Enkerlin-Hoeflich and Hogan 1997, unpaginaged).

Red-crowned parrots are nonmigratory (Enkerlin-Hoeflich and Hogan, unpaginated), but are apparently nomadic during the winter (non-breeding) season when large flocks range widely to forage (Clinton-Eitniear 1986, pp. 2223; Collar et al. 1992, p. 426). Regional movements spanning up to tens of kilometers have been reported from Tamaulipas, Mexico (Aragon-Tapia 1986, in Enkerlin-Hoeflich 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.). In Texas LRGV, red-crowned parrots concentrate in large flocks during the non-breeding season, regularly using the same roost sites; a trait that enables observers to locate the flocks (Gustafson, 2014, pers. comm.). The flocking and use of well-known roosts provides the best opportunities for getting population counts and enhances bird-watching opportunities. In summer, the species is very scattered, dispersing in pairs around the LRGV (Gustafson 2014, pers. comm.).

Nesting by red-crowned parrots occurs from March to August (Enkerlin-Hoeflich and Hogan 1997, unpaginated) throughout their range. 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), *B. laetivirens*, and *Brosinum alicastrum* (breadnut) (Gelhbach 1987, Perez and Equiarte 1989, in Collar et al. 1992, p. 426), as well as in *P. flexicaule, F. cotinifolia, H. parvifolia, B. simaruba* (Enkerlin-Hoeflich 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 39229 cm (1590 in) in diameter at breast height and nest cavities were located 3.813.5 m (12.4644.29 ft) above the ground (Enkerlin-Hoeflich 1995, p. 36). Red-crowned parrots may preferentially select nest sites in open and wooded pastures rather than in heavily forested areas (Enkerlin-Hoeflich 1995, pp. 4344), with nests of the same species generally clumped at a nesting site (Enkerlin-Hoeflich 1995, p. 42). Fidelity to specific nest sites is lower than in other Amazona (Enkerlin-Hoeflich 1995, p. 75), although

individuals show attachment to a general area when selecting nests (Enkerlin-Hoeflich 1995, p. 66). Nests in which more than one young fledge have a greater likelihood of being reused (Enkerlin-Hoeflich 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 hatchingsecond clutches are not known (Enkerlin-Hoeflich 1995, pp. 65, 86, 104). Although the average age at fledging is between 7 and 8 weeks, the young may stay close to the parents for up to 10 weeks post-fledging (Enkerlin-Hoeflich and Hogan 1997, unpaginated). Red-crowned parrots in Mexico were documented to have a 43 percent fledging rate of young, suggesting that like most other parrot species, there is low reproductive success of the species (Enkerlin-Hoeflich 1995, p. 96). This contributes to their low capacity to recover quickly from pressures to which they are subjected (Macias and Enkerlin-Hoeflich 2003, p. 16). A low reproductive success rate due to egg and chick mortality was attributed to nest abandonment from unknown causes, brood reduction, and predation during the earlier parts of their nesting season (Enkerlin-Hoeflich 1995, pp. 8993; Enkerlin-Hoeflich and Hogan 1997, unpaginated).

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 (Ridgely 1981, p. 351; Forshaw 1989, p. 603; Collar et al. 1992, p. 423; Enkerlin-Hoeflich and Hogan 1997, unpaginated;), 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 LRGV 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 LRGV consist, at least partly, of naturally occurring populations (Arvin 1982, p. 872; Neck 1986, entire; Walker and Chapman 1992, pp. 3839; Brush 2005, pp. 9799). Availability of food resources in the LRGV during the 1980s freezes of Mexico and Texas may have contributed to the establishment of red-crowned parrots northward into South Texas (McKinney 2013, pers. comm.). It is unknown what portion of 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 (Collar et al. 1992, p. 423; Macias and Enkerlin-Hoeflich 2003, p. 4). 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-Hoeflich 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-Hoeflich 2003, p. 3). The authors estimate the current range of the species in Mexico to be 32,500 square kilometers (km2) (12,548 square miles (mi2)), representing a 77 percent decrease from the species estimated original range of 140,000 km2 (54,054 mi2) (Macias and Enkerlin-Hoeflich 2003, p. 14). Most of the species current distribution occurs in Tamaulipas followed, in order of importance, by Veracruz and San Luis Potosi, and red-crowned parrots have also been confirmed in northeast Queretaro (Macias and Enkerlin-Hoeflich 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-Hoeflich 2003, p. 3).

Within Texas LRGV, 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 (Brush 2011, pers. comm.; Hagne 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-Hoeflich and Hogan 1997, unpaginated).

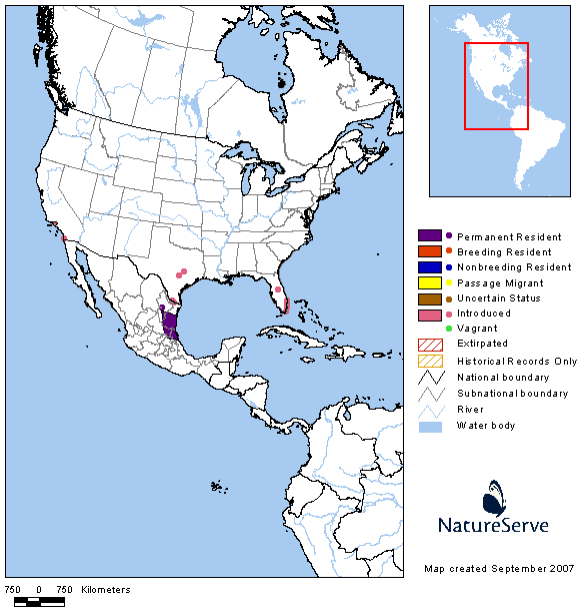

Figure 2. Range map of red-crowned parrot in North America (Ridgely et al. 2003).

Population Estimates/Status:

Historic numbers of red-crowned parrots are believed to have exceeded 100,000 individuals (Enkerlin-Hoeflich 1998, p. 8). Records through the 1950s indicate the species was relatively common in appropriate habitat in Mexico 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 1970s, 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 3,0006,500 birds (UNEPWCMC 2002, in Macias and Enkerlin-Hoeflich 2003, p. 15).

