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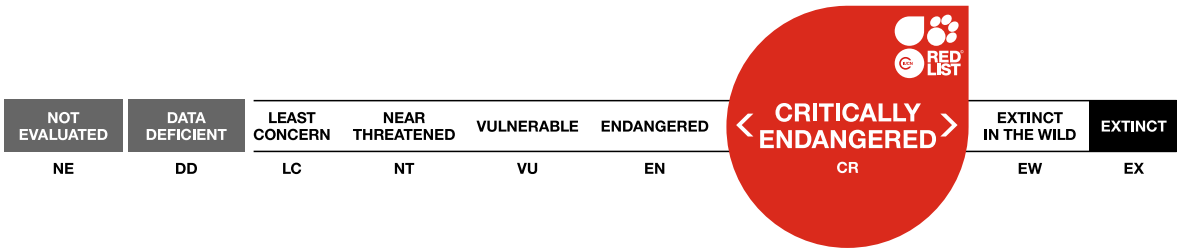
Pongo pygmaeus, Bornean Orangutan

Amendment version

Assessment by: Ancrenaz, M., Gumal, M., Marshall, A.J., Meijaard, E., Wich , S.A. & Husson, S.



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Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Primates	Hominidae

Scientific Name: *Pongo pygmaeus* (Linnaeus, 1760)

Synonym(s):

- *Simia pygmaeus* Linnaeus, 1760

Infra-specific Taxa Assessed:

- Pongo pygmaeus ssp. morio
- Pongo pygmaeus ssp. pygmaeus
- Pongo pygmaeus ssp. wurmbii

Common Name(s):

- English: Bornean Orangutan
- French: Orang-outan de Bornéo
- Spanish; Castilian: Orang-után

Taxonomic Source(s):

Mittermeier, R.A., Rylands, A.B. and Wilson D.E. 2013. *Handbook of the Mammals of the World: Volume 3 Primates*. Lynx Edicions, Barcelona.

Taxonomic Notes:

Although there is ongoing debate about the taxonomic status of the Bornean Orangutan (see review in Goossens *et al.* 2009); three subspecies are currently recognized for the taxon:

P. p. pygmaeus: Northwest Bornean Orangutan:

- State of Sarawak (Malaysia)
- Province of West Kalimantan (Indonesia)

P. p. wurmbii: Southwest Bornean Orangutan:

- Province of West Kalimantan (Indonesia)
- Province of Central Kalimantan (Indonesia)

P. p. morio: Northeast Bornean Orangutan:

- State of Sabah (Malaysia)
- Province of North Kalimantan (Indonesia)
- Province of East Kalimantan (Indonesia)

Assessment Information

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Red List Category & Criteria: Critically Endangered A4abcd ver 3.1

Year Published: 2024

Date Assessed: February 8, 2016

Justification:

Bornean Orangutans are lowland forest specialists, rarely found above 500 m asl. In the 1950s, the habitat suitable for orangutans extended across ~255,000 km² of the island of Borneo (see below).

The two major reasons why most Bornean Orangutans populations are in sharp decline are (1) destruction, degradation and fragmentation of their habitats, and (2) hunting. Recurrent forest fires, especially in peat forests, cause additional sharp declines about once every decade. Bornean Orangutans decreased by more than 60% between 1950 and 2010, and a further 22% decline is projected to occur between 2010 and 2025 (see below). Combined, this equates to a loss of more than 82% over 75 years, 1950–2025. Given that a Bornean Orangutan's generation length is ~25 years (Wich *et al*. 2009), this decline will occur in a period of three generations. Each of the *Pongo pygmaeus* subspecies is roughly equally affected. Only one comprehensive quantitative survey of Bornean Orangutans has been conducted, in 2010, which prohibits quantitative assessment of changes in numbers for most populations. Temporal changes in population status are therefore best assessed via the proxies of habitat loss and hunting rates. A detailed rationale for a population decline of more than 86% between 1950 and 2025 follows.

