van Strien, N.J., Manullang, B., Sectionov, Isnan, W., Khan, M.K.M, Sumardja, E., Ellis, S., Han, K.H., Boeadi, Payne, J. & Bradley Martin, E. 2008. *Dicerorhinus sumatrensis*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.1. <www.iucnredlist.org>. Downloaded on **30 June 2011**.

van Strien, N.J., Steinmetz, R., Manullang, B., Sectionov, Han, K.H., Isnan, W., Rookmaaker, K., Sumardja, E., Khan, M.K.M. & Ellis, S. 2008. *Rhinoceros sondaicus*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.1. <www.iucnredlist.org>. Downloaded on **30 June 2011**.

Talukdar, B.K., Emslie, R., Bist, S.S., Choudhury, A., Ellis, S., Bonal, B.S., Malakar, M.C., Talukdar, B.N. & Barua, M. 2008. *Rhinoceros unicornis*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.1. <www.iucnredlist.org>. Downloaded on **30 June 2011**.

Taxonomy [top]

Kingdom	Phylum	Class	Order	Family
ANIMALIA	CHORDATA	MAMMALIA	PERISSODACTYLA	RHINOCEROTIDAE

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

Common Name/s:
English – Sumatran Rhinoceros
French – Rhinocéros De Sumatra
Spanish – Rinoceronte De Sumatra

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

Assessment Information [top]

Red List Category & Criteria:	Critically Endangered A2abd; C1+2a(i) ver 3.1
Year Assessed:	2008
Assessor/s	van Strien, N.J., Manullang, B., Sectionov, Isnan, W., Khan, M.K.M, Sumardja, E., Ellis, S., Han, K.H., Boeadi, Payne, J. & Bradley Martin, E.
Reviewer/s:	van Strien, N.J. & Talukdar, B.K. (Asian Rhino Red List Authority)

Justification:
This species is listed as Critically Endangered due to very severe declines of greater than 80% over three generations (generation length estimated at 20 years); and because its population size is estimated to number fewer than 250 mature individuals and there is an expected continuing decline of at least 25% within one generation; 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.

History:

1996 – Critically Endangered
1994 – Endangered (Groombridge 1994)
1990 – Endangered (IUCN 1990)
1988 – Endangered (IUCN Conservation Monitoring Centre 1988)
1986 – Endangered (IUCN Conservation Monitoring Centre 1986)

Geographic Range [top]

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 populations remain in northern Myanmar.

The subspecies *Dicerorhinus sumatrensis harrissoni* formerly occurred throughout the island of Borneo. Currently, the species occurs only in Sabah (Malaysia), although a few individuals may still survive in Sarawak (Malaysia) and Kalimantan (Indonesia) (Meyaard, 1986).

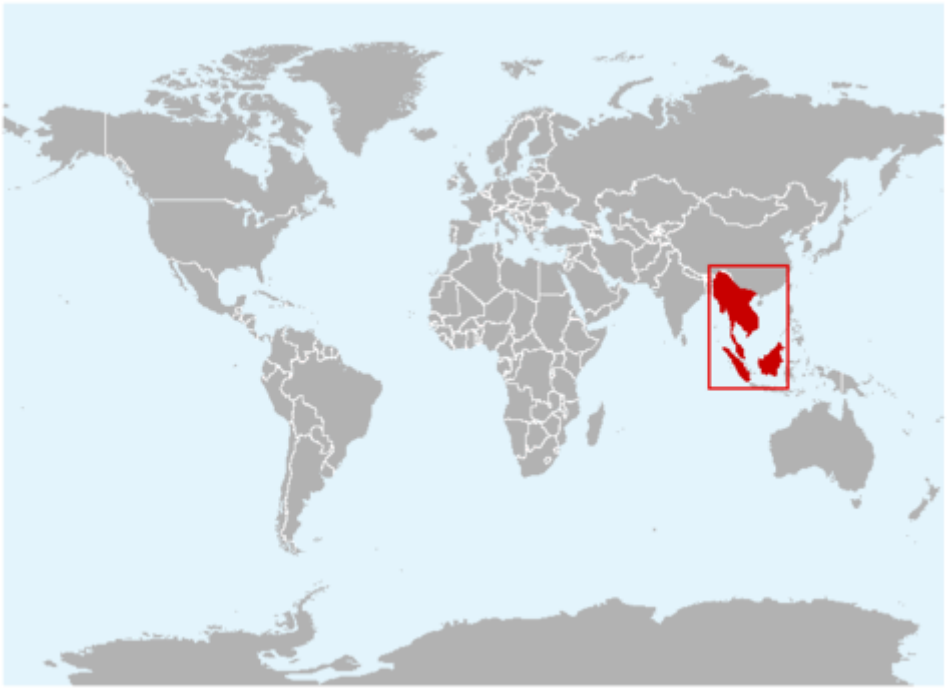
Dicerorhinus sumatrensis sumatrensis formerly occurred in Thailand, Peninsular Malaysia, and Sumatra (Indonesia). Presently, the subspecies occurs only in parts of Sumatra and Peninsular Malaysia (Foose *et al*., 1997).

