Lycalopex vetulus, Hoary Fox

Assessment by: Lemos, F.G., Azevedo, F.C., Paula, R.C. & Dalponte, J.C.

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Scientific Name: *Lycalopex vetulus* Lund, 1842

Synonym(s):
- *Pseudalopex vetulus* (Lund, 1842)

Common Name(s):
- English: Hoary Fox, Hoary Zorro, Small-toothed Dog
- French: Renard du Brésil
- Spanish; Castilian: Zorro de Campo Común
- German: Brasilianischer, Kampfuchs
- Portuguese: Raposa-do-campo, Raposinha

Taxonomic Source(s):

Taxonomic Notes:
Several recent molecular studies have provided support for a monophyletic assemblage of South American endemic canids (Lindblad-Toh *et al.* 2005, Perini *et al.* 2010), with *Chrysocyon* and *Speothos* forming a sister-clade to the monophyletic South American foxes and *Atelocynus*. On the basis of morphology, Zunino *et al.* (1995) reviewed previous work and also supported clustering species within the two previous paraphyletic genera (*Pseudalopex*, *Lycalopex*) into a single monophyletic genus. They further argued that *Lycalopex* had priority over *Pseudalopex*, subsequently also supported by Zrzavý and Říčánkova (2004). This raises the question of whether *Dusicyon* would have been a more appropriate name, since Perini *et al.* (2010) reported a close relationship between *L. culpaeus* and *Dusicyon*. However, we now know that *Dusicyon* is far outside this clade (*Slater et al.* 2009, *Austin et al.* 2013). Based on this evidence, the genus *Lycalopex* is used over *Pseudalopex* for all South American foxes, following Wozencraft’s (2005) earlier treatment.

Assessment Information

Red List Category & Criteria: Near Threatened C1 [ver 3.1](https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T6926A87695615.en)

Year Published: 2020

Date Assessed: March 15, 2019

Justification:
The Hoary Fox, *Lycalopex vetulus*, is endemic to the Cerrado of Brazil, a savanna biome under severe anthropogenic pressure and with less than 20% of its original area undisturbed. The estimated number of mature individuals is 9,840-19,200 and it is estimated that the species has undergone a decline of...
10% in the last ~12 years due to the joint effects of ongoing habitat loss, road kills, killing by domestic dogs, diseases, retaliation to suspected predation of domestic fowl and high mortality of pups/juveniles, especially in unprotected regions. Hence, the species qualifies either as Near Threatened, based on nearly meeting criterion C1, or Least Concern. The current assessment is slightly precautionary in assessing the species as Near Threatened, but recognizes the uncertainty in this assessment and the possibility that the species may be Least Concern.

**Previously Published Red List Assessments**

2008 – Least Concern (LC)
https://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T6926A12815527.en

2004 – Data Deficient (DD)

1996 – Data Deficient (DD)

1994 – Insufficiently Known (K)

1990 – Insufficiently Known (K)

**Geographic Range**

**Range Description:**

The geographic distribution of the Hoary Fox, the only endemic Brazilian carnivore, is associated with the limits of the Cerrado ecosystem (Brazilian savanna) (Dalponte 2009). However, it can also be found in transition zones, including open habitats in the Pantanal (a mosaic of grasslands and xerophytic vegetation), although there are still states and regions within this ecosystem in which the species has not been recorded. It is more common in the central-southern region of the Cerrado (Dalponte 2009), although recent recordings have considerably extended their distribution in ecotonal vegetation in northern Mato Grosso (Dalponte et al. 2018). The current range extends from north-eastern and western São Paulo (Dalponte 2003, Dalponte 2009) to northern Piauí (Costa and Courtenay 2003) and middle-eastern Maranhão (T.G. Oliveira, unpubl. data), including also Mato Grosso (central-southern) and Mato Grosso do Sul (dry and non-flooded Pantanal areas) (Dalponte et al. 2018), southern Rondônia (L.A. Ribeiro, pers. comm.), Tocantins, Goiás, Distrito Federal, south-western Bahia, and central-western Minas Gerais (Dalponte 2009, Lemos et al. 2013). Isolated records suggest its occurrence in southern Minas Gerais (Fernandes and Costa 2013) and southern Ceará (Olifiers and Delciellos 2013), both in instances where Cerrado habitat is encroaching on the Atlantic Forest and Caatinga domains, respectively.