Anecdotal information received in 2014 indicated that increasing numbers of red-crowned parrots were being seen in urban areas of Tamaulipas, Mexico in 2003, and the possibility was expressed that the species may be rebounding, to a certain extent, since 1995, likely due to its adaptability to urban environments (Franco 2014, pers. comm.). There was an unconfirmed report of 3,000 birds in downtown Monterrey, Nuevo Leon in Mexico, and also reports that observations of flocks of 20-40 parrots in Cuidad Victoria, Tamaulipas in Mexico, were not uncommon (Franco 2014, pers. comm.). Field survey data from the Sierra of Tamaulipas also shows that the birds may be increasing, with records of flocks of at least 200 seen at a single site. Within these mountains, community observers conducting a bird survey in the Ejido El Sabinito, Mexico, counted approximately 2,500 red-crowned parrots in 2012 and 1,889 in 2013. These observers noted that red-crowned parrots were the most abundant species during this bird survey and that during the 2013 survey, the largest single flock of red-crowned parrots numbered 255 birds (Franco 2014, pers. comm.).

Density estimates of red-crowned parrots in Tamaulipas, Mexico between the 1970s1990s differ by an order of magnitude and have been cited as evidence for population declines (Castro 1976, in Enkerlin-Hoeflich 1995, p. 117; Birdlife International (BLI) 2011, unpaginated). Population density estimates per hectare (acre) between the 1970s and the mid-1990s are shown below in Table 1. The variance in population numbers may be attributed to different methodologies (Enkerlin-Hoeflich 1995, p. 117) or the abilities of different researchers to distinguish red-crowned from red-lored parrots (Amazona autumnalis) in the field (Enkerlin-Hoeflich 1995, p. 124).

Population Density per 100 ha (247 ac)	**Year**	**Citation**
25.2	1970's	Castro 1976 in Enkerlin-Hoeflich 1995
11.5	1985	Perez and Eguiarte 1089 in Enkerlin-Hoeflich 1995
4.72	1986	Aragon-Tapia 1986 in Enkerlin-Hoeflich 1995
5.7	1992-1994	Enkerlin-Hoeflich 1995

Table 1. Density estimates of red-crowned parrots in Tamaulipas, Mexico; 1970s1990s.
(Castro 1976, in Enkerlin-Hoeflich 1995, p. 117; Birdlife International (BLI) 2011, unpaginated).

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 red-crowned parrot 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 (BCR). The BCRs 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 (PIF 2005a, unpaginated; PIF 2007, unpaginated; Berlanga et al. 2010, pp. 38 39). 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 (Brush 2011, pers. comm.; Hagne 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:

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-Hoeflich 2003, p. 4). As a result of extensive deforestation, red-crowned parrot habitat has changed

substantially since the early 1970s (Macias and Enkerlin-Hoeflich 2003, p. 14). Further, according to PIF, extreme deterioration in the future suitability of conditions in the species breeding and nonbreeding ranges is expected (Berlanga et al. 2010, pp. 3839).

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, Mexicos deforestation has been rapid (Blaser et al. 2011, pp. 343344). 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).

Mexicos 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 250,000300,000 ha (617,763741,316 ac) degraded each year (Food and Agriculture Organization 2010, p. 233; Government of Mexico 2010b in Blaser et al. 2011, p. 344). 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 further; 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. Tamaulipas contains the largest number of recent records of the red-crowned parrot locations (Macias and Enkerlin-Hoeflich 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 0.10.3 percent of its forest area per year. Over 80 percent of the red-crowned parrots lowland habitat in Tamaulipas, Mexico, has been lost (CITES 1997, p. 2; Macias and Enkerlin-Hoeflich 2003, p. 14), and Rio (2002, in Macias and Enkerlin-Hoeflich 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-Hoeflich 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 0.10.3 percent of forest area, respectively, during this period (Masek et al. 2011, pp. 910).

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. 2224). Factors that put lands at greatest risk are favorable 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)

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-Hoeflich 2003, pp. 34). 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. 3839; Enkerlin-Hoeflich and Hogan 1997, unpaginated; Enkerlin-Hoeflich 2000, in Macias and Enkerlin-Hoeflich 2003, p. 18).

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 (crops) or grazing purposes (Government of Mexico 2010, p. 24). A majority of the red-crowned parrots range occurs within the Gulf of Mexico coastal plain in Mexicos lowland area; one of the most productive regions of intensive agricultural use in Mexico (Vázquez and Aragón-Tapia 1993, in Enkerlin-Hoeflich 1995 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-Hoeflich 1995, pp. 2021; Enkerlin-Hoeflich and Hogan 1997, unpaginated). The red-crowned parrot requires trees for nesting, feeding, and roosting and 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-Hoeflich and Hogan 1997, unpaginated).

In Texas, Hidalgo and Cameron Counties are within the South Texas Plains ecoregion where native plant abundance and distribution has been reduced over time by extensive farming (Texas State Historical Association 2012a, p. 1). In fact, 4150 percent of Cameron County, and 5160 percent of Hidalgo County, are 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. Between 1997 and 2007, the land base for agriculture in Cameron and Hidalgo counties increased by almost 3 percent (Wilkins et al 2009, p. 1). Wilkins et al. (2009, p. 2) noted an increasing trend in non-native pasture acreage in the two-county area in the decade leading up to 2007; a change that likely removed native brush and trees.

Logging

The harvest of trees, whether legal or illegal, in the red-crowned parrots suitable habitat 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 as a consequence of agricultural uses (described above).

Five percent of Mexicos forests are designated as production forest (forest area designated primarily for production of wood, fiber, 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 Mexicos 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.

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). Increased access to forests associated with commercial harvest can have direct and indirect impacts to the red-crowned parrots and their habitat. The construction of roads to provide access to logging sites may directly eliminate habitat and increase human access to these areas. 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 countrys deforestation (USAID 2009, pp. 5657; Government of Mexico 2010, p. 24; USAID Center for International Forestry Research 2010, p. 12;). 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. Residential and commercial development; oil, gas, and water pipelines; commercial scale wind energy facilities; and U.S. Border Patrol activities and infrastructure are widespread activities in Cameron and Hidalgo counties. Specific information on residential and commercial development and 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 parrots 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, including associated infrastructure such as roads, bridges, and water pipelines, as mentioned above. However, urbanization has been suggested as a potentially positive factor for 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 (Service 2011, p. 62021; Hagne 2012, pers. comm.). Red-crowned parrots are known to use dead palm trees for nesting and live ones for roosting and foraging (on fruit stalks). Within municipal areas, for aesthetic purposes and liability reasons, dead palms are often taken down and live ones are trimmed to remove dead and drooping fronds and fruit stalks within city parks, cemeteries, and other public places (Hagne 2012, pers. comm., Pons 2014, pers. comm.). Removal of dead trees and continuing these tree-grooming activities could negatively impact the species by reducing the availability of food, nest sites, and roosts sites in urban areas where suitable habitat is already sparse.