It occurs from sea level to over 2,500 m asl.

Countries:

ve:
nesia; Malaysia
sibly extinct:
nmar
onally extinct:
gladesh; Bhutan; Brunei Darussalam; Cambodia; India; Lao People's Democratic Republic; Thailand; Viet Nam

Range Map: (click map to view full version)



Population [top]

Population:	The total population is estimated at fewer than 275 individuals, though probably more than 220. Until the early 1990's 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). Over the last decade the decrease has been halted or slowed in most of the larger populations because of better protection, but animals are still being lost in the small remnant populations. The subspecies *Dicerorhinus sumatrensis sumatrensis* now occurs mainly on Sumatra, where there are 170 to 230 individuals. It has its largest populations remaining in Bukit Barisan Selata, Way Kambas, and Gunung Leuser National Park (Foose *et al*., 1997). There are about 60 to 80 animals in Gunung Leuser, about 60 to 80 Bukit Barisan Selatan, and 15-25 in Way Kambas, with some local reports of rhinos occurring outside of protected areas in Aceh Province (Sectionov and Waladi pers. comm.). There are also a few small, non-viable populations, including no more than a few individuals in Kerinci-Seblat National Park. Some populations are decreasing due to poaching, with very steep decreases in some areas (Sectionov and Waladi pers. comm.). Poaching has ceased in Bukit Barisan Selata and Way Kambas National Parks recently (Sectionov and Waladi pers. comm.). Populations in Peninsular Malaysia are now very small, but the species possibly survives in Taman Negara National Park and in Tamon Besor/Belum area. It probably no longer survives in Endau Rompin National Park (Malaysia). The majority of the few remaining individuals of the subspecies *Dicerorhinus sumatrensis harrissoni* occur in Tabin National Park in Sabah (Malaysia), with some also in the Danum Valley (also in Sabah). The total population in Sabah is likely to be about 50 individuals (Han pers. comm.). A two year survey from 2000-2002 indicated 6 known individuals, 10 probable individuals, and an additional 35 possible (Van Strien, 2005). The population status of the subspecies *Dicerorhinus sumatrensis lasiotis* is unknown, with the very slight possibility that a small number of individuals survive in the Lassai Tract in Myanmar. There are over 20 animals in captivity, mostly in Indonesia and Malaysia, with a few in the United States.
Population Trend:	Decreasing

Habitat and Ecology [top]

Habitat and Ecology:	The species inhabits tropical rainforest and montane moss forest, and occasionally occurs at forest margins and in secondary forest (Nowak, 1999). The species occurs 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; Boeadi pers. comm.). 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, 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, and age at sexual maturity estimated at 6-7 years for females and 10 years for males (Nowak, 1999; IRF website (www.rhinos-irf.org), 2007). Home range: Males up to 5,000 ha, females 1,000 -1,500 ha. Daily movements between feeding sites and wallows are probably only a few kilometers 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
List of Habitats:	1 Forest 1.6 Forest - Subtropical/Tropical Moist Lowland 1.9 Forest - Subtropical/Tropical Moist Montane

Threats [top]

Major Threat(s):	The two principal threats are poaching and reduced population viability. Hunting is primarily driven by the demand for the supposedly medicinal properties of rhino horns and other body parts, and many centuries of over-hunting has reduced this species to a tiny percentage of its former population and range. The species is now so reduced that there are very small numbers in each locality where it still survives. As a result, breeding activity is infrequent, successful births are uncommon in many populations, and there is a severe risk of inbreeding depression (J. Payne pers. comm.). The species is frequently stated to be sensitive to habitat disturbance (van Strien, 1986), but timber extraction is of little or no significance to the species, as it is robust enough to withstand more or less any forest condition (J. Payne pers. comm.).
List of Threats:	2 Agriculture & aquaculture 2.1 Annual & perennial non-timber crops 2.1.3 Agro-industry farming 5 Biological resource use 5.1 Hunting & trapping terrestrial animals 5.1.1 Intentional use (species is the target) 5.3 Logging & wood harvesting 5.3.5 Motivation Unknown/Unrecorded

Conservation Actions [top]