Although the range of the species is relatively well understood, three regions still present knowledge gaps due to the lack of unequivocal confirmation of existing records. The first is the precise western limit of the distribution (Mato Grosso do Sul): although its occurrence has been suggested for the Bolivian Cerrado, at the Serranía de Huanchaca (Anderson 1997), the western-most record of the species is located approx. 80 km before the Bolivian border (Dalponte 2009). The second gap is the north-eastern region of its distribution, where the Cerrado is replaced by the Caatinga. Although several researchers have remarked on finding the species in central and eastern Caatinga, there is evidence (including pictures of live animals, roadkills, and tracks) to confirm that they were in fact misidentified Crab-eating Foxes (*Cerdocyon thous*). Crab-eating Foxes in the eastern extent of their range have lighter fur than what is generally found in other regions. In fact, most canids diagnosed with leishmaniasis and rabies in

https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T6926A87695615.en
the north-east originally identified as *Lycalopex vetulus* were in fact misidentified *C. thous* (Courtenay et al. 1996, Carnieli et al. 2008). Similarly, different populations of *L. vetulus* (e.g., from Mato Grosso, Goiás and Minas Gerais) can show variation in their coat colour patterns, with dark, almost melanic forms similar to Crab-eating Foxes commonly seen (see Dalponte 2009, Lemos and Azevedo, pers. obs). The third knowledge gap is Paraná: although São Paulo represents their current distributional limit confirmed by material evidence (Dalponte 2009), Mikich and Bérnils (2012) include the Hoary Fox in Paraná’s state Red List based on three records in the eastern portion of the state. However, material evidence to support this range extension is lacking.

Part of the difficulty in determining the distribution of Hoary Foxes is related to difficulties in reliably identifying the species, which traditionally is based on colour patterns (Costa and Courtenay 2003, Dalponte 2009). The species is easily confused with other canids of similar body mass: the Crab-eating Fox and the Pampas Fox (*L. gymnocercus*). Crab-eating Foxes occur sympatrically with *L. vetulus*, while the Pampas Fox replaces the Hoary Fox at the southern limit of its distribution, with the northern distribution limit of the latter currently unknown. Also, although Lemos and Azevedo (pers. comm.) have recorded the Pampas Fox in south-western São Paulo, recent evidence suggests the existence of a hybridization zone between Hoary Fox and Pampas Fox in this region and the extent of this zone is still under investigation (Garcez 2019). Due to overlapping colour patterns between the Hoary Fox and other Brazilian canids of similar size, their identification should be based on less variable morphological differences such as body size, head and nose size and shape relative to the body (bigger and more robust in Crab-eating Foxes, followed by the Pampas Fox), in addition to the presence of one dark spot on the base and tip of the Hoary Fox tail (Dalponte 2009, Lemos et al. 2013). Although the Pampas Fox also has dark spots on the tail, they are much bigger (5–8 kg) than Hoary Foxes.

**Country Occurrence:**

**Native, Extant (resident):** Brazil (Bahia, Brasília Distrito Federal, Ceará, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Piauí, Rondônia, São Paulo, Tocantins)
Population

Only two studies have previously estimated population densities of the Hoary Fox. Rocha et al. (2008) used linear transects at two locations in Mato Grosso and estimated 1.21 individuals per km$^2$ in an area covered by shrub savannah and 4.28 individuals per km$^2$ in an exotic grass pasture. However, these estimates should be cautiously interpreted since it is possible that the difference in density is biased by: i) the species’ detectability in the different environments, and ii) the timing of sampling in different reproductive seasons. The 4.28 density was estimated in the second semester, when foxes are known to be denning and foraging with puppies together, and this may have overestimated density at the pasture site. Rezende (2018), using capture-recapture models accounting for imperfect detectability, estimated 0.41 individual per km$^2$ in a fragmented area comprising a matrix of exotic pastures in south-eastern Goiás. In the same region/population, Lemos and Azevedo (unpublished data) registered offspring mortality greater than 50% in cohorts monitored during 12 years, with potentially negative demographic impacts.