The most accurate estimate of the geographic range of Bornean Orangutans showed that in 2010, 59.6% of the forest remaining in Borneo was suitable habitat (155,106 km² of 260,109 km² of forest: Wich *et al*. 2012, Gaveau *et al.* 2014). Considering that in 1973, 75.7% of Borneo (424,753 km²) was under natural forest (Gaveau *et al*. 2014), we estimate that 253,153 km² of forest was orangutan habitat at this time.

Mechanized logging in Borneo started in the early 1950s, and industrial logging and forest conversion intensified in the late 1960s. The rate of forest conversion is difficult to estimate prior to 1973 due to the lack of satellite imagery, but a recent spatial analysis evaluated forest persistence, clearance and logging spanning the 37 years between 1973 and 2010 (Gaveau *et al*. 2014). We take the rate of forest loss documented from 1973 to 2010 as conservative and *de facto* lower than if data were available from 1950.

1. Habitat loss and orangutan decline

During the period 1973–2010, 39% of Bornean forests were lost (Gaveau *et al*. 2014), representing a net loss of 98,730 km² of prime orangutan habitat. It is estimated that a further 37% of suitable orangutan habitat (155,106 km²) will be converted to plantations between 2010 and 2025, which accounts for the loss of an additional 57,140 km² of orangutan habitat (Wich *et al*. 2012). Compared to the baseline (253,153 km²), more than 155,867 km² or of 61.5% of orangutan habitat will be gone by 2025; see Table 1 in Supplementary Material.

The orangutan habitat remaining in 2010 (97,716 km²) was either protected or designated for timber production (Wich *et al*. 2012). Nonetheless, forest loss is expected to occur here too, owing to fires, encroachment and smallholder plantation development. Rates of forest loss measured at two sites with

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the largest Borneo orangutan populations are: 1.9% per year (1991–2000) and 1.5% per year (2000–2007) at Sebangau National Park (Husson *et al*. 2015); and 2.4% per year including the buffer zone, or 1.1% excluding the buffer zone (1988–2002) at Gunung Palung National Park (Curran *et al*. 2004). The rate of loss in production forests outside formally protected areas will undoubtedly be higher (Santika *et al*. 2015). Thus we conservatively estimate the ongoing rate of loss in this administrative type of forest to be 1.5% per year. This will represent another 19,821 km² of forest lost between 2010 and 2025: 20.2% of the orangutan habitat in 2010, or 8.7% in 1973.

2. Habitat degradation and orangutan decline

In addition to habitat loss, selective logging has degraded 56% of Bornean Orangutan habitat since 1973 (Gaveau *et al*. 2014). The impacts of logging on orangutan density are variable, from little change in lightly-logged forest to major negative impacts in heavily-logged forest (Ancrenaz *et al*. 2010). For example, selective artisanal logging reduced orangutan densities in peat-swamp forests by 21–30% (Husson *et al*. 2009), while mechanised logging in dryland forests is presumed to have a greater impact. Thus, 56% of the Bornean Orangutan range could undergo a 20% decrease in carrying capacity. This estimate is conservative, considering that in Kalimantan the total area of natural forest allocated for timber extraction is increasing. Reduction in carrying capacity due to logging would then equate to a loss of 7% of the 1973 population by 2010, and overall accounts for 4% of the total projected 1973–2025 population decline.