Conservation Actions:	The species has been included on CITES Appendix I since 1975, and legally protected in all range states. An extensive international co-operative programme for the conservation of this species is being implemented with *in situ* activities being conducted in Indonesia and Malaysia. The primary objectives are to develop and deploy effective anti-poaching teams and to provide the co-ordination capacity to manage and sustain the programme. Rhino Protection Units (RPU) have been a *force majeur* in stopping poaching in Sumatra. Many organizations are involved with these units, including the Government of Indonesia (Sectionov and Waladi pers. comm.). The expansion and reinforcement of anti-poaching programmes is the top priority if this species is to survive. There are also ongoing efforts to develop managed breeding centers for the species in Indonesia and Malaysia. There have been recent advances in captive breeding techniques for this species, including a successful births at the Cincinnati Zoo in 2001 and 2004 (Khan *et al*., 2004). One of these offspring was transferred back to a breeding center in Sumatra. There is a need for further surveys in northern Myanmar to determine the status of any remaining populations.
List of Conservation Actions:	2 Land/water management 2.1 Site/area management 3 Species management 3.1 Species management 3.1.1 Harvest management 3.1.2 Trade management 3.2 Species recovery 3.4 Ex-situ conservation 3.4.1 Captive breeding/artificial propagation 4 Education & awareness 4.1 Formal education 4.2 Training 4.3 Awareness & communications 5 Law & policy 5.4 Compliance and enforcement 5.4.1 International level 5.4.2 National level

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Taxonomy [top]

Kingdom	Phylum	Class	Order	Family
ANIMALIA	CHORDATA	MAMMALIA	PERISSODACTYLA	RHINOCEROTIDAE

Scientific Name:	*Rhinoceros sondaicus*
Species Authority:	Desmarest, 1822

Common Name/s:
English – Javan Rhinoceros
French – Rhinocéros De La Sonde
Spanish – Rinoceronte De Java

Taxonomic Notes:	There are three recognized subspecies: *Rhinoceros sondaicus sondaicus*, *Rhinoceros sondaicus annamiticus*, and *Rhinoceros sondaicus inermis* (Extinct).

Assessment Information [top]

Red List Category & Criteria:	Critically Endangered C2a(i);D ver 3.1
Year Assessed:	2008
Assessor/s	van Strien, N.J., Steinmetz, R., Manullang, B., Sectionov, Han, K.H., Isnan, W., Rookmaaker, K., Sumardja, E., Khan, M.K.M. & Ellis, S.
Reviewer/s:	van Strien, N.J. & Talukdar, B.K. (Asian Rhino Red List Authority)

Justification:
This species is listed as Critically Endangered because there are less than 50 mature individuals; and because there fewer than 250 mature individuals, with no subpopulation greater than 50 individuals, and it is experiencing a continuing decline.

History:

1996 – Critically Endangered
1994 – Endangered (Groombridge 1994)
1990 – Endangered (IUCN 1990)
1988 – Endangered (IUCN Conservation Monitoring Centre 1988)
1986 – Endangered (IUCN Conservation Monitoring Centre 1986)

Geographic Range [top]

Range Description:

The Javan Rhino formerly occurred from Bangladesh, Myanmar, Thailand, Lao PDR, Cambodia, Viet Nam, and probably southern China through peninsular Malaya to Sumatra and Java (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 unicornis* and *Dicerorhinus sumatrensis*). Beginning in the middle of the nineteenth century, the species was extirpated from most of its historical range, and currently occurs only in two small isolated areas. The last records of Javan Rhino vary, from 1920 in Myanmar, to 1932 in Malaysia, and 1959 on Sumatra (Indonesia) (Simon and Geroudet, 1970).

The subspecies *Rhinoceros sondaicus inermis* formerly occurred in northeastern India, Bangladesh, and Myanmar, but is now extinct (Nowak, 1999).

The subspecies *Rhinoceros sondaicus annamiticus* formerly occurred in Viet Nam, Lao PDR, Cambodia, and eastern Thailand. Currently, this subspecies is restricted to the area in and around the Cat Loc part (Dong Nai province) of the Cat Tien National Park in Viet Nam (Schenkel and Schenkel, 1969).