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. 56 and figures SPM.3 and SPM.4; Solomon et al. 2007, pp. 2135).

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 due to potential hotter, drier conditions. 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, other facets of 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 parrots historical range occurs, is one of the most productive regions of agricultural use in Mexico, indicate 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, as well as increasing the ease of access to parrot nest sites. 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, we find that the present and threatened destruction, modification, or curtailment of the red-crowned parrots habitat is a threat to the species.

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

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-Hoeflich 2003, p. 18). Mexicos 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 agreementan 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 ProgrammeWorld Conservation Monitoring Center CITES Trade Database, from 1997 through 2009, there were 1,218 specimens of red-crowned parrots, 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 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 this 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 exceeds 75 percent (Cantú et al. 2007, p. 7), 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 414 percent of parrots now exported out of the country), the illegal exports of some species, including the red-crowned parrot, appeared to be on the rise (Cantu et al. 2007, pp. 5859). Service law enforcement in the LRGV indicated that red-crowned parrots were not one of the primary species of concern with respect to cross-border smuggling in 2014 (Rodriquez 2014, pers. comm.).

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 (Valdez et al. 2006, p. 276,; USAID Center for International Forestry Research 2010, p. 46; Government Of Mexico 2010, p. 24), 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 65,00075,000 parrots were illegally captured each year in Mexico, mostly (8696 percent) for Mexicos 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-Hoeflich 2003, p. 19). Cantú et al. (2007, p. 35) estimated 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 20082010, it appears that illegal trade in parrots in Mexico may have 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 Mexicos 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 parrots 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 Mexicos 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.

Within Texas capture of red-crowned parrots, particularly taking of young from nests, has been reported; however, the scope and severity of this threat is unknown. In Texas LRGV, 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.) or by cutting into or downing nesting trees to remove nestlings (Gustafson 2014, pers. comm.). However, the number of these requests, the intensity and success rate of potential captures, as well as the intention of the collector, whether for personal or illegal trading, are unknown. In April 2014, Texas Parks and Wildlife Department, and Service law enforcement, indicated that they are not receiving reports regarding attempted capture or nest robbing of red-crowned parrots in the LRGV (Barker 2014, pers. comm., Cantu 2014, pers. comm., Lucio 2014, pers. comm., Plumas 2014, pers. comm., Rodriquez 2014, pers. comm.)we are unaware of any information indicating that trade is a threat to the species. In the LRGV, 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 not aware of any information indicating that scientific or educational use of the red-crowned parrot is a threat to the species.

C. Disease or predation:

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. In one study, Stone et al. (2005, entire) sampled free-ranging Mexican red-crowned parrots for external parasites and several avian diseases. External parasites found were both adult lice (Paragoniocotes mexicanus) on nestlings and adult hematophagous nest mites (Ornithonyssus sylviarum). Effects of these parasites on nestling health are unclear (Stone et al. 2005, p. 247). Another study sampled blood and fecal material of captive red-crowned parrots and yellow-headed parrots for the avian disease. All results were negative (Paras and Lamberski 1997, in Stone et al. 2005, pp. 245246). 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 (USFWS 2011, p. 62024).

Snakes, red-tailed hawks (Buteo jamaicensis), roadside hawks (B. magnirostris), 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-Hoeflich and Hogan 1997, unpaginated). During migration, Peregrine falcons (Falco peregrinus), Coopers hawks (Accipiter cooperii), red-tailed hawks (Buteo jamaicensis), 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:

D. The inadequacy of existing regulatory mechanisms:

Trade

Within the U.S., the red-crowned parrot is protected by its listing in Appendix I of CITES and the passage of the Wild Bird Conservation Act (WBCA) which restricts the import of most CITES-listed live or dead exotic birds (for scientific or museum specimens), except for certain limited purposes such as zoological display or cooperative breeding programs. Wild-caught birds may be imported into the U.S. if they are subject to Service-approved management plans for sustainable use. Currently there are no cooperative breeding programs or approved management plans for the red-crowned parrot (USFWS 2011, p. 62025). No other state laws exist for the red-crowned parrot.

Four of the largest LRGV cities, Brownsville, Harlingen, Weslaco, and McAllen, have passed municipal ordinances to protect red-crowned parrots with several of these ordinances also including protection for green parakeets (Aratinga holochlora), red-lored parrots (Amazona autumnalis), and yellow-headed parrots (Amazona oratrix). In 1992, in response to evidence that showed red-crowned parrots were being hunted and sold, the City of Brownsville declared the species as its official city bird and made it a criminal misdemeanor offense (Ordinance Number 92-1249) within city limits to knowingly or intentionally injure, capture, or kill adults; remove nestlings; take, remove or destroy eggs; or to cut down or harm trees with nests. Violations are punishable by fines up to $500. Over time, the cities of Weslaco (Municipal Ordinance Chapter 22: Section 22221) and McAllen (Ordinance Number 2014-06) followed suit, making it unlawful to knowingly or intentionally carry out any of the above-listed activities within their city limits, and included all of the parrots and parakeets listed above. The City of Harlingen passed Ordinance Number 11-55 in 2011 declaring that protecting red-crowned parrots and green parakeets was in the best interest of Harlingens citizens due to both species contributions to the Rio Grande Valley Birding Festivals (RGVBF) success in ecotourism and because the LRGV was the only U.S. location of wild populations of both species. Harlingens ordinance lists the same protections for the birds, their young, and eggs provided by the other cities, but limits protection of nesting trees to those on public property or public rights-of-way. We have no information about the effectiveness of these ordinance on the illegal taking of the red-crowned parrot. These cities support some of the largest flocks that coalesce in the non-breeding seasons, so these protections should apply to many of the parrots at this time of the year, especially since public viewing of the roosting flocks is very popular and violations of the ordinance would be more likely to be seen and reported. However, during the breeding season, the parrots tend to disperse as pairs in a more widespread fashion across the LRGV, so some pairs may well be nesting outside of the four cities in small towns or other areas. Additionally, red-crowned parrots become more secretive and quiet during the nesting season, making them harder to locate, and potentially making trapping violations harder to detect. Therefore, although the city ordinances provide protections within city limits, these municipal laws may be most effective during the non-breeding season when the parrots have concentrated in larger flocks within the cities; in some cases at well-known roost areas where enforcement of the ordinances is probably easier. In areas outside of the four cities, red-crowned parrots and

their nest trees have no protection at all; a situation that becomes more relevant during the breeding season. Also, in Harlingen, trees with nests on private property would not be protected from being cut down or otherwise damaged.