3. Hunting and orangutan decline

The widespread impacts of illegal hunting had not been quantified prior to a major questionnaire study throughout Kalimantan in 2008–2009 (Meijaard *et al*. 2011). The authors estimated that 630–1,357 Bornean Orangutans were killed in 2008 and that an average of 2,383–3,882 per year had been killed during the lifetimes of the survey respondents. The mean estimate (2,256 orangutans poached in Kalimantan each year) equates to 2.6% of the 2010 population for Kalimantan. Population losses due to hunting may be partially offset by population growth, which has a maximum theoretical rate of 2% annually (Marshall *et al*, 2009). The only study to have measured growth in a Bornean Orangutan population was carried out in Sebangau National Park in a population recovering from a logging-induced crash. Here, growth was relatively uninhibited and estimated to increase at an average annual rate of 1.6% between 2001 and 2013 (Husson *et al*. 2015). It is highly unlikely that a continuously-hunted population could recover at this rate, but in order to take into account uncertainties in determining the level of hunting, a 1.5% growth rate is applied, resulting in a net population decrease due to hunting of 1.1% annually. This equates to an additional loss (once habitat clearance and impacts of logging are factored in) of 18% of the 1973 population by 2010 and 7% of the 2010 population by 2025. Overall, poaching contributes 12% to the estimated 1973–2025 population decrease.

The combined impacts of habitat loss, habitat degradation and illegal hunting equate to an 86% population reduction between 1973 and 2025 which qualifies the species for listing as Critically Endangered. This estimate is relatively conservative, as it does not include additional future population losses anticipated due to stochastic effects that will reduce populations inhabiting increasingly small forest fragments.

Orangutan habitat loss and killing were already significant threats during the period 1950–1973, and the species was already declining at this time. However the paucity of data for this period prevents to estimate a specific rate of population decline for this specific period of time. However, if we assume that

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orangutan abundance in 1950 was similar to that in 1973 (which is not the case because any declines that occurred between 1950 and 1973 are not accounted for), our analysis shows that the species will suffer a more than 80% decline in three generations (1950–2025).

For further information about this species, see Supplementary Material.

Previously Published Red List Assessments

2023 – Critically Endangered (CR)

2016 – Critically Endangered (CR)

2008 – Endangered (EN)

2007 – Endangered (EN)

2000 – Endangered (EN)

1996 – Vulnerable (VU)

1994 – Endangered (E)

1990 – Endangered (E)

1988 – Endangered (E)

1986 – Endangered (E)

1965 – Unknown (N/A)

Geographic Range

Range Description:

The Bornean Orangutan is endemic to the island of Borneo where it is present in both the Malaysian states of Sabah and Sarawak, as well as in four of the five Indonesian Provinces of Kalimantan: North, East, Central and West Kalimantan. The distribution of Bornean Orangutans is highly patchy throughout the island; they are apparently absent or uncommon in the southeast, the forests between the Rejang River in central Sarawak, and the Padas River in western Sabah (including the Sultanate of Brunei). The Bornean Orangutan occurs preferentially in lowland forests below 500 m asl, but some individuals can also be found in highland habitats, for example, up to 1,500 m asl in Kinabalu National Park. Large rivers are natural barriers that are impassable to these animals and limit their dispersal (Goossens *et al.* 2005).

See the Supplementary Information for details of how the distribution map for this species was updated for the amended version of this assessment.