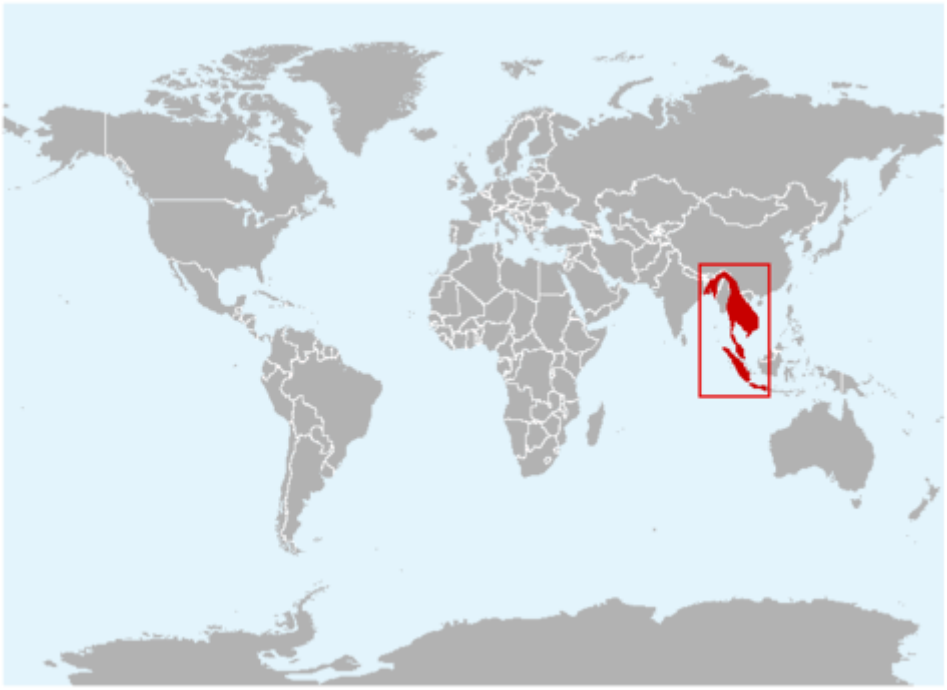
The subspecies *Rhinoceros sondaicus sondaicus* formerly occurred from Thailand through Malaysia, to the islands of Java and Sumatra (Indonesia). The only remaining population occurs on the Ujung Kulon Peninsula (Hoogerwerf, 1970), which forms the westernmost extremity of the island of Java. The Javan population of this subspecies has been restricted to this area since around the 1930s.

This is a lowland species that typically occurs up to 600 m (Sectionov and Waladi pers. comm.), but has been recorded above 1,000 m (Nowak, 1999).

Countries:

ve:
nesia; Viet Nam
onally extinct:
gladesh; Cambodia; China; India; Lao People's Democratic Republic; Malaysia (Peninsular Malaysia); Myanmar; Thailand

Range Map: (click map to view full version)



Population [top]

Population:	An estimated 40-60 animals live in the area on the western tip of Java in Ujung Kulon National Park. Another smaller population occurs in and around the Cat Loc part (Dong Nai province) of the Cat Tien National Park in of Viet Nam, with maybe as few as six individuals remaining (R. Steinmetz, M. Khan bin Momin Khan pers. comm.). These populations have not significantly declined over the last few decades, and the current trend is not known (Sectionov and Waladi pers. comm.), but no breeding has been observed in the Cat Loc population for many years (M. Khan bin Momin Khan pers. comm.). There are no animals currently in captivity, and a total of only 22 individuals have ever been known to exist in captivity (Rookmaaker *et al.*, 1998).
Population Trend:	? Unknown

Habitat and Ecology [top]

Habitat and Ecology:	The Javan rhinoceros currently occurs in lowland tropical rainforest areas, especially in the vicinity of water (Schenkel and Schenkel, 1969). The species formerly occurred in more open mixed forest and grassland and on high mountains. Because of its rarity, little is known about its preferred habitat, but it is certainly not naturally restricted to dense tropical forest water (Schenkel and Schenkel, 1969). Little is known about the species' biology and the habitats in which the two remaining populations are found may not be optimal. The home range size of females is probably no more than 500 ha, 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 30-40 years, gestation length of approximately 16 months (as with other rhino species), and age at sexual maturity estimated at 5-7 years for females and 10 years for males (Nowak, 1999; International Rhino Foundation website, (www.rhinos-irf.org) 2006).
Systems:	Terrestrial
List of Habitats:	1 Forest 1.5 Forest - Subtropical/Tropical Dry 1.6 Forest - Subtropical/Tropical Moist Lowland 1.9 Forest - Subtropical/Tropical Moist Montane

Threats [top]

Major Threat(s):	The cause of population decline is mainly attributable to the excessive demand for rhino horn and other products for Chinese and allied medicine systems (Foose and van Strien 1997). The bulk of the remaining population occurs as a single population within a national park and the population size in Ujung Kulon National Park is probably limited to the effective carrying capacity of the area (around 50 animals). One possible threat to this population is disease. In addition, such a small population faces a constant threat from poachers, although there is evidence that current poaching levels are under control (Sectionov and Waladi pers. comm.). The Cat Loc population may be too small to be viable, and no breeding has been observed for many years, and it is possible that the animals are too old to breed. The population is so small that all the animals could be of the same sex.
List of Threats:	2 Agriculture & aquaculture 2.1 Annual & perennial non-timber crops 2.1.2 Small-holder farming 2.1.3 Agro-industry farming 5 Biological resource use 5.1 Hunting & trapping terrestrial animals 5.1.1 Intentional use (species is the target)

	5.3 Logging & wood harvesting 5.3.5 Motivation Unknown/Unrecorded 8 Invasive & other problematic species & genes 8.2 Problematic native species

Conservation Actions [top]

