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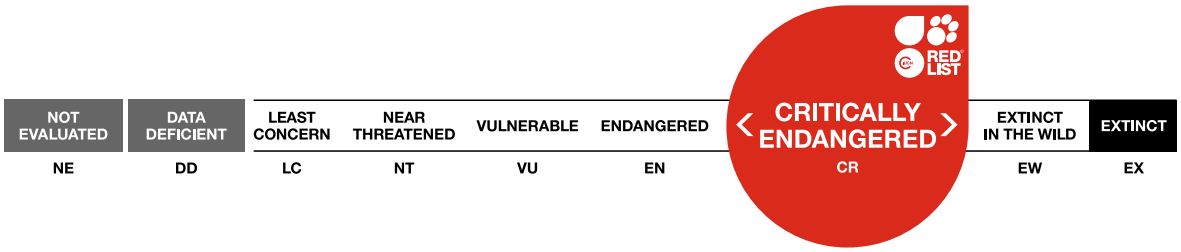
Dicerorhinus sumatrensis, Sumatran Rhinoceros

Assessment by: Ellis, S. & Talukdar, B.



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Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Perissodactyla	Rhinocerotidae

Scientific Name: *Dicerorhinus sumatrensis* (G. Fischer, 1814)

Synonym(s):

- *Rhinoceros sumatrensis* G. Fischer, 1814

Common Name(s):

- English: Sumatran Rhinoceros
- French: Rhinocéros de Sumatra
- Spanish; Castilian: Rinoceronte de Sumatra

Taxonomic Notes:

There are three recognized subspecies: *Dicerorhinus sumatrensis lasiotis* (probably extinct), *Dicerorhinus sumatrensis sumatrensis*, and *Dicerorhinus sumatrensis harrissoni*.

Assessment Information

Red List Category & Criteria: Critically Endangered A2cd+3cd+4cd; C2a(i); D ver 3.1

Year Published: 2020

Date Assessed: May 29, 2019

Justification:

This species is listed as Critically Endangered due to very severe past declines of greater than 80% over three generations (generation length estimated at 20 years if using average age of parents in the population); and because there is a continuing decline of at least 30% within 10 years or 90% within three generations (cause is inferred to be poaching and habitat loss due to encroachment); and because its population size is estimated to number fewer than 250 mature individuals, with no subpopulation greater than 50 individuals, and it is experiencing a continuing decline (the cause of the decline is inferred to be poaching, habitat fragmentation, human disturbance, and habitat loss due to encroachment). We estimate that the probability of extinction in 3 generations (60 years) is 90%, without successful interventions. This could trigger criterion CR E for this species, however due to current uncertainty over its future and stronger evidence for criteria A, C and D being triggered for this species, criterion E is not applied for this assessment.

Sumatran Rhinos have declined significantly across their range in the past 30 years, with populations lost in Peninsular Malaysia, the State of Sabah, Malaysia, and in Kerinci Seblat National Park in Indonesia. The three principal threats across Sumatra are small population effects (e.g., the Allee effect), human disturbance, and poaching. Threats in the three populations are slightly different (Miller *et al.* 2015). In Way Kambas National Park, threats are poaching, bird collection, illegal fishing, agar wood collection, human disturbance, annual and catastrophic drought, annual and catastrophic forest fires. In Bukit Barisan Selatan, primary threats are poaching, the Allee effect and resultant inbreeding, human

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disturbance (e.g., natural resource collection activities such as non-timber forest products, illegal bird collection, pangolin poaching, and illegal fishing), road development, small and large scale encroachment, and catastrophic events. In Aceh Province, threats include poaching, the Allee effect and resultant inbreeding, catastrophic events, El Nino Southern Oscillation events, human disturbance and encroachment, forest conversion into various commodities and plantations, and road development. In Gunung Leuser National Park, the primary threats are poaching, the potential for stochastic catastrophes, human encroachment and disturbance, forest conversion, and road construction.

Previously Published Red List Assessments

2008 – Critically Endangered (CR)
https://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T6553A12787457.en

1996 – Critically Endangered (CR)

1994 – Endangered (E)

1990 – Endangered (E)

1988 – Endangered (E)

1986 – Endangered (E)

1965 – Unknown (N/A)

Geographic Range

Range Description:

The Sumatran Rhinoceros once occurred from the foothills of the Himalayas in Bhutan and north-eastern India, through southern China (Yunnan), Myanmar, Thailand, Cambodia, Lao PDR, Viet Nam and the Malay Peninsula, and onto the islands of Sumatra and Borneo in Indonesia (Foose *et al*. 1997, Grubb 2005). The species' precise historical range is indeterminate, as early accounts failed to distinguish rhinos to specific level, due to partial sympatry with the other two Asian rhino species (*Rhinoceros sondaicus* and *Dicerorhinus sumatrensis*).