Within Mexico, the red-crowned parrot is considered an endangered species as per Norma Oficial Mexicana (Official Mexican Standard) NOM059ECOL2010a. 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 60 2 of Mexicos 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).
The level of enforcement effort might influence the effectiveness of existing regulations. In Mexico, the Federal Attorney Office for the Protection of the Environment (PROFEPA) is the main agency in charge of making seizures and arrests for illegal shipments of wildlife; other agencies might include the Procuraduría General de la República (PGR) (General Attorney of the Republic) and the Army (Cantú et al. 2007, p. 45). In 1995, PROFEPA inspectors were hired and trained to monitor, inspect, patrol, verify and seize any illegal wildlife. Inspectors are located in each Mexican state, with the main PROFEPA office residing in Mexico City. PROFEPA employees a small number of inspectors who do not carry weapons and require reinforcement during an operation for their own security. PROFEPA stated (2002), Without a doubt the most serious difficulty the PROFEPA faces in the combat against illegal bird trade is the small number of inspectors it has for the whole country (Cantú et al. 2007, p. 45). Budgets cuts have increased in these programs from 2.5 to 5.0 percent from 2006 to 2007, respectively (Cantú et al. 2007, p. 45). PROFEPA maintains a database of seizures however, records are largely incomplete and inaccurate. Records indicate the number of seizures but it does not necessarily reflect illegal trade levels or parrot population levels (Cantú et al. 2007, p. 47).

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-Hoeflich 2003, p. 18). Despite the passage of the laws and regulations described above that were intended to minimize Mexicos 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.

Regulations Aimed at Habitat Destruction and Modification

Because red-crowned parrots in the Texas LRGV frequently use cavities in dead palm trees as nest sites, protection of dead palms could play an important role in providing nesting habitat into the future. Although the four cities mentioned above have included protection of trees with nests in their parrot ordinances, these protections would not apply to unoccupied dead palms. Unoccupied, dead palm trees may be important as future nesting habitat but they are not protected by municipal law, conversely municipal landscape ordinances often encourage removal of dead trees. Municipal landscape ordinances frequently require vegetation maintenance for purposes of keeping plants looking healthy and neat; actions that may lead to trimming of palm fronds and fruiting stalks, resulting in eliminating food for the birds. 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 (5380 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 et al. 2011, pp. 1415), 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 (Government Of Mexico 2010, p. 24,; Blaser et al. 2011, p. 351). 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. Mexicos 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; Mexicos 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 parrots 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 Mexicos 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-Hoeflich 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-Hoeflich 2003, p. 14), where a designated biosphere occurs, and Rios (2002, in Macias and Enkerlin-Hoeflich 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.

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 threatens the species despite multiple laws and regulations that should prevent this from occurring. 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:

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

Nesting and foraging is not known to occur within agricultural areas. Therefore, only nesting sites that abut agricultural fields could be impacted from pesticides or avicides (chemicals specifically targeting birds). Studies have not been completed on the impacts to red-crowned parrots from the use of agricultural pesticides or avicides (McKinney 2013, pers. comm.) and are therefore not considered a threat at this time. We are not aware of any additional 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 :

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. 725726; 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. As forests are destroyed for agriculture, logging, and other uses, the carbon stored in the trees is released as carbon dioxide, which adds to the concentration of greenhouse gases. About 20 percent of the global greenhouse gas emissions are thought to be from deforestation (Chatterjee 2009, p. 557). Under this type of program, developing countries would be paid to protect their forests and reduce emissions associated with deforestation, a type of mitigation for climate change. 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 Mexicos 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 Mexicos 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-Hoeflich 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 Artificial Nest Structures: Because protection of red-crowned parrot nest sites is a concern in the LRGV (Gustafson 2014, pers. comm.), and continued successful reproduction is a key to the parrots long-term persistence in South Texas (Brush 2005, p. 95), experiments with artificial nesting structures have been undertaken in several LRGV cities. In 2011, artificial nest box projects were initiated in Weslaco and Harlingen (Hagne 2012, pers. comm.; Ohaver 2012, pers. comm., SoCal Parrot News 2014). Although the Weslaco projects were designed for green parakeets, it is likely that these structures could eventually be used by parrots due to the natural progression of entry-hole enlargement, from woodpeckers to parakeets to parrots (Yoakum 2014, pers. comm). The success of the structures at Harlon Block City Park has not yet been demonstrated; this is a highly-used recreational park and the area surrounding this box location had more human activity than was previously expected during site-selection (Ohaver 2013, pers. comm.). Although several structures with pre-existing cavities were installed at the Valley Nature Center (VNC) in Weslaco, construction of a new building there during 2013-2014 has probably precluded parrot use of the VNC natural or artificial habitats (Yoakum 2014, pers. comm). Red-crowned parrots actively traveled within the area throughout the spring, summer, and fall months and both nesting site projects have the potential to provide good nesting habitat for red-crowned parrots and woodpecker species (Ohaver (2013, pers. comm.).

In Harlingen, a structure consisting of four dead palm pieces attached to a pole, and as many as eight nest boxes were installed at several selected sites; however, as of 2014, there are no records of red-crowned parrots using these structures (Friedrich 2014, pers. comm). The only structure with nesting parrots documented to date is located in a backyard in San Benito, Cameron County. The homeowner indicated that the structure was in place for 3 years before the parrots began using it and there was already regular parrot use of the yard prior to occupation of the box. The TPWD suggested that lessons learned from the red-cockaded woodpecker artificial nest program might be useful for the LRGV parrot nest box efforts (Ortego 2014, pers. comm.). Since the parrot uses pre-existing cavities constructed by woodpeckers including the pale-billed woodpecker (Campephilus guatemalensis), golden-fronted woodpecker (Melanerpes aurifrons), and lineated woodpecker (Dryocopus lineatus) (Enkerlin-Hoeflich and Hogan 1997, p. 7), we assume that these species could also nest within these constructed nest sites, if suitable.

Riparian Corridor Re-Vegetation/Restoration: A project initiated by the Services LRGV Refuge Complex and the Rio Grande Joint Venture to understand and compare how birds are using revegetated tracts of land that were previously impacted by flooding. The project is only in its infancy and research sites are only currently being identified (Gustafson 2013, pers. comm.).