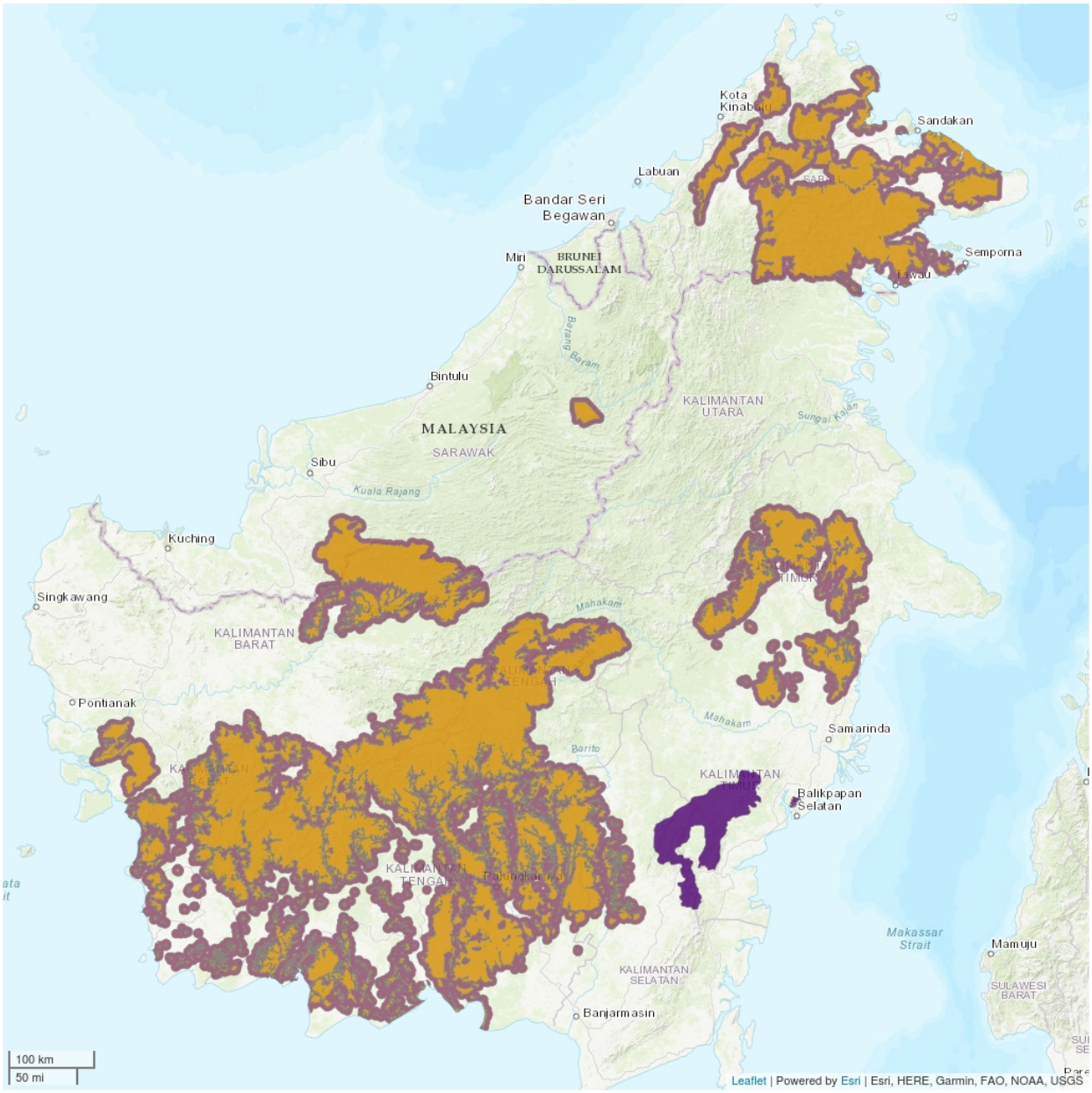
For further information about this species, see Supplementary Material.

Country Occurrence:

Native, Extant (resident): Indonesia (Kalimantan); Malaysia (Sabah, Sarawak)

Presence Uncertain & Origin Uncertain: Brunei Darussalam

Distribution Map



Legend

- EXTANT (RESIDENT)
- POSSIBLY EXTANT (RESIDENT)
- EXTANT & INTRODUCED (RESIDENT)

Compiled by:

Meijaard, E., Ni'Matullah, S, Dennis, R.A., Ancrenaz, M., Sherman, J. and Wich, S.A. 2023. Spatial data for P. pygmaeus Red Listing. Borneo Futures, Brunei Darussalam 2023

The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.

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Population

Climatic change and human pressure have resulted in significant reductions in the range and numbers of Bornean Orangutans during the recent historic past (Goossens *et al*. 2006, Meijaard *et al*. 2010).