The subspecies *Dicerorhinus sumatrensis lasiotis* formerly occurred in India, Bhutan, Bangladesh, and Myanmar (Nowak 1999). The subspecies is extinct in the three former countries, but there is a possibility that a tiny remnant population remains in northern Myanmar.

The subspecies *Dicerorhinus sumatrensis harrissoni* formerly occurred throughout the island of Borneo. The subspecies now is considered extinct in the wild in Sabah (Malaysian Borneo). A handful of individuals may still survive in east Kalimantan (Indonesian Borneo) (Kurniawan, pers. comm.).

Dicerorhinus sumatrensis sumatrensis formerly occurred in Thailand, Peninsular Malaysia, and Sumatra (Indonesia). Presently, the subspecies primarily occurs in three protected areas in Sumatra (Miller *et al*. 2015); there may be a handful of stragglers living outside protected areas, particularly in Aceh Province. The continued existence of a rhino population in Bukit Barisan Selatan National Park is in question due to unprecedented disturbance and illegal activities in the park.

The species occurs from sea level and up to 2,500 m asl.

Country Occurrence:

Native, Extant (resident): Indonesia

Native, Extinct: Bangladesh; Bhutan; Brunei Darussalam; Cambodia; India; Lao People's Democratic Republic; Malaysia; Thailand; Viet Nam

Native, Presence Uncertain: Myanmar

Distribution Map

Legend

EXTANT (RESIDENT)

Compiled by:

IUCN (International Union for Conservation of Nature) 2020

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

The total population now is estimated to be fewer than 80 individuals. Until the early 1990s the numbers continued to decline at a rapid rate with estimated losses of 50% or more of the population per decade (Foose and van Strien 1997). The total population of the Sumatran Rhino has declined by at least 80 percent in the last 30 years. The combination of the extent and rate of population reduction, as well as population fragmentation, makes it perhaps the most threatened large mammal on Earth.

The subspecies *Dicerorhinus sumatrensis sumatrensis* now occurs only on Sumatra, where there are fewer than 80 individuals in roughly ten subpopulations (Miller *et al.* 2015). The largest populations remain in Bukit Barisan Selatan, Way Kambas, and Gunung Leuser National Park (Miller *et al.* 2015). The population estimate is still in question in Bukit Barisan Selatan, with no estimate larger than 10 individuals at most and no signs of calves in the past four years. There are thought to be 15-25 rhinos in Way Kambas, the only population considered to be slowly growing, with four calves observed in 2014. In Aceh, there are five subpopulations, ranging in estimated size from two to 24, for a possible maximum total of 30-40 individuals. Miller *et al.* (2015) report that there may be three small subpopulations in Leuser Barat, but this has not been confirmed. At least four of the five subpopulations in the north of Sumatra are considered non-viable, containing only between two and five animals (Miller *et al.* 2015). Despite protection, populations continue to decrease. Anti-poaching teams are in place in Bukit Barisan Selatan and Way Kambas National Parks, and in parts of Gunung Leuser.

A tiny population (perhaps no more than three animals) was discovered in east Kalimantan in 2012. Surveys are currently underway to determine the individuals and locations. In 2016, a female with a snare wound was successfully rescued, but subsequently died. In 2018, another capture operation for one animal began in April; a female was captured in November 2018. At the time of this assessment she is in relatively good condition.

The population status of the subspecies *Dicerorhinus sumatrensis lasiotis* is unknown, with the very slight possibility that a small number of individuals survive in Myanmar.

There are nine animals in captivity, eight in Indonesia and one in Sabah, Malaysia. Two calves were born at the Sumatran Rhino Sanctuary in Way Kambas National Park in 2012 and 2016. The remaining female at the Borneo Rhino Alliance Sanctuary in Tabin Wildlife Reserve, Sabah, Malaysia is non-reproductive.
Current Population Trend: Decreasing

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

The species inhabits tropical rainforest and montane moss forest, and occasionally occurs at forest margins and in secondary forest (Nowak 1999). Sumatran Rhinos occur mainly in hilly areas nearby water sources, and exhibits seasonal movements, moving uphill in times of lowland flooding (van Strien 1975). This shy species is dependent on salt licks, and occurs mostly in primary forest in protected areas, but wandering into secondary forests outside protected areas, especially in the dry season in search of water (van Strien 1975).