To estimate the population size of the Hoary Fox, the total area of suitable habitat was determined taking into account remnants of Cerrado habitats (grassland, savannah, and other non-forest), and 50% of the area of pastures, within the species’ current range, yielding an area of approximately 120,000 km$^2$. Considering the limited information on density for the species in disturbed and natural habitats (0.41 individual per km$^2$, Rezende 2018; 1.21 individuals per km$^2$, Rocha et al. 2008), the habitats known to be used and the anthropogenic threats across most of the range, it was estimated that the Hoary Fox population might be approximately 49,200-96,000 individuals (based on a mean density of 0.8 individual per km$^2$). Number of mature individuals may vary according to species life stories, degree of habitat specificity, mortality rates, and how isolated subpopulations are. There are no available data on the number of mature individuals among different Hoary fox subpopulations. From a monitored subpopulation of Cumari, south-eastern Goiás, not all adults were able to find a mate and breed annually, and mortality of adults and dispersing young was high. Breeding males and females represented about 20-25% of monitored individuals annually (Lemos and Azevedo, pers. obs). On the other hand, genetic data obtained from Cumari and a second subpopulation from Araguari, western Minas Gerais, suggest high genetic diversity of individuals (He = 0.816, Silva 2015), despite the high degree of human disturbance in sampled areas. On a wider phylogeographic perspective, Garcez (2019) also infers that the population of Hoary Foxes is structured in only one population along Brazil, not showing signs of isolation or fragmentation. Therefore, considering 20-25% of the population is capable of reproducing, the high mortality rates of adults and dispersing young, and the low densities registered, the number of mature individuals is estimated to range between 9,840 and 19,200 mature individuals.

Considering the joint impacts of ongoing loss of habitat, road-kills, persecution, killing and transmission of diseases by domestic dogs, retaliation for the alleged predation of domestic fowl, high mortality of pups/juveniles in different populations along unprotected areas, and that this is common throughout the species distribution, it is not unreasonable to estimate that in 12 years (three generations) a decline of at least 10% of the population could occur.

**Current Population Trend:** Decreasing

**Habitat and Ecology** (see Appendix for additional information)

Hoary Foxes are typically found in open Cerrado, apparently preferring areas with sparse vegetation...
such as *campos limpos*, *campos sujos*, *campos cerrados* and cerrado *sensu stricto* (Cabrera and Yepes 1960, Coimbra-Filho 1966, Dalponte 1997, 2003, Silveira 1999, Juarez and Marinho-Filho 2002). Despite apparently avoiding swamp or flooded regions, it can be found in some open and dry lands in the Pantanal during the flooding period (Dalponte 2003). Censuses conducted in flooded lowlands of the Paraguay river did not record the species, neither in low continuous areas (Alho et al. 1988) nor in high, isolated areas (Schaller 1983, Dalponte 2003). There are records in human-modified areas such as pastures (Courtenay et al. 2006, Rocha et al. 2008, Dalponte 2009, Lemos, Facure et al. 2011, Lemos, Azevedo et al. 2011), agriculture (Juarez and Marinho-Filho 2002, Dalponte 2003, Lemos and Azevedo, obs. pes.) and silviculture, specifically in recent plantations of eucalyptus (Courtenay et al. 2006) and rubber (Lemos and Azevedo, pers. obs.). According to Dalponte (2003), cattle ranching areas (managed and in recomposition) represented 24.5% of Hoary Fox records by direct observation, while cultivated areas represented 7.5% of the records. In cattle farms in south-eastern Goiás, Lemos, Facure et al. (2011) observed, via radio-telemetry, that Hoary Foxes utilized more pasture areas (especially trampled and overgrazed pastures) compared with other available habitats (pastures in some stage of succession, semi-deciduous vegetation and their edges, and swamps and their edges). There were no records in forest areas.