The total number of orangutans in Borneo is not precisely known, except for Sabah, where comprehensive aerial surveys in the early 2000s provided an estimate of 11,000 individuals for the entire State (Ancrenaz *et al*. 2005). The most recent (2004) estimate for the species is that *c.* 55,000 Bornean Orangutans inhabit 82,000 km² of forest (Wich *et al*. 2008). However, using modelling and the latest field data available for Borneo, a revised map of their current distribution gives a larger range estimate of 155,000 km², or 21% of Borneo's landmass (Wich *et al*. 2012). If the mean average orangutan density recorded in 2004 (0.67 individuals/km²) is applied to the updated geographic range, then the total population estimate would be 104,700 individuals. This represents a decline from an estimated 288,500 individuals in 1973 and is projected to decline further to 47,000 individuals by 2025.

Compounding loss of habitat, recent interview surveys in Kalimantan have concluded that 2,000–3,000 orangutans were killed every year in Indonesian Borneo during the past four decades alone (Meijaard *et al*. 2011). This would represent a loss of 44,170–66,570 individuals (Davis *et al*. 2013), or more than 50% of the original population in just 40 years. Such a rate of killings is unsustainable (Marshall *et al*. 2009) and many populations will be reduced or become extinct in the next 50 years (Abram *et al*. 2015).

For further information about this species, see Supplementary Material.

Current Population Trend: Decreasing

Habitat and Ecology (see Appendix for additional information)

Bornean Orangutans are the largest arboreal mammals in the world, although they walk significant distances on the ground (Ancrenaz *et al*. 2014). Historically, Bornean Orangutans were most abundant in inundated and semi-inundated lowland Dipterocarp mosaic forests, where movement between different habitat types could buffer them against shortages in food availability in a particular habitat type. Their diet consists primarily of fruits, but also includes leaves, barks, flowers and insects (Russon *et al*. 2009).

Bornean Orangutans live a semi-solitary life and rarely aggregate in groups. Males are the dispersing sex: upon reaching sexual maturity (at 10–12 years old), they leave the area where they were born to establish large territories covering several hundred hectares. Females' territories are smaller, with actual size depending on forest type and availability of food resources. Bornean Orangutans are very slow breeders and produce on average one offspring every 6–8 years, which explains their extreme sensitivity to hunting pressure. Females reach maturity at 10–15 years old; they generally give birth to a single infant after a gestation period of approximately 254 days (Kingsley 1981).

Systems: Terrestrial

Use and Trade

For information on use and trade, see under Threats.

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Threats (see Appendix for additional information)

Major threats include:

• **Habitat loss**. Between 2000 and 2010, the mean annual rate of deforestation for Borneo was 3,234 km² per year (Gaveau *et al*. 2014). Assuming a similar deforestation rate in the future, 32,000 km² of forest could be lost by 2020; 129,000 km² by 2050 and 226,000 km² by 2080 (Wich *et al*. 2015). In the early 2010s, only 22% of the current Bornean Orangutan distribution was located in protected areas (Wich *et al*. 2012). Approximately a third of the entire Bornean Orangutan range was in commercial forest reserves exploited for timber, and about 45% was in forest areas earmarked for conversion to agriculture or other land uses. A business-as-usual scenario, whereby non-protected forests would be converted along the lines of current development plans, will result in the loss of more than half of the current orangutan range on the island of Borneo in the next 50 years or so.

• **Illegal hunting**. Illegal killing of Bornean Orangutans is a major cause of their decline. Recent interview surveys conducted in Kalimantan revealed that several thousand individuals are killed every year for meat consumption, as a way to mitigate conflict, or for other reasons (Davis *et al*. 2013). Overall Bornean Orangutan mortality rates in Kalimantan seem to significantly exceed the maximum rates that populations of this slow-breeding species can sustain (Marshall *et al*. 2009, Meijaard *et al*. 2011). If hunting does not stop, all populations that are hunted will decline, irrespective of what happens to their habitat. These findings confirm that habitat protection alone will not ensure the survival of orangutans in Indonesian Borneo, and that effective reduction of orangutan killings is urgently needed.

• **Fires**. Fires occur in Borneo on a yearly basis and are responsible for significant forest loss with dramatic results for certain orangutan populations. For example, 90% of Kutai National Park was lost to massive fires in 1983 and 1998 and its Bornean Orangutan population was reduced from an estimated 4,000 individuals in the 1970s to a mere 600 (Rijksen and Meijaard 1999); over 4,000 km² of peatland forest in southern Kalimantan was burnt to ashes in six months of 1997–1998, resulting in an estimated loss of 8,000 orangutans. In 2015, more than 20,000 km² of forest were lost to fires, which resulted in hundreds (or more) of additional orangutan deaths.

• **Habitat fragmentation**. With the current scale of habitat exploitation and forest conversion to other types of land uses in Borneo, only a small percentage of current orangutan habitat will remain undisturbed by infrastructure development by 2030 (Gaveau *et al*. 2013). Several orangutan PHVAs have shown that Bornean Orangutan populations of fewer than 50 individuals are not viable in the long term (Marshall *et al*. 2009), and that many small populations will go extinct unless they are actively managed (Bruford *et al*. 2010).

• **Lack of awareness**. A recent study suggested that 27% of the people in Kalimantan did not know that orangutans are protected by law (Meijaard *et al*. 2011). Campaigns to effectively inform the public and encourage rural people to support the principles of environmental conservation and be actively responsible for the management of their resources are therefore a crucial requirement for successful orangutan conservation.

• **Climate change**. Spatial models point to the possibility that a large amount of current orangutan habitat will become unsuitable because of changes in climate (Struebig *et al*. 2015). Across all climate and land-cover change projections assessed in a recent analysis, models predicted that 49,000–83,000 km² of orangutan habitat will remain by 2080, reflecting a loss of 69–81% since 2010. This projection represents a three to five-fold greater decline in habitat than that predicted by deforestation projections alone. A major reduction in the extent of suitable orangutan habitat can be expected. However, core strongholds of suitable orangutan habitat are predicted to remain to the west, east and northeast of the

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island where populations of *P. p. wurmbii* and *P. p. morio* are found.

Conservation Actions (see Appendix for additional information)

The Bornean Orangutan is fully protected in Malaysia and Indonesia, and is listed on Appendix I of CITES. However, its forest habitat is not necessarily protected: about 20% of the current orangutan range in Sabah, and 80% in Kalimantan is not protected (Wich *et al*. 2012). Innovative mechanisms to ensure the long-term survival of Bornean Orangutans outside protected forests are urgently needed.

The future of Bornean Orangutans will very much depend on the long-term security of large, strictly-protected forests where illegal logging and hunting will be efficiently controlled and the orangutan populations large enough to cope with catastrophic events such as fires and disease outbreaks (Meijaard *et al*. 2011). These forests need to contain the ecological gradients that will provide the key resources to sustain orangutans through climate and other gradual environmental changes (Gregory *et al*. 2012). In the larger landscape, scientifically-based, regional land-use planning is needed to delineate zones of interaction around protected forests and their surroundings, encompassing hydrological, ecological and socio-economic interactions. Ideally, the core protected areas will remain connected to other areas of forest that could be used sustainably for (commercial) timber extraction. The design of such living landscapes must be approached across the whole landscape rather than at the site level.

Credits

Assessor(s): Ancrenaz, M., Gumal, M., Marshall, A.J., Meijaard, E., Wich , S.A. & Husson, S.

Reviewer(s): Williamson, L. & Mittermeier, R.A.

Authority/Authorities: IUCN SSC Primate Specialist Group

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External Resources

For Supplementary Material, and for Images and External Links to Additional Information, please see the Red List website.

Appendix

Habitats

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

Habitat	Season	Suitability	Major Importance?
1. Forest -> 1.6. Forest - Subtropical/Tropical Moist Lowland	Resident	Suitable	Yes

Use and Trade

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

End Use	Local	National	International
1. Food - human	Yes	No	No
13. Pets/display animals, horticulture	Yes	Yes	Yes

Threats

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

Threat	Timing	Scope	Severity
1. Residential & commercial development -> 1.1. Housing & urban areas	Ongoing	Minority (<50%)	Slow, significant declines
Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
2. Agriculture & aquaculture -> 2.1. Annual & perennial non-timber crops -> 2.1.2. Small-holder farming	Ongoing	Minority (<50%)	Rapid declines
Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
2. Agriculture & aquaculture -> 2.1. Annual & perennial non-timber crops -> 2.1.3. Agro-industry farming	Ongoing	Majority (50-90%)	Very rapid declines
Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
2. Agriculture & aquaculture -> 2.2. Wood & pulp plantations -> 2.2.2. Agro-industry plantations	Ongoing	Minority (<50%)	Very rapid declines
Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
3. Energy production & mining -> 3.2. Mining & quarrying	Ongoing	Minority (<50%)	Slow, significant declines
Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 2. Species Stresses -> 2.2. Species disturbance		
5. Biological resource use -> 5.1. Hunting & trapping terrestrial animals -> 5.1.1. Intentional use (species is the target)	Ongoing	Majority (50-90%)	Very rapid declines
Stresses:	2. Species Stresses -> 2.1. Species mortality		

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5. Biological resource use -> 5.1. Hunting & trapping terrestrial animals -> 5.1.3. Persecution/control		Ongoing	Minority (<50%)	Very rapid declines
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
5. Biological resource use -> 5.3. Logging & wood harvesting -> 5.3.5. Motivation Unknown/Unrecorded		Ongoing	Minority (<50%)	Slow, significant declines
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation		
7. Natural system modifications -> 7.1. Fire & fire suppression -> 7.1.1. Increase in fire frequency/intensity		Ongoing	Majority (50-90%)	Rapid declines
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
11. Climate change & severe weather -> 11.1. Habitat shifting & alteration		Ongoing	Whole (>90%)	Slow, significant declines
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		

Conservation Actions in Place

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

Conservation Action in Place
In-place research and monitoring
Action Recovery Plan: No
Systematic monitoring scheme: No
In-place land/water protection
Conservation sites identified: Yes, over part of range
Percentage of population protected by PAs: 31-40
Area based regional management plan: Yes
Occurs in at least one protected area: Yes
In-place species management
Harvest management plan: No
In-place education
Included in international legislation: Yes
Subject to any international management / trade controls: Yes

Conservation Actions Needed

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

Conservation Action Needed	**Notes**
1. Land/water protection -> 1.1. Site/area protection	-

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Conservation Action Needed	Notes
2. Land/water management -> 2.1. Site/area management	-
5. Law & policy -> 5.1. Legislation -> 5.1.1. International level	-
5. Law & policy -> 5.1. Legislation -> 5.1.2. National level	-
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.1. International level	-

Research Needed

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

Research Needed	Notes
1. Research -> 1.2. Population size, distribution & trends	-
2. Conservation Planning -> 2.2. Area-based Management Plan	-
3. Monitoring -> 3.1. Population trends	-
3. Monitoring -> 3.4. Habitat trends	-

Additional Data Fields

Distribution
Lower elevation limit (m): 0
Upper elevation limit (m): 500
Population
Continuing decline of mature individuals: Yes
Extreme fluctuations: No
Population severely fragmented: Yes
Continuing decline in subpopulations: Unknown
Extreme fluctuations in subpopulations: Unknown
All individuals in one subpopulation: No
Habitats and Ecology
Continuing decline in area, extent and/or quality of habitat: Yes
Generation Length (years): 25
Movement patterns: Not a Migrant

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Amendment

Amendment reason: This amended version of the 2016 assessment was created to update the supplementary information. Previous corrected assessments were created to update the distribution map.

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: ABQ BioPark; Arizona State University; BirdLife International; Botanic Gardens Conservation International; Conservation International; Missouri Botanical Garden; NatureServe; Re:wild; Royal Botanic Gardens, Kew; Sapienza University of Rome; Senckenberg Society for Nature Research; Texas A&M University; and Zoological Society of London.