Texas Parks and Wildlife Departments is considering developing a citizen science project for red-crowned

parrots in the LRGV. Participants would gather data on the status and distribution of the species in the LRGV, map roost sites, and install artificial nest structures (Shackelford 2014, pers. comm.).

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 LRGV as continued urbanization is expected (see section on Factor A, Urbanization for more details). 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 such as buildings, roofs, other non-natural cavities, with the exception of one pair using an artificial nest structure designed to mimic natural tree 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 LRGV. 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 LRGV 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 LRGV 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.

We consider the existing laws and regulations discussed above that address destruction and modification of habitat 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 either Mexico or the United States. In addition, multiple laws and regulations 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 across the species range 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; conducting annual monitoring of accessible sites to gain information on abundance and behavioral trends; and, providing education and perhaps guidelines on best management practices for palm tree maintenance in order to avoid removal of dead and drooping palm fronds and fruiting stalks.

Priority Table

Magnitude	Immediacy	Taxonomy	Priority
High	**Imminent**	Monotypic genus	1
		Species	**2**
		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 LRGV. 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 LRGV 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__ 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__ 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 LRGV, 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, nesting, or threats. Parrot box sites in Weslaco and nesting sites in Harlingen will continue to be monitored, however 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:

During this review, the Service contacted the following parties for information or comments:
Texas Parks and Wildlife Department, State Parks Division, Kendal Keyes, John Yoakum
Texas Parks and Wildlife Department, Wildlife Division, Wildlife Diversity Program, Clifford Shackelford, Brent Ortego
Texas Parks and Wildlife Department, Game Wardens, Jaret Barker, Daniel Cantu, Billy Lucio, and William Plumas
Rio Grande Valley Birding Festival, Secretary, Norma Friedrich, and Marci Fuller

Rio Grande Joint Venture, Director, Mary Gustafson; Assistant to Director, Jesus Franco
The Nature Conservancy, Southmost Nature Preserve Manager, Maxwell Pons Jr.

South Texas Academy for Medical Professions, Assistant Principal, Brad McKinney

University of Texas-Pan American, Edinburg, Texas, Dr. Timothy Brush
U.S. Fish and Wildlife Service, Zone Biologist, Mitch Sternberg
U.S. Fish and Wildlife Service, Special Agent, Alejandro Rodriquez

In preparation of the Notice of 12-month finding published on October 6, 2011 (FR 76, pp. 6201662034), local ornithologists and researchers were contacted. Additional researchers and Service staff were contacted prior to the completion of this species assessment for new information on threats and regulations specific to the LRGV, Texas.

Literature Cited:

Abramson, J., B. L. Speer, and J. B. Thomsen. 1995. The Large Macaws: Their care, breeding, and conservaton. Raintree Publications. Fort Bragg, California.

Animal Legal and Historical Center. 2008. Mexico; General Law of Wildlife, Article 602. http://www.animallaw.info/nonus/statutes/stmxparrotban_english.htm. Accessed August 3, 2011.
Arvin, J. C. 1982. The Spring Migration, South Texas Region. American Birds 36(5): 871-873.

Barker, J. B. 2014. Telephone conversation between Jaret Barker, TPWD Game Warden, and Frank Weaver, U.S. Fish and Wildlife Service regarding reports of trapping of red-crowned parrots in the Texas LRGV. April 21, 2014.

Berlanga, H., J. A. Kennedy, T. D. Rich, M. C. Arizmendi, C. J. Beardmore, P. J. Blancher, G. S. Butcher, A. R. Couturier, A. A. Dayer, D. W. Demarest, W. E. Easton, M. Gustafson, E. Iñigo-Elias, E. A. Krebs, A. O. Panjabi, V. Rodriguez Contreras, K. V. Rosenberg, J. M. Ruth, E. Santana Castellón, R. Ma. Vidal, and T. Will. 2010. Saving Our Shared Birds: Partners in Flight Tri-National Vision for Landbird Conservation. Cornell Lab of Ornithology: Ithaca, NY.

BirdLife International. 2011. Red-crowned Amazon (Amazona viridigenalis) - Species Factsheet. http://www.birdlife.org/datazone/speciesfactsheet.php?id=1669. Accessed February 23, 2011.

Blaser, J., A. Sarre, D. Poore, and S. Johnson. 2011. Status of Tropical Forest Management 2011. ITTO Technical Series No 38. International Tropical Timber Organization, Yokohama, Japan. 418 pp.
Brush, T. 2005. Nesting Birds of a Tropical Frontier: The Lower Rio Grande Valley of Texas. Texas A & M University Press. College Station, Texas.

Brush, T. 2011. Personal communication to USFWS. Response to request for information about the red-crowned parrot numbers and population trends in Texas. May 30, 2011 email to E. VanGelder.

Cantú Guzmán, J. C., M. E. Sánchez Saldaña, M. Grosselet, and J. Silva Gamez. 2007. The Illegal Parrot Trade in Mexico: A Comprehensive Assessment. http://www.defenders.org/programs_and_policy/international_conservation/mexico_program/stopping_the_ille Accessed May 4, 2011.

Cantu, J. C. and M. E. Sanchez. 2011. A Ban and a Plan: Decreasing Illegal Trade in Mexico. PsittaScene 2011 (May): 10-11.

Cantu, D. 2014. Telephone conversation between Daniel Cantu, TPWD Game Warden, and Frank Weaver, U.S. Fish and Wildlife Service regarding reports of trapping of red-crowned parrots in the Texas LRGV. April 21, 2014.

Chatterjee, R. 2009. The Road to Reduced Emissions From Deforestationand Forest Degradation. Environmental Science and Technology Perspective 43: 557-560.

Clements, P. 2012. Conversation about urban predation on the red-crowned parrot. April 4, 2012.

Clinton-Eitniear, J. 1986. Status of the green-cheeked amazon in northeastern Mexico. Watchbird (December/January): 22-24.

Clinton-Eitniear, J. 1988. From the field: green-cheeked amazon update. Watchbird (August/September): 28-29.

Collar, N.J., L. P. Gonzaga, N. Krabbe, A. Madroño Nieto, L. G. Naranjo, T. A. Parker III, and D. C. Wege. 1992. Threatened birds of the Americas. The ICBP/IUCN red data book, Third edition (part 2). BirdLife International Publications, Cambridge UK.