Males are primarily solitary, but can have overlapping territories with females, which are commonly found with offspring (Nowak 1999). The home range size of females is probably no more than 500 ha,

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while males wonder over larger areas, with likely limited dispersal distance. The species is generally solitary, except for mating pairs and mothers with young (Nowak 1999). Its life history characteristics are not well known, with longevity estimated at about 35–40 years, gestation length of approximately 15-16 months. Captive females have copulated as early as six years of age, and males at eight years of age (Miller *et al*. 2015; IRF website 2018, www.rhinos.org). Females may develop reproductive pathologies if they do not become pregnant (Roth pers. comm). Because they are induced ovulators (Roth *et al*. 2001) timing of females meeting males is critical; females are most likely to become pregnant when an ovarian follicle is approximately 20 mm in size prior to copulation.

Home ranges are up to 5,000 ha for males, 1,000–1,500 ha for females. Daily movements between feeding sites and wallows are probably only a few kilometres per day. Longer treks are made when males and females go to saltlicks (5-10 km) and by males exploring their large ranges. Dispersal appears to be mainly by sub-adult animals (4-7 years) old. In this period they may be found rather far from the home grounds. Adults are very traditional in the use of their ranges and will not move away unless severely disturbed. Water is never very far away in the habitats occupied by the Sumatran rhino.

Systems: Terrestrial

Use and Trade

Presumed illegal killing for its horn and other medicinal products has driven this formerly widespread species to the brink of extinction. No wild carcasses from natural or poaching deaths have been found in recent years, except one with its horn removed in 2006 in Way Kambas National Park.

Threats (see Appendix for additional information)

The three principal threats across Sumatra are small population effects (e.g., the Allee effect), human disturbance, and poaching. The species is now so reduced that there are very small numbers in each locality where it still survives. Threats in the three populations are slightly different (Miller *et al.* 2015). In Way Kambas National Park, threats are poaching, disturbance from bird collection, illegal fishing, agar wood collection, human disturbance, annual and catastrophic drought, annual and catastrophic forest fires. In Bukit Barisan Selatan, primary threats are poaching, the Allee effect and resultant inbreeding, human disturbance (e.g., natural resource collection activities such as non-timber forest products, illegal bird collection, pangolin poaching, and illegal fishing), road development, small and large scale encroachment, and catastrophic events. In Aceh Province, threats include poaching, the Allee effect and resultant inbreeding, catastrophic events, El Nino Southern Oscillation events, human disturbance and encroachment, forest conversion into various commodities and plantations, and road development. In Gunung Leuser National Park, the primary threats are poaching, the potential for stochastic catastrophes, human encroachment and disturbance, forest conversion, and road construction.

Poaching looms as a threat but at this time is opportunistic and that organized criminal networks are not in operation at the scale they are in Africa. Poaching is primarily driven by the demand in Viet Nam and China for the supposedly medicinal properties of rhino horns and other body parts, and as a high-value gift item. Many centuries of over-hunting as well as habitat loss has reduced this species to a tiny percentage of its former population and range.

Conservation Actions (see Appendix for additional information)

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The species has been included on CITES Appendix I since 1975, and legally protected in all range states. Rhino Protection Units (RPUs) have been a *force majeur* in fighting poaching in Sumatra. Many organizations are involved with these units, which work under a Memorandum of Understanding with the Government of Indonesia's Ministry of Environment and Forestry. The expansion and reinforcement of anti-poaching programs, as well as expanding the current captive breeding program, are the top priorities if this species is to survive.

A standardized method for rhino monitoring has been developed and launched (Tim Monitoring Badak Sumatra 2014). However, it has only been partially implemented and in few areas. The low number apparently poses a big challenge in obtaining an adequate sample that will result in reliable population estimates. Meanwhile, there has also been a concern about introducing disturbance if an intensive survey is conducted in sensitive areas. Because of this, to-date no robust population data are available. The current survey is directed to focus on identifying rhino that are considered "doomed" and to be rescued as recommended by the PVA analysis (Miller *et al.* 2015) and endorsed under the Government of Indonesia's Emergency Action Plan.