The Hoary Fox is an omnivore that uses termites as the basis of its diet in addition to beetles and grasshoppers, and depending on environment and season, wild and exotic fruits, small mammals, lizards, snakes, anurans and birds (Dalponte 1995, Dalponte 1997, Dalponte and Lima 1997, Juarez and Marinho-Filho 2002, Jácomo et al. 2004, Ferreira-Silva and Lima 2006, Trovati et al. 2006, Dalponte 2009, Lemos, Facure et al. 2011, Kotviski et al. in press). When it occurs in sympatry with the Crab-eating Fox and Maned Wolf (*Chrysocyon brachyurus*), there is some degree of interspecific dietary overlap (Jácomo et al. 2004; Kotviski et al. in press). However, the primarily termite-based diet of the Hoary Fox apparently allows it to coexist with other canids (Dalponte 2009, Kotwiski et al. in press). Some moderate diet overlap between *C. thous* and *L. vetulus* has been observed, although there were some differences in their preference for food items (Silveira 1999, Juarez and Marinho-Filho 2002, Lemos, Facure et al. 2011, Kotviski et al. in press). Jácomo and collaborators (2004) analysed the overlap in trophic niches among the three species at Emas National Park in Goiás and the largest overlap was between the Maned Wolf and the Hoary Fox. However, both species differed in their activity patterns, which allows them to co-exist sympatrically.

Hoary Foxes are considered solitary (Dalponte 2009) and monogamous, forming reproductive pairs during the breeding season and having offspring care (Dalponte 2003, Courtenay et al. 2006, Lemos, Facure et al. 2011, Lemos 2016). Direct observations report social interactions between the members of the familial group (male, female and season offspring), with more intense contact between males and females during the first four months of the offspring life. Females generate litters of one to five offspring (mean = 3, often born between July and August), with a gestation period of approximately 50 days (Dalponte 2003, Dalponte 2009, Lemos, Facure et al. 2011, Lemos and Azevedo, pers. obs.). Juvenile dispersal occurs between nine and ten months of age, when they begin to establish their own territories, which can be close to the area of their first months of life (Dalponte 2003, Lemos and Azevedo, pers. obs.).

There are few studies about home-range patterns. In Bahia, Juarez and Marinho-Filho (2002) estimated the home-range of an adult female at 3.8 km² while that of a juvenile male was 2 km². Courtenay et al. (2006) followed a pair and two cubs in a human-modified area in Minas Gerais for a few months and

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estimated a family home-range of 4.56 km². In Mato Grosso two pairs monitored for seven months had home-ranges of approximately 2 km² (Dalponte et al. 2018). In south-eastern Goiás, in human-modified areas of pasture in Cumari, Hoary Foxes (n = 12 males and eight females) monitored between 2008 and 2016 had an average home-range of 2.77 km² (Lemos 2016). Due to the low number of monitored populations (both in natural and human-modified areas) and the short duration of most studies, medium and long-term population studies are necessary.

Regarding interspecific interactions, there are very few studies about encounters between the Hoary Fox and other carnivores. From 2005 to 2016, in south-eastern Goiás, Lemos et al. (pers. obs.) witnessed at least six encounters between Hoary Foxes and Crab-eating Foxes/Maned Wolves, which generally resulted in the larger species chasing the smaller one (Lemos et al. 2007, Lemos 2016). Three records consisted of observations of Hoary Foxes monitored via radio-telemetry being expelled from their areas by monitored Crab-eating Foxes. Lemos, Facure et al. (2011) also reports one male Hoary Fox with aggressive behaviour repelling a Maned Wolf from a den. There are very limited data with respect to predation by large carnivores, although Jácomo et al. (2004) registered Hoary Fox fur in Maned Wolf scats and R.C. de Paula (pers. obs.) and C. Bickley (pers. comm.) recorded Maned Wolves pursuing Hoary Foxes at Serra da Canastra National Park and south-eastern Goias, respectively. In south-eastern Goiás, 24% of the mortality in a monitored population (N = 40 Hoary Foxes) was due to predation by Pumas Puma concolor (Lemos 2016).

Systems: Terrestrial

Use and Trade (see Appendix for additional information)

The species is not exploited for fur or any other products. However, young foxes are very occasionally taken as pets (Dalponte and Courtenay 2004).

Threats (see Appendix for additional information)

The major threats to the Hoary Fox are habitat destruction and other direct and indirect anthropogenic effects (Lemos, Azevedo et al. 2011, Lemos et al. 2013, Lemos 2016). The species is endemic to the Cerrado, which was historically seen as unproductive land. However, extensive commercial and industrial development in the region over the last two decades, characterized by growth (in size and number) of urban centres, increased timber exploitation for coal provision, conversion of natural habitats to pastures and crops, and the expansion of linear structures for transportation of rural products has resulted in loss and fragmentation of the original Cerrado habitats (Dalponte 2003, Lemos and Azevedo 2009, Lemos, Azevedo et al. 2011, Lemos et al. 2013). Natural Cerrado areas in São Paulo and Minas Gerais occur in small and scattered fragments, and are currently isolated from the northern, more continuous portion of the biome.

Road kills are responsible for a high number of individuals being lost from populations (Dalponte 2003, Dalponte and Courtenay 2004, Lemos and Azevedo, 2009, Lemos, Azevedo et al. 2011, Lemos 2016), followed by attacks by domestic dogs and human persecution in response to an erroneous perception that Hoary Foxes attack domestic fowl (Dalponte 2003, Lemos and Azevedo 2009, Lemos, Azevedo et al. 2011, Lemos et al. 2013, Bickley et al. in press). In fact, domestic fowl are mostly absent from the Hoary Fox diet (Lemos, Facure et al. 2011, Kotviski et al. in press). During population monitoring (n = 40 individuals) in Cumari, south-eastern Goiás, 29 Hoary Fox carcasses were retrieved, with the cause of
mortality identified as: road-kills (n = 5), attacks by domestic dogs (n = 1), poisoning/gunshot (n = 3), predation by cougars (n = 7) and old age (n = 1). Mortality causes for 12 individuals were impossible to determine, but it is possible that diseases may have played a role.

Increasing contact between Hoary Foxes and humans and domestic animals may be leading to the development of novel eco-epidemiologic relationships as observed in Cumari (Goiás state). Hoary Foxes are frequently observed foraging among cattle and in close contact with human residences, and involved in antagonistic encounters with domestic dogs (Lemos, Azevedo et al. 2011). An infection of canine distemper virus (CDV) has been reported in a wild Hoary Fox and the potential sources of infection were domestic dogs (Megid et al. 2010). This report highlights the susceptibility of the species to CDV, with clinical and histopathological signs identical to those developed by domestic dogs. There are also reports of two individuals that tested positive for canine parvovirus (Curi 2005). In the past, Hoary Foxes were identified as reservoirs of Leishmania chagasi (Deane and Deane 1954). However, Courtenay et al. (1996) compared craniums and demonstrated that infected individuals were in fact misidentified Crab-eating Foxes. There are no reports of rabies for the species. Hoary Foxes of two populations sampled in Cumari (Goiás) and Araguari (Minas Gerais) showed positive seroprevalence for Trypanosoma cruzi (71%) and Leptospira spp. (14.2%). However, parasites were not isolated, and there were no parasitemia cases nor clinical signs. Therefore, clinical and epidemiological importance of these parasites for Hoary Foxes is still unclear (Rocha et al. 2013, Rodrigues et al. 2015). Consequently, long-term studies to elucidate the susceptibility of this species to pathogens and understand the effects of these parasites on the survival of populations in natural and human-modified areas across its range are urgently needed.

**Conservation Actions (see Appendix for additional information)**

**Legislation**
Not included on the CITES Appendices. Hunting and trade in wildlife is forbidden in Brazil. There is no specific hunting legislation for Hoary Foxes.

**Presence in protected areas**
The species occurs in a number of protected areas throughout its range, including Águas Emendadas Ecological Station (ES), Santa Bárbara ES, Jataí ES, Ribeirão Preto ES, Serra das Araras ES, Chapada dos Veadeiros National Park (NP), Emas NP, Brasília NP, Grande Sertão Veredas NP, Serra da Canastra NP, Serra do Cipó NP, Chapada dos Guimarães NP, Serra da Capivara NP, Rio da Casca State Ecological Station (SES), Rio Ronuro SES, Serra de Caldas Novas State Park (SP), Pau Furado SP, Mirador SP, Serra Azul SP, Gruta da Lagoa Azul SP, Cajuru State Forest (SF), Batatais SF, Bebedouro SF, Limoeiro Environmental Protection Area (EPA), Chapada dos Guimarães EPA, Bacaba Municipal Ecological Station (MES), Serra do Tombador Private Reserve of Natural Heritage (PNHR) (Cabral et al. 2017), Panga PNHR (Bruna et al. 2010), Galheirao PNHR, Santo Antonio Natural Monument (NM), and Cabeceira do Rio Coxipozinho Municipal Natural Park (MNP).

**Presence in captivity**
Although known to occur in captivity, no specimens were confirmed in Brazilian zoos and other wildlife keeping facilities at the time of assessing the species.

**Gaps in Knowledge**
Areas for further research include: i) population studies in protected areas in order to establish base-line
information of Hoary foxes, ii) population dynamics in regions under different degrees of conservation and land use, and the real impact of human activities on populations occurring on private lands; iii) estimates of birth and death rates, longevity, and dispersal potential of juveniles; iv) investigation into the genetic viability of different subpopulations and the effects of hybridization with Pampas Foxes at São Paulo state; and v) an evaluation of the potential role of disease in population dynamics and the status of the Hoary Fox as potential reservoir of veterinary (e.g., scabies, CDV) and public health (e.g., leishmaniasis, rabies) pathogens.

Priorities for action
In 2013 an evaluation of the extinction risk for the Hoary Fox was conducted and the species was considered Vulnerable by the Brazilian Red List of Species Threatened of Extinction (Lemos et al. 2013). Based on this assessment, the species was included in the National Plan for the Conservation of Brazilian Canids published in 2018 by the National Center for Research and Conservation of Mammalian Carnivores/Chico Mendes Institute for Biodiversity Conservation (CENAP/ICMBio). The document contains specific actions for the conservation of Brazilian canids threatened with extinction to be held between 2018 and 2022, planned in association with governmental institutions, researchers and the private sector. Proposed actions include prioritizing the protection of Cerrado-specific habitats adequate for the survival of the species. Government and private projects and initiatives that aim at reducing negative impacts on the Cerrado, in addition to actions from rural development policies targeting sustainable production and development, and biodiversity maintenance in agro-ecosystems (Dalponte 2003), can effectively contribute to the conservation of the Hoary Fox in human-modified landscapes.

Credits
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Reviewer(s): Hoffmann, M. & Sillero-Zubiri, C.
Facilitator(s) and Compiler(s): Hoffmann, M.
Authority/Authorities: IUCN SSC Canid Specialist Group (foxes, jackals and wild dogs)
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**Citation**


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Appendix

Habitats
(http://www.iucnredlist.org/technical-documents/classification-schemes)

<table>
<thead>
<tr>
<th>Habitat</th>
<th>Season</th>
<th>Suitability</th>
<th>Major Importance?</th>
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<tr>
<td>2. Savanna - Dry</td>
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<tr>
<td>14. Artificial/Terrestrial - Arable Land</td>
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<td>Marginal</td>
<td>-</td>
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<tr>
<td>14. Artificial/Terrestrial - Pastureland</td>
<td>-</td>
<td>Suitable</td>
<td>No</td>
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Threats
(http://www.iucnredlist.org/technical-documents/classification-schemes)