Conservation Actions:	It is legally protected in all range states. The species has been on CITES Appendix I since 1975. A Rhino Protection Unit (RPU) has been established for the protection of this species on Java (Sectionov and Waladi pers. comm.). It occurs in two protected areas: Ujung Kulon National Park on Java and the Cat Loc part (Dong Nai province) of the Cat Tien National Park in Viet Nam. There is an urgent need to review the feasibility of a reintroduction/translocation program, since the only known viable population occurs in a geographically restricted area of Java. There is also a need to survey parts of its historical range for the very remote possibility that small remnant populations exist, especially in parts of Lao PDR or Cambodia. The population in Cat Loc is probably no longer viable, and requires intensive management measures in order to survive (perhaps including captive breeding and re-introductions).
List of Conservation Actions:	1 Land/water protection 1.1 Site/area protection 2 Land/water management 2.1 Site/area management 3 Species management 3.1 Species management 3.1.1 Harvest management 3.1.2 Trade management 3.2 Species recovery 3.3 Species re-introduction 3.3.1 Reintroduction 3.4 Ex-situ conservation 3.4.1 Captive breeding/artificial propagation 3.4.2 Genome resource bank 4 Education & awareness 4.1 Formal education 4.2 Training 4.3 Awareness & communications 5 Law & policy 5.4 Compliance and enforcement 5.4.1 International level 5.4.2 National level

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Citation: van Strien, N.J., Steinmetz, R., Manullang, B., Sectionov, Han, K.H., Isnan, W., Rookmaaker, K., Sumardja, E., Khan, M.K.M. & Ellis, S. 2008. *Rhinoceros sondaicus*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.1. <www.iucnredlist.org>. Downloaded on **30 June 2011**.

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Taxonomy [top]

Kingdom	Phylum	Class	Order	Family
ANIMALIA	CHORDATA	MAMMALIA	PERISSODACTYLA	RHINOCEROTIDAE

Scientific Name:	*Rhinoceros unicornis*
Species Authority:	Linnaeus, 1758

Common Name/s:
English – Indian Rhinoceros, Greater One-horned Rhino, Great Indian Rhinoceros
French – Rhinocéros Unicorne De L'Inde
Spanish – Rinoceronte Unicornio Índico

Assessment Information [top]

Red List Category & Criteria:	Vulnerable B1ab(iii) ver 3.1
Year Assessed:	2008
Assessor/s	Talukdar, B.K., Emslie, R., Bist, S.S., Choudhury, A., Ellis, S., Bonal, B.S., Malakar, M.C., Talukdar, B.N. & Barua, M.
Reviewer/s:	Talukdar, B.K. & van Strien, N.J. (Asian Rhino Red List Authority)

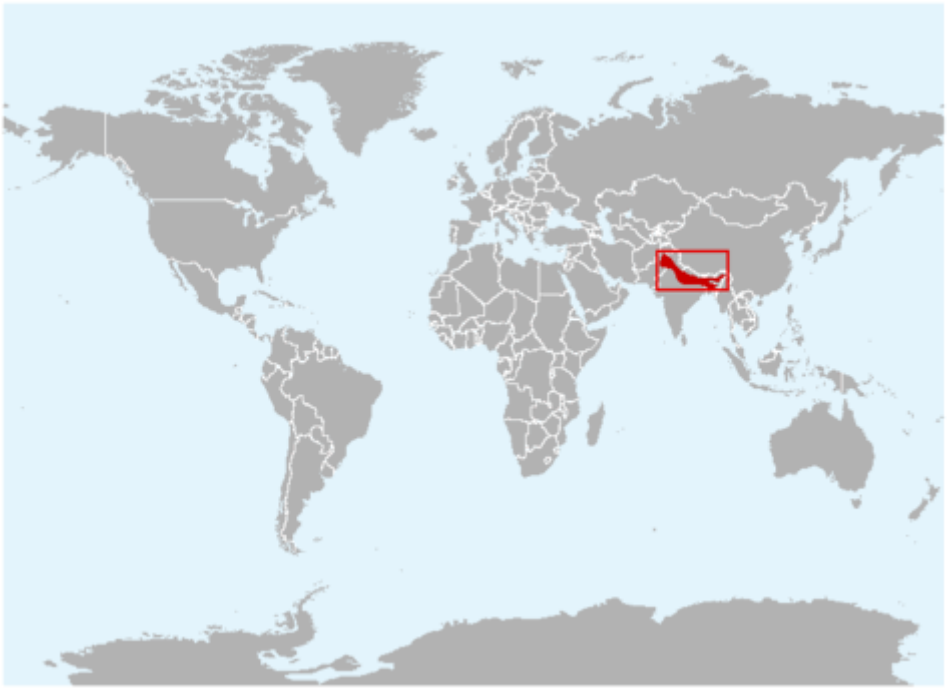
Justification:
The Greater One-horned Rhinoceros populations are increasing overall due to strict protection, especially in India. However, some populations are decreasing, especially in Nepal and parts of northeastern India. The species is currently confined to fewer than ten sites, with a total extent of occurrence of less than 20,000 km². There is a continuing decline in the quality of habitat, projected to continue into the future, which, if not addressed, will affect the long-term survival of some of the smaller populations, and could jeopardize the further recovery of the species. Its populations are also severely fragmented, and with over 70% of the population in Kaziranga National Park, a catastrophic event there could have a devastating impact on the status of the species.

History:

1996 – Endangered
1994 – Endangered (Groombridge 1994)
1990 – Endangered (IUCN 1990)
1988 – Endangered (IUCN Conservation Monitoring Centre 1988)
1986 – Endangered (IUCN Conservation Monitoring Centre 1986)

Geographic Range [top]

Range Description:	Historically, the Indian rhinoceros once existed across the entire northern part of the Indian subcontinent, along the Indus, Ganges and Brahmaputra River basins, from Pakistan to the Indian-Burmese border, including parts of Nepal, Bangladesh and Bhutan (Foose and van Strien 1997). It may also have existed in Myanmar, southern China, and Indochina, though this is uncertain. The species was common in northwestern India and Pakistan until around 1600, but disappeared from this region shortly after this time (Rookmaker, 1984). The species declined sharply in the rest of its range from 1600-1900, until the species was on the brink of extinction at the beginning of the twentieth century. Currently, the Indian rhinoceros exists in a few small subpopulations in the Nepal and India (West Bengal, Uttar Pradesh, Assam) (Foose and van Strien 1997; Grubb, 2005), with an unsuccessful reintroduction of a pair in 1983 into Pakistan.
Countries:	**ve:** ; Nepal **onally extinct:** gladesh; Bhutan; Pakistan
Range Map:	(click map to view full version)



Population [top]

Population:	The total population estimate in May 2007 was estimated to be 2,575 individuals, with estimates of a total of 378 in Nepal and 2,200 in India (Asian Rhino Specialist Group 2007). The Indian Rhino, with strict protection from Indian and Nepalese wildlife authorities, has recovered from a total population of under 200 in the early 1900s. Although some populations have declined in recent years, overall there has been a population increase for almost 100 years which still continues. India The species exists in several protected areas in India, with the following population estimates in May 2007 (Asian Rhino Specialist Group 2007): Dudhwa National Park (21), Manas National Park (3), Karteniaghat (2), Kaziranga National Park (1,855 in 2006; 1,551 in 1999), Orang (68 in 2006; 46 in 1999), Pabitora (81 in 2006; 74 in 1999, 79 in 2004), Jaldapara (108 in 2006; 96 in 2004; 84 in 2002), Gorumara (27 in 2006; 25 in 2004; 22 in 2002). Estimates given in Foose *et al*. (1997) were as follows: Dudhwa National Park (11), Manas National Park (60), Karteniaghat (4), Kaziranga (1164 +/- 134), Orang (over 90), Pabitora (80 individuals over 38.8 km²) (Choudhury, 2005), Jaldapara (over 33), Gorumara (13), and a few remaining small populations in Assam. Kaziranga National Park, which was established as a reserve for the last 10-20 Indian rhinos in Assam in 1905, is home to over 70% of the global population of this species. Poaching rendered the species extinct in Laokhowa Wildlife Sanctuary by the mid-1990s (Foose *et al*., 1997), and there has also been a severe decline in Manas National Park due to poaching related to civil unrest. The overall population tendency is to increase (especially in Kaziranga, Pabitora, Dudhwa, Jaldapara and Gorumura), with decreases in Manas, Orang (now increasing again) and Laokhowa. The population in Karteniaghat is best described as transient (S.S. Bist pers. comm.). Nepal In the late 1960s, an estimated 65 Indian rhinos survived in Nepal, but due to increased conservation efforts, the total population was up to 612 in 2000. A total of at least 91 animals were poached in 2000-2003 (Martin, 2004), and since 2000, numbers have declined. In Royal Chitwan National Park, the number of individuals has declined from 544 individuals in 2000, to 372 individuals in 2005 (Asian Rhino Specialist Group 2007), the decrease being due to increased poaching following political instability in Nepal (Rothley *et al*., 2004; Khan *et al*., 2005), and habitat changes. In Royal Bardia National Park (where rhinos were re-introduced) there were approximately 40 individuals in 1997 (Foose *et al*., 1997) and 35 animals in 2007 (Asian Rhino Specialist Group 2007). In Royal Suklaphanta Wildlife Reserve (where the species was also re-introduced), the population is only six individuals (Martin, 2004; Asian Rhino Specialist Group 2007). Pakistan. A pair of rhinos was introduced into Lal Sohanra National Park in 1983, but have not bred.
Population Trend:	Increasing

Habitat and Ecology [top]

Habitat and Ecology:	The species inhabits the riverine grasslands of the Terai and Brahmaputra Basins (Foose and van Strein 1997). The species prefers these alluvial plain grasslands, but was known to occur in adjacent swamps and forests. The populations are currently restricted to habitats surrounded by human-dominated landscapes, so that the species often occurs in adjacent cultivated areas, pastures, and secondary forests. The diet includes mainly grasses, but also some fruit, leaves, shrub and tree branches, and cultivated crops (Nowak, 1999). The species also utilizes mineral licks regularly. Males are solitary, with unstructured, overlapping territories. The females solitary unless occurring with young. Its life history characteristics are not well known, with longevity estimated at about 30-45 years, gestation length of approximately 16 months (as with other rhino species), and age at sexual maturity estimated at 5-7 years for females and 10 years for males (Nowak, 1999; IRF website, 2006).
Systems:	Terrestrial; Freshwater

List of Habitats:	1 Forest 1.5 Forest - Subtropical/Tropical Dry 1.6 Forest - Subtropical/Tropical Moist Lowland 4 Grassland 4.6 Grassland - Subtropical/Tropical Seasonally Wet/Flooded 5 Wetlands (inland) 5.4 Wetlands (inland) - Bogs, Marshes, Swamps, Fens, Peatlands 5.7 Wetlands (inland) - Permanent Freshwater Marshes/Pools (under 8ha) 5.8 Wetlands (inland) - Seasonal/Intermittent Freshwater Marshes/Pools (under 8ha)

Threats [top]

Major Threat(s):	This species declined to near extinction in the early 1900s, primarily due to widespread conversion of alluvial plains grasslands to agricultural development, which led to human-rhino conflicts and easier accessibility for hunters. Sport hunting became common in the late 1800s and early 1900s. A reversal of government policies shortly thereafter protected many of the remaining populations. However, poaching, mainly for the use of the horn in Traditional Chinese Medicine has remained a constant and the success is precarious without continued and increased support for conservation efforts in India and Nepal. Poaching has lead to decreases in several important populations, especially those in Chitwan, Manas , Laokhowa, and the Babai Valley area of Bardia. However, not all recent population decreases can be linked to poaching. There have been serious declines in quality of habitat in some areas. This is due to: 1) severe invasion by alien plants into grasslands affecting some populations; 2) demonstrated reductions in the extent of grasslands and wetland habitats due to woodland encroachment and silting up of beels; and 3) grazing by domestic livestock. In Chitwan (the second largest population) there is clear evidence that poaching on its own does not account for the observed level of population decline (R.H. Emslie pers. comm.), and there are trends in a number of reproductive indicators (i.e., decline in the percentage of adult females calving and in the percentage of the population that is calves) that are strongly indicative of negative changes in habitat quality. In Chitwan there has been severe infestation of some riverine and grassland areas by the climbing *Mikania micrantha* (which covers over indigenous vegetation), and invasion of Eupatorium in other areas. There is also heavy livestock grazing pressure and disturbance in buffer zone areas as well as some invasion of grasslands by *Acacia catechu* and *Dalbergia sissou*. It has been reported that grassland area in Chitwan has been reduced from 20% to 4.7% of the national park (R.H. Emslie pers. comm.). In India, there is not yet any evidence that invasion by alien plants has caused any population decreases. However, in Orang National Park, there have been marked habitat changes due to grazing, human encroachment and silting up. In particular, short grass areas have declined by 75% due to silting up and draining of beels (B.N. Talukdar pers. comm.). Mimosa is also an alien invader in this area. In the Karnali floodplain area of Bardia there is also some invasion of habitat by the alien *Lantana camara*. In Pabitora there has been an invasion of *Ipomoea* "weeds" into grassland areas (S. Dutta pers. comm.). There also has been an invasion of woodland into grassland and siltation and drying up of some water bodies. There also has been some human encroachment and very heavy livestock grazing. With increasing human densities this pressure is unlikely to get any less (S. Dutta pers. comm.). Analysis of satellite imagery has shown that there has a substantial increase in woodland (34.51%) in Pabitora since 1977 accompanied by decline in alluvial grassland (68%). This change of habitat is mostly because of natural succession process, livestock grazing from the nearby villages as well as improper management of the grassland habitat (Sarma *et al*., in press). The West Bengal populations (Jaldapara and Gorumara) are affected by high levels of grazing from fringe villages, and there have been weed and climber infestations by *Mikania cordata*, *M. scandens*, *Lantana camara* and *Leea* spp. The species is inherently at risk because over 70% of its population occurs at a single site, Kaziranga National Park. This area, is subject to poaching and tensions with the surrounding high human population due to human-wildlife conflicts (including conflicts with rhinos). The level of poaching in Kaziranga has generally not been at a level to prevent the ongoing increase in the population, but constant vigilance is required. Clearly, any catastrophic event in Kaziranga (such as disease, civil disorder, poaching, habitat loss, etc) would have a devastating impact on the status of this species. Sex-ratio among the adult rhinos in Gorumara National Park is almost 1:1. As a result, intra-specific fights among the bulls are very common and these animals have a tendency to stray out of the National Park very often, leading to human-wildlife conflicts (S.S. Bist pers. comm.). There are suggestions that the small population of rhinos in Jaldapara and Gorumara may be prone to in-breeding depression (S.S. Bist pers. comm.). There have been proposals to dam the Bramaphutra River in Arunachal Pradesh, and should this happen in future this could very negatively affect the habitat quality and rhino carrying capacity of major parks like Kaziranga in future (by preventing or reducing the pulse of nutrients brought in by regular large floods). In Jaldapara Sanctuary, the River Torsa no longer overflows as a result of massive flood-control structures. As a result the water table in the sanctuary is receding and the natural water-bodies and wallow-pools used by rhinos are slowly drying up (S.S. Bist pers. comm.).
List of Threats:	1 Residential & commercial development 1.1 Housing & urban areas 2 Agriculture & aquaculture 2.1 Annual & perennial non-timber crops 2.1.2 Small-holder farming 2.3 Livestock farming & ranching 2.3.2 Small-holder grazing, ranching or farming 4 Transportation & service corridors 4.1 Roads & railroads 4.2 Utility & service lines 5 Biological resource use 5.1 Hunting & trapping terrestrial animals 5.1.1 Intentional use (species is the target) 6 Human intrusions & disturbance 6.2 War, civil unrest & military exercises 7 Natural system modifications 7.2 Dams & water management/use 7.2.11 Dams (size unknown) 8 Invasive & other problematic species & genes 8.1 Invasive non-native/alien species 8.1.1 Unspecified species 8.2 Problematic native species 11 Climate change & severe weather 11.4 Storms & flooding

Conservation Actions [top]

Conservation Actions:	The species has been included on CITES Appendix I since 1975. The Indian and Nepalese governments have taken major steps towards Indian Rhinoceros conservation, especially with the help of the World Wide Fund for Nature (WWF) and other non-governmental organizations. Indian Rhino populations occur almost exclusively within and around protected areas. In India, the species occurs in Kaziranga National Park (World Heritage Site), Manas National Park (World Heritage Site in danger), Dudhwa National Park (re-introduced population), Karteniaghat Wildlife Sanctuary, Orang National Park, Pabitora Wildlife Sanctuary, Jaldapara Wildlife Sanctuary, and Gorumara National Park. In Nepal, the species occurs in Royal Chitwan National Park, Royal Bardia National Park (re-introduced population), and Royal Suklaphanta Wildife Reserve (a very small re-introduced population). Strict anti-poaching measures are needed to maintain all of these populations. It is also important to reduce human-wildlife conflicts around these areas, and this might involve fencing. Many of the areas also require targeted programmes to control invasive plants, to prevent the spread of woodland, to safeguard wetlands through appropriate water management, and to limit the extent of grazing by domestic livestock. In Pabitora, specific recommendations have been made to increase the quality of feeding habitat of rhino within the sanctuary through meticulous manipulation and checking livestock grazing (Sarma *et al*., in press). Water holding mechanisms within the sanctuary during winter are crucial in terms of keeping moist grassland available in winter seasons, thereby reducing the number of rhinos straying out of the sanctuary and thus exposing themselves to poaching (Sarma *et al*., in press). The area of Kaziranga National Park has officially been extended, although animals had access to this area previously as the original park area was not fenced. In West Bengal (Jaldapara and Gorumara), there is a programme of habitat improvement in old teak areas, weed control is being carried out in 50-60 ha annually. With the support of the IUCN SSC Asian Rhino Specialist Group, an Indian Rhino Vision 2020 and a Nepal Rhino Action Plan have been developed. These cover a number of important and specific conservation measures, including: translocating rhinos to bolster struggling populations (e.g., Manas National Park) and to start new populations; improving security around rhino populations and reducing poaching; assessing habitat status and management needs; expanding available habitat through active management; improving protected area infrastructure; training staff in specific rhino conservation techniques; reducing human-wildlife conflicts; involving local people in rhino conservation; and implementing education and awareness programmes. Overall, there is a need for further reintroductions, thereby reducing the concentration of over 70% of the individuals in one large population.
List of Conservation Actions:	1 Land/water protection 1.1 Site/area protection 2 Land/water management 2.1 Site/area management 2.3 Habitat & natural process restoration 3 Species management 3.1 Species management 3.1.1 Harvest management 3.1.2 Trade management 3.3 Species re-introduction 3.3.1 Reintroduction 4 Education & awareness 4.1 Formal education 4.2 Training 4.3 Awareness & communications 5 Law & policy 5.4 Compliance and enforcement 5.4.1 International level 5.4.2 National level

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