There are ongoing efforts to further develop capacity for managed breeding in Indonesia. There have been recent advances in captive breeding techniques for this species, including successful births at the Cincinnati Zoo & Botanical Garden in 2001, 2004, and 2006 and at the Sumatran Rhino Sanctuary in Sumatra in 2012 and 2016. All the animals from Cincinnati Zoo & Botanical Garden (United States) have now been transferred to the Sumatran Rhino Sanctuary. The size of the facility will be doubled by the end of 2019 so that it can hold more animals. The Government of Indonesia has endorsed further rhino rescues to speed up conservation breeding. In late 2018, a collaborative project led by the Ministry of Environment and Forestry, involving the IUCN SSC, the International Rhino Foundation, WWF, National Geographic, and Global Wildlife Conservation and Yayasan Badak Indonesia, WWF-Indonesia, and Forum Konservasi Leuser in-country, was launched to speed up the conservation breeding of the species by expanding the Way Kambas Sumatran Rhino Sanctuary and to develop new captive breeding centres in Leuser and in Kalimantan.

The Government of Indonesia published its "Strategy and Action Plan for the Conservation of Rhinos in Indonesia" covering the time period of 2007 to 2017. A further conservation strategy for the Indonesian Sumatran rhino populations was developed in a series of workshops in 2014 and 2015. The Government of Indonesia launched an Emergency Action Plan in early 2019.

In Sabah, Malaysia, the Borneo Rhino Alliance focused on collecting oocytes from an older female, in the hopes of creating an embryo using semen from Sumatran Rhino Sanctuary males. To ease collaboration between the countries, the Government of Malaysia has the State of Sabah to act on behalf of the Government of Malaysia. The Governments of Indonesia and Malaysia have, in principle, agreed to this exchange but for various reasons no exchanges have occurred. No successful oocyte collection has occurred with this female to-date.

There is a need for further surveys in Myanmar and in Kalimantan to determine the location of any remaining animals.

Credits

Assessor(s): Ellis, S. & Talukdar, B.

Reviewer(s): Putra, R., Ramono, W. & Sunarto, S.

Contributor(s): van Strien, N.J., Manullang, B, Sectionov, Han, K.H., Waladi Isnan, B., Khan, M., Sumardja, E., Han, K., Boeadi, P. & Bradley Martin, E.

Authority/Authorities: IUCN SSC Asian Rhino 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	-	Suitable	Yes
1. Forest -> 1.9. Forest - Subtropical/Tropical Moist Montane	-	Suitable	Yes

Use and Trade

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

End Use	Local	National	International
Medicine - human & veterinary	Yes	Yes	No

Threats

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

Threat	Timing	Scope	Severity	Impact Score
2. Agriculture & aquaculture -> 2.1. Annual & perennial non-timber crops -> 2.1.3. Agro-industry farming	Ongoing	Minority (50%)	Slow, significant declines	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects 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%)	Rapid declines	Medium impact: 7
	Stresses:	2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance 2. Species Stresses -> 2.3. Indirect species effects		
5. Biological resource use -> 5.3. Logging & wood harvesting -> 5.3.3. Unintentional effects: (subsistence/small scale) [harvest]	Ongoing	Majority (50-90%)	Causing/could cause fluctuations	Medium impact: 6
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects 2. Species Stresses -> 2.2. Species disturbance		
5. Biological resource use -> 5.3. Logging & wood harvesting -> 5.3.4. Unintentional effects: (large scale) [harvest]	Ongoing	Majority (50-90%)	Rapid declines	Medium impact: 7
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects 2. Species Stresses -> 2.1. Species mortality		