<table>
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<th>Threat</th>
<th>Timing</th>
<th>Scope</th>
<th>Severity</th>
<th>Impact Score</th>
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<tr>
<td>2. Agriculture &amp; aquaculture - Annual &amp; perennial non-timber crops</td>
<td>Ongoing</td>
<td>Majority (50-90%)</td>
<td>Slow, significant declines</td>
<td>Medium</td>
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<tr>
<td>2.3. Agro-industry farming</td>
<td></td>
<td></td>
<td></td>
<td>impact: 6</td>
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<tr>
<td>Stresses:</td>
<td></td>
<td>1. Ecosystem stresses - &gt; 1.1. Ecosystem conversion</td>
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<tr>
<td>1. Ecosystem stresses - &gt; 1.2. Ecosystem degradation</td>
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<tr>
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<td>Majority (50-90%)</td>
<td>Slow, significant declines</td>
<td>Medium</td>
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<td>2.3.3. Agro-industry grazing, ranching or farming</td>
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<td>impact: 6</td>
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<td>Stresses:</td>
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<td>1. Ecosystem stresses - &gt; 1.2. Ecosystem degradation</td>
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<tr>
<td>4. Transportation &amp; service corridors - Roads &amp; railroads</td>
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<td>Majority (50-90%)</td>
<td>Slow, significant declines</td>
<td>Medium</td>
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<tr>
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<td>2. Species Stresses - &gt; 2.1. Species mortality</td>
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</tr>
<tr>
<td>5. Biological resource use - Hunting &amp; trapping</td>
<td>Ongoing</td>
<td>Minority (50%)</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>terrestrial animals - &gt; 5.1. Persecution/control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stresses:</td>
<td></td>
<td>2. Species Stresses - &gt; 2.1. Species mortality</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Conservation Actions in Place
(http://www.iucnredlist.org/technical-documents/classification-schemes)

<table>
<thead>
<tr>
<th>Conservation Action in Place</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>In-place research and monitoring</td>
<td></td>
</tr>
<tr>
<td>Action Recovery Plan: No</td>
<td></td>
</tr>
<tr>
<td>Systematic monitoring scheme: No</td>
<td></td>
</tr>
<tr>
<td>In-place land/water protection</td>
<td></td>
</tr>
<tr>
<td>Conservation sites identified: No</td>
<td></td>
</tr>
</tbody>
</table>
### Conservation Action in Place

<table>
<thead>
<tr>
<th>Category</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area based regional management plan</td>
<td>No</td>
</tr>
<tr>
<td>Occurs in at least one protected area</td>
<td>Yes</td>
</tr>
<tr>
<td>Invasive species control or prevention</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

#### In-place species management

<table>
<thead>
<tr>
<th>Category</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvest management plan</td>
<td>No</td>
</tr>
<tr>
<td>Successfully reintroduced or introduced benignly</td>
<td>No</td>
</tr>
<tr>
<td>Subject to ex-situ conservation</td>
<td>No</td>
</tr>
</tbody>
</table>

#### In-place education

<table>
<thead>
<tr>
<th>Category</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject to recent education and awareness programmes</td>
<td>No</td>
</tr>
<tr>
<td>Included in international legislation</td>
<td>No</td>
</tr>
<tr>
<td>Subject to any international management / trade controls</td>
<td>No</td>
</tr>
</tbody>
</table>

### Conservation Actions Needed

(\[link to IUCN Red List\])

#### Conservation Action Needed

2. Land/water management -> 2.1. Site/area management

4. Education & awareness -> 4.3. Awareness & communications

### Research Needed

(\[link to IUCN Red List\])

#### Research Needed

1. Research -> 1.2. Population size, distribution & trends
1. Research -> 1.3. Life history & ecology
1. Research -> 1.5. Threats

### Additional Data Fields

**Distribution**

- Estimated extent of occurrence (EOO) (km²): 3085062
- Lower elevation limit (m): 90
- Upper elevation limit (m): 1,100
<table>
<thead>
<tr>
<th><strong>Population</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of mature individuals: 9,840-19,200</td>
</tr>
<tr>
<td>Continuing decline of mature individuals: Yes</td>
</tr>
<tr>
<td>Extreme fluctuations: No</td>
</tr>
<tr>
<td>Population severely fragmented: Unknown</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Habitats and Ecology</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation Length (years): 3-4</td>
</tr>
</tbody>
</table>
The IUCN Red List Partnership

The IUCN Red List of Threatened Species™ is produced and managed by the IUCN Global Species Programme, the IUCN Species Survival Commission (SSC) and The IUCN Red List Partnership.

The IUCN Red List Partners are: Arizona State University; BirdLife International; Botanic Gardens Conservation International; Conservation International; NatureServe; Royal Botanic Gardens, Kew; Sapienza University of Rome; Texas A&M University; and Zoological Society of London.