Collar, N.J., and A. T. Juniper. 1992. Dimensions and causes of the parrot conservation crisis. Pp. 124 in New World Parrots in crisis: solutions from conservation biology (S. R. Beissinger and N. F. R. Snyder, eds.). Smithson. Inst. Press, Washington, D.C. in: A. Poole and F. Gill. 1997. The Birds of North America, Red-crowned parrot. 292: 1-20.

Comisión Nacional de Áreas Naturales Protegidas. 2011. Comisión Nacional de Áreas Naturales Protegidas webpage. http://www.conanp.gob.mx/english.php. Accessed August, 12, 2011.

Commission for Environmental Cooperation. 2008. The North American Mosaic: An Overview of Key Environmental Issues. Published by the CEC Secretariat, Montreal, Canada.
Commission for Environmental Cooperation. 2010. North American Environmental Outlook to 2030. Published by the CEC Secretariat, Montreal, Canada.

Convention on the International Trade in Endangered Species. 1997. Consideration of Proposals for Amendment of Appendices 1 and 2. CoP10-P-42. http://www.cites.org/eng/cop/10/prop/E-CoP10-P-42.pdf. Accessed March 7, 2011.
Convention on the International Trade in Endangered Species. 2010. How CITES Works. http://www.cites.org/eng/disc/how.shtml. Accessed June 24, 2010.

Convention on the International Trade in Endangered Species. 2011. CITES Species Database. http://www.cites.org/eng/resources/species.html. Accessed July 26, 2011.

Corbera, E., M. Estrada, P. May, G. Navarro, and P. Pacheco. 2011. Rights to Land, Forests and Carbon in REDD+: Insights from Mexico, Brazil and Costa Rica. Forests 2011 (2): 301-342.

Crick, H. 2004. The impact of climate change on birds. Ibis 146(Suppl. 1): 4856.
Enkerlin-Hoeflich, E. C. 1995. Comparative Ecology and Reproductive Biology of three sympatric species of Amazona parrots in Northeast Mexico. Ph.D. diss. Texas A&M University, College Station, Texas.

Enkerlin-Hoeflich, E. C. and K. M. Hogan. 1997. Red-crowned Parrot (Amazona viridigenalis), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/292. Accessed May 5, 2011.

Food and Agriculture Organization. 2010. Global Forest Resources Assessment 2010.

Food and Agriculture Organization Forestry Paper 163. Food and Agriculture Organization of the United Nations,
Rome, Italy. 340 pp.

Forshaw, J.M. 1989. Parrots of the World, 3rd Edition. Silvio Mattachhione & Co., Ontario, Canada.

Franco, J. 2014. Electronic mail communication between Jesus Franco, Rio Grande Joint Venture, and Robyn Cobb, U.S. Fish and Wildlife Service, transmitting written comments from Dr. Hector Arturo Garza Torres, Universidad Autonoma de Tamaulipas, regarding red-crowned parrots in Mexico, particularly in Tamaulipas. May 1, 2014.

Friedrich, N. 2014. Telephone conversation between Norma Friedrich, Secretary of Rio Grande Valley Birding Festival, and Robyn Cobb, U.S. Fish and Wildlife Service, regarding artificial nest box projects in Harlingen, Texas. April 28, 2014.

Froke, J. B. 1981. Populations, movements, foraging, and nesting of feral Amazona parrots in southern Californaa. M.S. Thesis, California State Univ., Humboldt, CA.

Fuller, M. 2014. Electronic mail communication between Marci Fuller, homeowner in San Benito, Texas, and Robyn Cobb, U.S. Fish and Wildlife Service, regarding successful nest of red-crowned parrots in backyard nest structure. April 24, 2014.

Gelhbach, F., D. O. Dillon, H. L. Harrell, S. E. Kennedy, and K. R. Wilson. 1976. Avifauna of the Río Corona, Tamaulipas, Mexico: Northeastern limit of the tropics. The Auk, 93 (1): 53-65.

Government of Mexico. 2010. Forest Carbon Partnership Facility: Readiness Preparation Proposal. http://www.Forestcarbonpartnersip.org/fcp/sites/forestcarbonpartnership.org /files/Documents/PDF/Mar2010/Mexico_120211_R-PP_Template_with_disclaimer.pdf

Gustafson, M. 2013. Telephone conservation with Service. Project update on the Rio Grande Joint Ventures

Riparian Re-vegetation/Restoration Design in Tamaulipan Brushlands proposal. February 21, 2013.
Hagne, M. 2011. Personal communication to USFWS. Response to request for information about red-crowned parrot numbers and population trends in Texas. June 13, 2011, email to E. VanGelder.

Gustafson, M. 2014. Telephone conservation between Mary Gustafson, Rio Grande Joint Venture Coordinator, and Robyn Cobb, U.S. Fish and Wildlife Service regarding an update on the status of the red-crowned parrot in the LRGV. April 23, 2014.

Hagne, M. 2012. Telephone conversation with USFWS. Red-crowned parrot habitat trends, population estimates, and threats. April 3, 2012.

Hawaii Audubon Society. 1993. Hawaiis Birds. Hawaii Aud. Soc., Honolulu, in: A. Poole and F. Gill. 1997. The Birds of North America, Red-crowned parrot. 292: 1-20.

Howell, S. N. G. and S. Webb. 1995. Guide to the Birds of Mexico and Northern Central America. Oxford Univ. Press, Oxford, UK.

Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: synthesis, report summary for policymakers. Intergovernmental Panel on Climate Change, Fourth Assessment Report. Released on 17 November 2007. 23 pp. Available from: http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf.
IPCC. 2007a. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K., and A. Reisinger (eds.)]. IPCC, Geneva, Switzerland. 104 pp.

Jahrsdoerfer, S.E., and D. M. Leslie, Jr.. 1988. Tamaulipan Brushland of the Lower Rio Grande Valley of South Texas: Description, Human Impacts, and Management Options. U.S. Fish and Wildlife Service, Biol. Rep. 88 (36). 63 pp.

Karesh, W.B., A. del Campo, W.E. Braselton, H. Puche, and R.A. Cook. 1997. Health evaluation of free-ranging and hand-reared macaws (Ara spp.) in Peru. Journal of Zoo and Wildlife Medicine 28(4): 368-77.

Keyes, K. Telephone conversation with USFWS. Red-crowned parrot habitat trends, population estimates, and threats. April 3, 2012.