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		2. Species Stresses -> 2.2. Species disturbance		
5. Biological resource use -> 5.3. Logging & wood harvesting -> 5.3.5. Motivation Unknown/Unrecorded	Past, unlikely to return	Majority (50-90%)	Causing/could cause fluctuations	Past impact
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation		
5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.3. Unintentional effects: (subsistence/small scale) [harvest]	Ongoing	Minority (50%)	Negligible declines	Low impact: 4
	Stresses:	1. Ecosystem stresses -> 1.3. Indirect ecosystem effects 2. Species Stresses -> 2.2. Species disturbance		
6. Human intrusions & disturbance -> 6.3. Work & other activities	Ongoing	Whole (>90%)	Rapid declines	High impact: 8
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects 2. Species Stresses -> 2.2. Species disturbance 2. Species Stresses -> 2.3. Indirect species effects		
7. Natural system modifications -> 7.1. Fire & fire suppression -> 7.1.3. Trend Unknown/Unrecorded	Ongoing	Minority (50%)	Causing/could cause fluctuations	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects 2. Species Stresses -> 2.2. Species disturbance 2. Species Stresses -> 2.3. Indirect species effects		
10. Geological events -> 10.1. Volcanoes	Ongoing	Minority (50%)	Causing/could cause fluctuations	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance 2. Species Stresses -> 2.3. Indirect species effects		
10. Geological events -> 10.2. Earthquakes/tsunamis	Ongoing	Minority (50%)	Causing/could cause fluctuations	Low impact: 5
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance 2. Species Stresses -> 2.3. Indirect species effects		
11. Climate change & severe weather -> 11.2. Droughts	Ongoing	Whole (>90%)	Slow, significant declines	Medium impact: 7
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation 1. Ecosystem stresses -> 1.3. Indirect ecosystem effects 2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance 2. Species Stresses -> 2.3. Indirect species effects		

Conservation Actions in Place

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

Conservation Action in Place
In-place research and monitoring

Conservation Action in Place
Action Recovery Plan: Yes
Systematic monitoring scheme: Yes
In-place land/water protection
Conservation sites identified: Yes, over entire range
Percentage of population protected by PAs: 91-100
Area based regional management plan: Yes
Occurs in at least one protected area: Yes
Invasive species control or prevention: Yes
In-place species management
Harvest management plan: No
Successfully reintroduced or introduced benignly: No
Subject to ex-situ conservation: Yes
In-place education
Subject to recent education and awareness programmes: Yes
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
1. Land/water protection -> 1.1. Site/area protection
1. Land/water protection -> 1.2. Resource & habitat protection
2. Land/water management -> 2.1. Site/area management
2. Land/water management -> 2.2. Invasive/problematic species control
2. Land/water management -> 2.3. Habitat & natural process restoration
3. Species management -> 3.1. Species management -> 3.1.1. Harvest management
3. Species management -> 3.1. Species management -> 3.1.2. Trade management
3. Species management -> 3.2. Species recovery
3. Species management -> 3.4. Ex-situ conservation -> 3.4.1. Captive breeding/artificial propagation
4. Education & awareness -> 4.1. Formal education
4. Education & awareness -> 4.2. Training

Conservation Action Needed
4. Education & awareness -> 4.3. Awareness & communications
5. Law & policy -> 5.1. Legislation -> 5.1.3. Sub-national level
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.1. International level
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.2. National level
6. Livelihood, economic & other incentives -> 6.1. Linked enterprises & livelihood alternatives

Research Needed

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

Research Needed
1. Research -> 1.2. Population size, distribution & trends
1. Research -> 1.3. Life history & ecology
1. Research -> 1.4. Harvest, use & livelihoods
1. Research -> 1.5. Threats
2. Conservation Planning -> 2.1. Species Action/Recovery Plan
2. Conservation Planning -> 2.2. Area-based Management Plan
3. Monitoring -> 3.1. Population trends
3. Monitoring -> 3.3. Trade trends
3. Monitoring -> 3.4. Habitat trends

Additional Data Fields

Distribution
Estimated area of occupancy (AOO) (km²): 3000
Continuing decline in area of occupancy (AOO): Yes
Extreme fluctuations in area of occupancy (AOO): Yes
Estimated extent of occurrence (EOO) (km²): 12796
Continuing decline in extent of occurrence (EOO): Yes
Extreme fluctuations in extent of occurrence (EOO): Yes
Number of Locations: 4
Continuing decline in number of locations: Yes
Extreme fluctuations in the number of locations: Yes
Lower elevation limit (m): 0

https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T6553A18493355.en

Distribution
Upper elevation limit (m): 2,500
Population
Number of mature individuals: 30
Continuing decline of mature individuals: Yes
Extreme fluctuations: Unknown
Population severely fragmented: Yes
No. of subpopulations: 10
Continuing decline in subpopulations: Yes
Extreme fluctuations in subpopulations: Yes
All individuals in one subpopulation: No
No. of individuals in largest subpopulation: 15
Habitats and Ecology
Continuing decline in area, extent and/or quality of habitat: Yes
Generation Length (years): 20
Movement patterns: Not a Migrant
Congregatory: Congregatory (and dispersive)

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.