Le Conte, J, S. Halderman, C. Girard, I. Lea, S. Baird, and J. Cassin. 1852-1853. June 28th; Synopsis of the Meloides of the United States: Synopsis of the Atopidoe, Rhipiceridoe and Cyphonidoe of the United States; Synopsis of the Endomychidoe of the United States; Descriptions of Some New Species of Insects, with Observations on Described Species; Descriptions of New Nemerteans and Planarians from the Coast of the Carolinas; Notice of the Mya nodulosa, Wood; Descriptions of Some New Fishes from the River Proceedings of the Academy of Natural Sciences of Philadelphia 6: 328373.

Lucio, B. J. 2014. Telephone conversation between Billy Lucio, TPWD Game Warden, and Frank Weaver, U.S. Fish and Wildlife Service regarding reports of trapping of red-crowned parrots in the Texas LRGV.

April 21, 2014.
Macias Caballero, C.M. and E. C. Enkerlin-Hoeflich. 2003. Evaluación del Estado Poblacional Actual de dos Especies Mexicanas de Loro en Peligro de Extinción: Parte II Loro Tamaulipeco (Amazona viridigenalis). Informe final presentado al Instituto Nacional de Ecología, SEMARNAT. 28pp.

Martin, P.S., C. R. Robins, and W. B. Heed. 1954. Birds and Biogeography of the Sierra de Tamaulipas, an isolated pine-oak habitat. The Wilson Bulletin 66 (1): 38-57.

Masek, J. G., W. B. Cohen, D. Leckie, M. A. Wulder, R. Vargas, B. de Jong, S. Healey, B. Law, R. Birdsey, R. A. Houghton, D. Mildrexler, S. Goward, and W. B. Smith. 2011. Recent rates of forest harvest and conversion in North America. Journal of Geophysical Research 116, G00K03. Retrieved at http://secure.ntsg.umt.edu/publications/2011/MCLWVJHLBHMGS11/Masek_et_al_2011.pdf. Accessed July 3, 2011.

Munoz Pina, C., A. Guevara, J. M. Torres, and J. Brana. 2008. Paying for the hydrological services of Mexicos forests: Analysis, negotiations and results. Ecological Economics 65: 725-736.

McKinney, B. 2003. Photo credit for red-crowned parrot at the World Birding Center, Texas.

McKinney, B. 2011. Personal communication to USFWS. Response to request for information about red-crowned parrot numbers and population trends in Texas. June 14, 2011 email to E. VanGelder.

McKinney, B. 2013. Telephone communication to USFWS. Red-crowned parrot photos; impacts to birds from freeze events; and references. April 12, 2013.

Neck, R. W. 1986. Expansion of red-crowned parrot, Amazona viridigenalis, into southern Texas and changes in agricultural practices in northern Mexico. Bulletin of the Texas Ornithological Society 19 (1&2): 6-12.

North American Bird Conservation Initiative. Undated. Bird Conservation Regions. http://www.nabci-us.org/bcrs.htm. Accessed August 12, 2011.

North American Bird Conservation Initiative. 2000. Bird Conservation Region Descriptions. Published by US Fish and Wildlife Service, Arlington, Virginia. 38 pp.

Ohaver, K. 2012. Telephone conversation with USFWS. Red-crowned parrot habitat trends, population estimates, and threats. April 3, 2012.

Ohaver, K. 2013. Personal communication to USFWS. Response to request for information about

red-crowned parrot nest box project in Weslaco, Texas. February 20, 2013 email to A. Miller.

Ortego, B. 2014. Telephone conversation between Brent Ortego, TPWD Wildlife Diversity Program, and Robyn Cobb, U.S. Fish and Wildlife Service, regarding red-crowned parrots in the LRGV. May 2, 2014.

Panjabi, A. 2011. Personal communication to USFWS. Response to request for information about PIF Species Assessment Database and Population Estimates Database. June 24, 2011 email to E. VanGelder.

Panjabi, A. O., E. H. Dunn, P. J. Blancher, W. C. Hunter, B. Altman, J. Bart, C. J. Beardmore, H. Berlanga, G. S. Butcher, S. K. Davis, D. W. Demarest, R. Dettmers, W. Easton, H. Gomez de Silva Garza, E. E. Iñigo-Elias, D. N. Pashley, C. J. Ralph, T. D. Rich, K. V. Rosenberg, C. M. Rustay, J. M. Ruth, J. S. Wendt, and T. C. Will. 2005. The Partners in Flight handbook on species assessment. Version 2005. Partners in Flight Technical Series No. 3. Rocky Mountain Bird Observatory website: http://www.rmbo.org/pubs/downloads/Handbook2005.pdf

Partners in Flight. 2005a. Species Assessment Database - Global Scores. Rocky Mountain Bird observatory website: http://www.rmbo.org/pif/jsp/BCRGlobal.asp. Accessed May 6, 2011.

Partners in Flight. 2005b. Species Assessment Database - Bird Conservation Region 36 Tamaulipan Brushlands. Rocky Mountain Bird observatory website: http://www.rmbo.org/pif/jsp/BCRBreed.asp?BCR_NUM=BCR36&BCR_Name=Tamaulipan%20Brushlands. Accessed May 6, 2011.

Partners in Flight. 2007. PIF Landbird Population Estimates Database. http://www.rmbo.org/pif_db/laped/PED4.aspx. Accessed May 6, 2011.

Perron Welch, F. 2010. Reducing Emissions from Deforestation and Forest Degradation: Mexicos Solution for Offsetting Emissions while Respecting Indigenous and Local Community Rights. The Center for International Sustainable Development Law & The International Development Law Organization Working Paper Series, December 2010. http://www.cisdl.org/pdf_working_papers_cop16/Frederic_Perron_Welch_Reducing_Emissions_from_Defores Accessed July 3, 2011.

Plumas, W. J. 2014. Telephone conversation between Will Plumas, TPWD Game Warden, and Frank Weaver, U.S. Fish and Wildlife Service regarding reports of trapping of red-crowned parrots in the Texas LRGV. April 21, 2014.

Pons, M. 2014. Telephone conversation between Maxwell Pons, Texas Nature Conservancy, Southmost Preserve Manager, and Robyn Cobb, U.S. Fish and Wildlife Service, regarding tree maintenance in the LRGV. May 1, 2014.

Putz, F. E., K. H. Redford, J. G. Robinson, R. Fimbel, and G. M. Blate. 2000. Biodiversity Conservation in the Context of Tropical Forest Management. Environment Department, World Bank, Washington, D.C. 80 pp.

Rich, T. D., C. J. Beardmore, H. Berlanga, P. J. Blancher, M. S. W. Bradstreet, G. S. Butcher, D. W. Demarest, E. H. Dunn, W. C. Hunter, E. E. Iñigo-Elias, J. A. Kennedy, A. M. Martell, A. O. Panjabi, D. N. Pashley, K. V. Rosenberg, C. M. Rustay, J. S. Wendt, T. C. Will. 2004. Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology. Ithaca, NY. 84 pp.

Ridgely, R. S. 1981. The Current Distribution and Status of Mainland Neotropical Parrots. Pp. 233-384 in R. Pasquierr (ed.), Conservation of New World Parrots. ICBP Technical Publication No. 1. Smithsonian Institute Press. Washington, D.C.

Ridgely, R.S., T.F. Allnutt, T. Brooks, D.K. McNicol, D.W. Mehlman, B.E. Young, and J.R. Zook. 2003. Digital Distribution Maps of the Birds of the Western Hemisphere, version 1.0 NatureServe, Arlington, Virginia, USA.
Ríos, V. and D. A. Shirk. 2011. Drug violence in Mexico: Data and analysis through 2010. Justice in Mexico Project, Trans-Border Institute, University of San Diego. San Diego, California. 21pp.

Ríos, V. and D. A. Shirk. 2011. Drug violence in Mexico: Data and analysis through 2010. Justice in Mexico Project, Trans-Border Institute, University of San Diego. San Diego, California. 21pp.

Rodriquez, A. 2014. Electronic mail communications between Alejandro Rodriquez, U.S. Fish and Wildlife Service Special Agent, and Robyn Cobb, U.S. Fish and Wildlife Service, regarding reports of illegal trapping of and trade in red-crowned parrots. April 24 and 25, 2014.

Sarukhan, J., and L. Merino. 2007. Challenges to sustainable forest management and stewardship in Mexico. http://pdf.usaid.gov/pdf_docs/PNADL267.pdf. Accessed July 30, 2011.

Shackelford, C. 2014. Telephone conversation between Clifford Shackelford, TPWD Wildlife Diversity Program, and Robyn Cobb, U.S. Fish and Wildlife Service, regarding TPWDs input on red-crowned parrots in the LRGV. April 29, 2014.

Solomon, S., D. Qin, M. Manning, R.B. Alley, T. Berntsen, N.L. Bindoff, Z. Chen, A. Chidthaisong, J.M. Gregory, G.C. Hegerl, M. Heimann, B. Hewitson, B.J. Hoskins, F. Joos, J. Jouzel, V. Kattsov, U. Lohmann, T. Matsuno, M. Molina, N. Nicholls, J. Overpeck, G. Raga, V. Ramaswamy, J. Ren, M. Rusticucci, R. Somerville, T.F. Stocker, P. Whetton, R.A. Wood, and D. Wratt. 2007. Technical Summary. Pp. 1991. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor, and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY. 996 pp.

SoCal Parrot News. 2014. Conservation Spotlight: Red-crowned Amazons. February 2014 electronic newsletter of the Southern California Parrot organization. http://www.socalparrot.org/about-us.html. Accessed on May 1, 2014.

Stone, E. G., G. Montiel Parra, and T.M. Perez. 2005. A survey of selected parasitic and viral pathogens in four species of Mexican parrots, Amazona autumnalis, Amazona oratrix,

Amazona viridigenalis, and Rhynchopsitta pachyrhyncha. Journal of Zoo and Wildlife Medicine 36(2): 245249.

Sutton, G. M. and O. S. Pettingill. 1942. Birds of the Gomez Farias region, southwestern Tamaulipas. The Auk 59(1): 1-34.

Texas State Data Center. 2008. Tables for Texas Population Projections. http://txsdc.utsa.edu/Data/TPEPP/Projections/2008/Index.aspx. Accessed August 18, 2011.

Texas State Historical Association. 2012a. The Handbook of Texas Online, Cameron County. http://www.tshaonline.org/handbook/onine/articles/hcc04. Accessed April 2, 2012.

Texas State Historical Association. 2012b. The Handbook of Texas Online, Hidalgo County. http://www.tshaonline.org/handbook/online/articles/hch14. Accessed April 2, 2012.

The California Parrot Project. 2012. Red-crowned parrot. Accessed online at: http://www.californiaparrotproject.org/red_crowned_parrot.html#photos (April 4, 2012).

US Agency for International Development. 2009. Assessment of Tropical Forest and Biodiversity Conservation in Mexico. http://www.usaid.gov/locations/latin_america_caribbean/environment/docs/FAA_118_119_Mexico_2009_FIN Accessed August 9, 2011.

US Agency for International Development. 2011. Mexico: Country Profile. http://www.usaid.gov/locations/latin_america_caribbean/country/mexico/Mexico_Country_Profile.pdf. Accessed July 3, 2011.

US Census Bureau. 2012. U.S. Census Bureau: State and County QuickFacts. http://quickfacts.census.gov/qfd/states/48000.html. Accessed April 4, 2012.

US Department of State. 2011. Travel Warning US Department of State Bureau of Consular Affairs Mexico. Issued April 22, 2011. http://travel.state.gov/travel/cis_pa_tw/tw/tw_5440.html. Accessed July 3, 2011.

U.S. Fish and Wildlife Service (Service). 2011. Endangered and Threatened Wildlife and Plant; Red-crowned parrot, Notice of 12-month finding. Federal Register 76(194): 6201662034.

Valdez, R., J. C. Guzmán-Aranda, F. J. Abarca, L. A. Tarango-Arámbula, and F. Clemente Sánchez. 2006. Wildlife Conservation and Management in Mexico. Wildlife Society Bulletin 34(2): 270-282.

Walker, S., and J. Chapman. 1992. Valley of the parrots. Texas Parks and Wildl. 1992 (11): 3741, in: A. Poole and F. Gill. 1997. The Birds of North America, Red-crowned parrot. 292: 1-20.

Yoakum, J. 2014. Telephone conversation between John Yoakum, TPWD Estero Llano Grande State Park, and Robyn Cobb, U.S. Fish and Wildlife Service, regarding the status of Weslaco, Texas artificial nest projects. May 2, 2014.
Walther, G.R., Post, E., Convey, P., Menzel, A., Parmesan, Cl., Beebee, T.J.C., Fremont, J.M. Hoegh-Guldberg, O., and Bairlein, F. 2002. Ecological responses to recent climate change. Nature 416: 398395.

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: Gary E. Nicholopoulos 06/06/2014
Date

Concur: David Cottingham 11/18/2014
Date

Did not concur: _____ _____
Date

Director's Remarks: