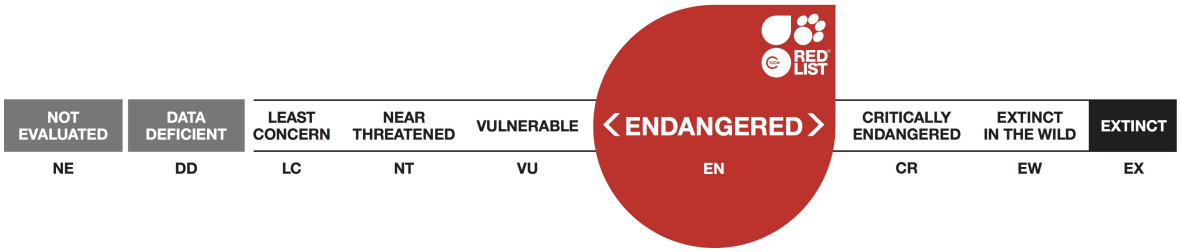
The IUCN Red List of Threatened Species™
ISSN 2307-8235 (online)
IUCN 2008: T3898A2884984
Scope: Global
Language: English

Carettochelys insculpta, Pig-nosed Turtle

Assessment by: Eisemberg, C., van Dijk, P.P., Georges, A. & Amepou, Y.



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Citation: Eisemberg, C., van Dijk, P.P., Georges, A. & Amepou, Y. 2018. *Carettochelys insculpta*. The IUCN Red List of Threatened Species 2018: e.T3898A2884984.
http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T3898A2884984.en

Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Reptilia	Testudines	Carettochelyidae

Taxon Name: *Carettochelys insculpta* Ramsay, 1886

Common Name(s):

- English: Pig-nosed Turtle, Fly River Turtle, New Guinea Plateless Turtle, Pig-nose Turtle, Pitted-shell Turtle

Taxonomic Source(s):

TTWG (Turtle Taxonomy Working Group: Rhodin, A.G.J., Iverson, J.B., Bour, R. Fritz, U., Georges, A., Shaffer, H.B. and van Dijk, P.P.). 2017. Turtles of the World: Annotated Checklist and Atlas of Taxonomy, Synonymy, Distribution, and Conservation Status (8th Ed.). In: Rhodin, A.G.J., Iverson, J.B., van Dijk, P.P., Saumure, R.A., Buhlmann, K.A., Pritchard, P.C.H., and Mittermeier, R.A. (eds), *Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group*, pp. 1-292. Chelonian Research Monographs.

Taxonomic Notes:

Carettochelys insculpta is the only surviving extant member of the genus *Carettochelys* and the family Carettochelyidae, a formerly widespread turtle family dating back to the Eocene and previously occurring across Asia and much of the rest of the globe. As such, it is considered a deep phylogenetic lineage with high-priority conservation needs, a so-called EDGE species (Evolutionarily Distinct, Globally Endangered). The common name in Indonesian Papua is Kura-kura Moncong Babi and the common name in Papua New Guinea is Piku.

Assessment Information

Red List Category & Criteria: Endangered A2bd+4bd ver 3.1

Year Published: 2018

Date Assessed: May 28, 2017

Justification:

Carettochelys insculpta is under significant pressure and subject to exploitation levels that appear unsustainable, particularly in Papua New Guinea and Indonesian Papua. Adults and their eggs are highly regarded as food by indigenous peoples throughout its range, and exploitation for both food and international trade is threatening populations in both Papua New Guinea and Indonesian Papua. Populations in northern Australia (representing about 10% of the global population) have appeared to be stable over the last *ca* 20 years (although threatened by habitat degradation). Populations in New Guinea (*ca* 90% of the global population) are under significant threats, especially in Indonesian Papua, and have declined by *ca* 57% in representative markets in Papua New Guinea in the 30-yr period between *ca* 1980 and 2010, with predictions of continued declines of at least 60% over three generations, including past, present, and future. In Indonesian Papua, eggs are also collected for local

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incubation under controlled conditions for sale of hatchlings into the international pet trade; total numbers of eggs collected amounted to 1.5 to 2 million eggs annually in the late 1990s and have continued at unsustainable and growing rates into the present, despite being listed on CITES Appendix II. Frequent seizures of illegal shipments of hatchlings as well as body parts have occurred recently. As a result of these combined threats and monitored population declines, this species is now assessed as Endangered under criteria A2bd and A4bd, but could quickly reach Critically Endangered status unless current threats and exploitation are curtailed. The species was first listed as Insufficiently Known in the 1982 Red Data Book, then uplisted to Vulnerable on the 1996 Red List.

Previously Published Red List Assessments

2000 – Vulnerable (VU)
http://dx.doi.org/10.2305/IUCN.UK.2000.RLTS.T3898A10155584.en

1996 – Vulnerable (VU)

1994 – Insufficiently Known (K)

1990 – Insufficiently Known (K)

1988 – Insufficiently Known (K)

1986 – Insufficiently Known (K)

1982 – Insufficiently Known (K)

Geographic Range

Range Description:

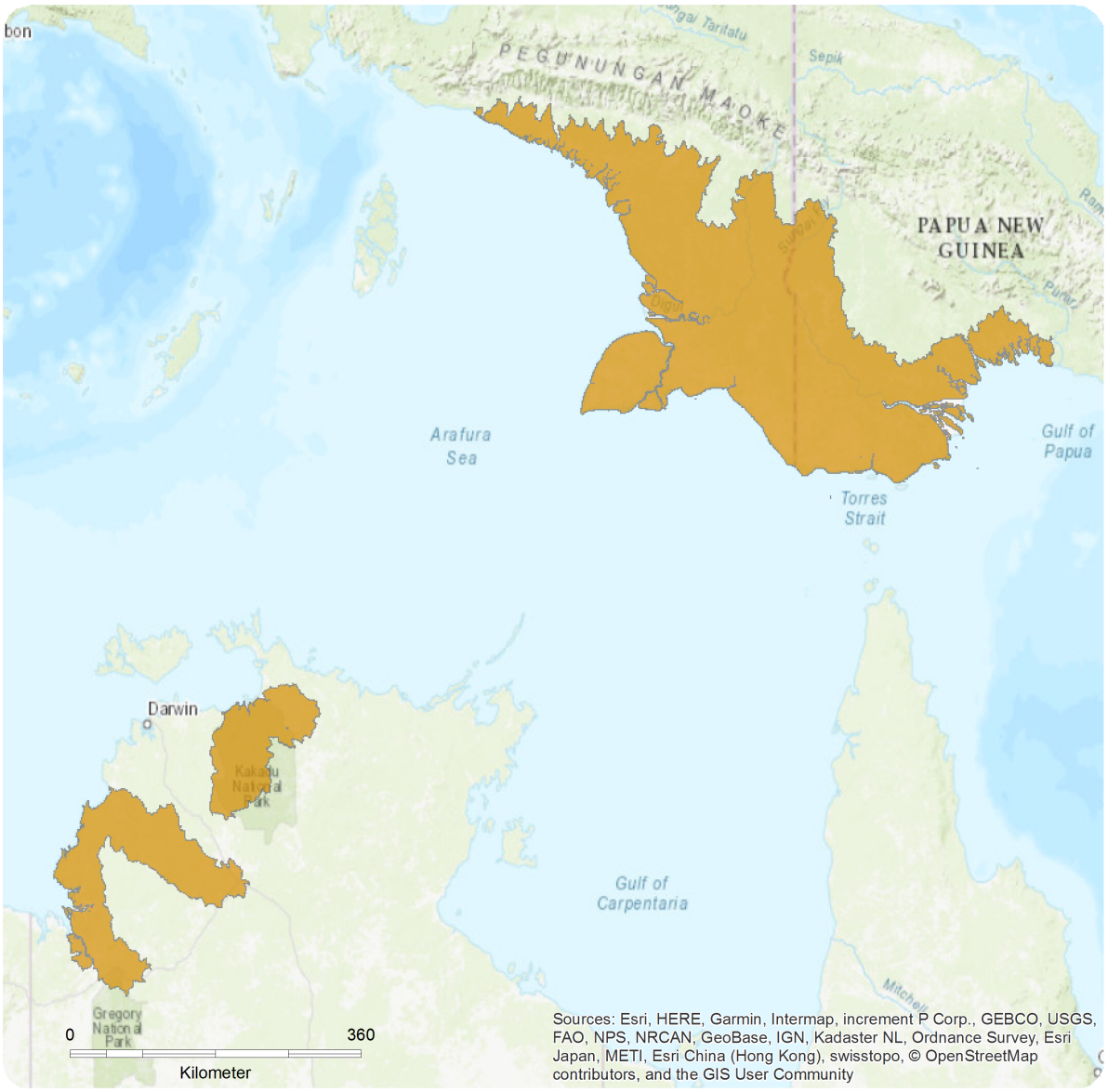
Carettochelys insculpta occurs in the rivers of southern New Guinea (both Papua, Indonesia, and Papua New Guinea) and the rivers of the Northern Territory of Australia, where it occurs in the Victoria, Daly, Fitzmaurice, East Alligator, and South Alligator river systems, and possibly in other rivers. In New Guinea it occurs from the Gulf Province in Papua New Guinea to the Mimika region of western Papua, Indonesia; records from further west in West Papua at Lake Jamur appear to represent trade specimens (Iverson 1992, Cann 1998, Rhodin and Genorupa 2000, Georges *et al*. 2008, TTWG 2017).

Country Occurrence:

Native: Australia (Northern Territory); Indonesia (Papua); Papua New Guinea

Distribution Map

Carettochelys insculpta



Range

Extant (resident)

Compiled by:

IUCN (International Union for Conservation of Nature)

NE DD LC NT VU EN ENDANGERED CR EW EX

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

http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T3898A2884984.en

Population

Although statements regarding *Carettochelys insculpta* populations vary substantially, the species appears to be reasonably common in suitable habitat, although there is wide variance from locally rare to locally abundant, and populations are decreasing. Population densities for *C. insculpta* in the upper reaches of the South Alligator River in Australia have been estimated at 33.8 ± 11.3 turtles/ha (equivalent to 67 turtles/km of channel) (Georges and Kennett 1989). These estimates are comparatively high, and turtle densities were probably inflated above the carrying capacity of the waters in which they were found because of seasonal contractions of their aquatic habitat (Georges *et al.* 1993). Population in northern Australia (representing about 10% of the global population) appeared stable in 2009, populations in New Guinea (ca. 90% of global populations) were under significant threats, especially in Indonesian Papua. A decline of *ca* 57% was reported in the Kikori delta of Papua New Guinea over a 30-yr period between 1980 and 2010 and is likely to also be representative of other regions in Papua New Guinea (Eisemberg *et al*. 2011).

Current Population Trend: Decreasing

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

In New Guinea, *Carettochelys insculpta* inhabits rivers, including their deltas and estuarine reaches, grassy lagoons, swamps, lakes, and waterholes of the southern lowlands (Eisemberg *et al*. 2015a, b). In Australia, the species appears restricted to seasonally clear, shallow, continuously-flowing waters of the Daly drainage and to billabongs and plunge pools of the Alligator Rivers region (Webb *et al*. 1986; Georges and Kennett 1989; Doody *et al*. 2001a, 2002; Georges *et al.* 2008). The species is omnivorous, but feeds principally on fruits, leaves, and stems of riparian vegetation, and aquatic plants, with some molluscs, crustaceans, insects, fish, and mammals (likely eaten as carrion) also consumed (Georges *et al.* 2008, and references therein). *Carettochelys* females may reach up to 57 cm carapace length (CL) and mature at 38 cm CL (Daly River) to 41 cm (Kikori region) or larger. Maturity in females appears to be reached at about 25 yrs, with generation time of *ca* 30–40 years (Heaphy 1990).

Female turtles nest gregariously at night on riverside or coastal marine sandbanks, and appear to produce two clutches every second year, with a non-reproducing year in between (Doody *et al*. 2003a, b, 2009; Georges *et al*. 2008). Depending on location, average clutch size ranges from 10 (Daly River, Australia) to 21 eggs (Kikori region, Papua New Guinea), with a range of 7 to 26 or more. This species exhibits embryonic diapause and temperature-dependent sex determination, with females produced at warmer temperatures and males at lower temperatures (Webb *et al*. 1986, Young *et al*. 2004). Hatching is triggered by anoxia associated with torrential rain or flooding of the nest, and can expedited by sibling vibrations (Doody *et al*. 2001b, 2012). Incubation duration averages 65 days in Papua New Guinea and 72 days on the Daly River in Australia. Hatchlings measure 41–56 mm CL and weigh 21–30 g. Natural egg loss rates can be high from predation (up to 25%), notably by goannas (Doody *et al*. 2006), and flooding (up to 20%), or intrinsic issues (infertility, developmental problems, also up to 20%) (Georges *et al*. 2008, and references therein). The invasion of Cane Toads in 2003 into the Daly River boosted *C. insculpta* recruitment by *ca* 20% via population declines of Yellow-spotted Monitor Lizards (Doody *et al*. 2006). Predation of adults occurs by Saltwater Crocodiles (*Crocodylus porosus*).

Systems: Terrestrial, Freshwater, Marine

http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T3898A2884984.en

Use and Trade

Adults and eggs of *Carettochelys insculpta* are highly regarded as food by indigenous peoples throughout its range, and exploitation for food is threatening populations in both Papua New Guinea and Indonesian Papua (Rhodin and Genorupa 2000; Samedi and Iskandar 2000; Eisemberg *et al*. 2011, 2015a). In Indonesian Papua, eggs are collected for local incubation under controlled conditions for sale of hatchlings into the international pet trade; total numbers of eggs collected amounted to 1.5 to 2 million eggs annually in the late 1990s, with the numbers of exports and confiscations gradually rising (Samedi and Iskandar 2000, Arida and Ibarrondo 2007, Georges *et al*. 2008, Burgess and Lilley 2014, and references therein). Local offtake can be significant: up to 23 females may be harvested in a single night in Papua New Guinea (Eisemberg *et al*. 2011). Harvest monitoring through market surveys has documented dramatic declines (*ca* 57%) in numbers traded despite increased local human population size and increased exploitation efforts over the 30-yr period of 1980–2010 (Eisemberg *et al*. 2011, 2015a): market, village, and sandbank surveys in the Kikori region of Papua New Guinea indicated large but steeply declining numbers of adult animals traded over time (Eisemberg *et al*. 2011). Recent available seizure records from 2017 (CITES document CoP17 Doc.73 Annex, p. 60) document 26 seizure cases comprising a combined total of 29,692 live specimens from primarily Indonesian Papua, plus two seizure cases of unspecified quantities of parts and derivatives, during the period 2000–2015. This makes *Carettochelys* the species with the second-largest number of seized live specimens of all tortoises and freshwater turtles seized world-wide.

Threats (see Appendix for additional information)

Carettochelys insculpta is vulnerable by virtue of its relatively limited distribution and stereotyped nesting habits rendering it susceptible to over-exploitation. Adults and their eggs are highly regarded as food by indigenous peoples throughout its range, and exploitation for food is threatening populations in both Papua New Guinea and Indonesian Papua (Rhodin and Genorupa 2000, Samedi and Iskandar 2000). In one study, 92% of nests were lost to a combination of flooding and human egg collection (Eisemberg *et al*. 2011, 2015b). In addition, in Indonesian Papua, eggs are collected for local incubation under controlled conditions for sale of hatchlings into the international pet trade; total numbers of eggs collected amounted to 1.5 to 2 million eggs annually in the late 1990s, with the numbers of exports and confiscations gradually rising (Samedi and Iskandar 2000, Arida and Ibarrondo 2007, Georges *et al*. 2008, Burgess and Lilley 2014, and references therein). Exploitation of the species (eggs and adults alike) has been facilitated in recent years by the availability of outboard motors and the cessation of clan warfare, which now allows people to live along riverbanks (Georges *et al.* 2008, Eisemberg *et al*. 2015a, Burgess and Lilley 2014).

Habitat degradation is the major potential threat to Australian populations, involving water extraction for agriculture, pollution from mining, increased sedimentation, changes in water quality, and fragmentation of rivers (Georges *et al.* 1993, 2008, and references therein). Trampling of nests, and damage to riparian vegetation, by feral Water Buffalo in the Alligators Rivers region of Australia were significant problems, but have been addressed by a buffalo reduction program (Georges *et al*. 2008, and references therein).

Most exploitation in Papua New Guinea occurs at the local level, with the cost of fuel for outboard motors the primary limiting factor; if fuel becomes more available, the offtake will expand and trade will extend to further areas (Eisemberg *et al*. 2015a). In the Kikori River, about 2–3% of nests survive to

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hatching (Eisemberg *et al*. 2011); goanna predation combined with human harvest amount to depredation of at least 92% of all eggs/nests deposited, usually up to 97–98%, and in some situations 100% of nests are destroyed before hatching. Local offtake can be significant: up to 23 females may be harvested in a single night in Papua New Guinea (Eisemberg *et al*. 2011, 2015a). Harvest monitoring through market surveys has documented dramatic declines in numbers traded despite increased local human population size and increased exploitation efforts over the ca. 30-yr period 1981–2008.

Impacts from human consumption are predicted to increase on the New Guinea *Carettochelys* populations with human population growth and human migration into turtle habitat. Recent available seizure records from 2017 (CITES document CoP17 Doc.73 Annex, p. 60) document 26 seizure cases comprising a combined total of 29,692 live specimens from primarily Indonesian Papua, plus two seizure cases of unspecified quantities of parts and derivatives, during the period 2000–2015. This makes *Carettochelys* the species with the second-largest number of seized live specimens of all tortoises and freshwater turtles world-wide.

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

Carettochelys insculpta was first listed in the 1982 IUCN Red Data Book as Insufficiently Known (Rose *et al*. 1982), then uplisted to Vulnerable on the 1996 Red List. It was included in CITES Appendix II in 2004, restricting international trade to quantities that should not be detrimental to the survival of the species in the wild. It is protected in Kakadu NP in Australia by the National Parks and Wildlife Conservation Act 1975, and elsewhere in the Northern Territory by the Territory Parks and Wildlife Conservation Act 1982. In Papua New Guinea, export is strictly controlled, but domestic exploitation is largely unregulated. In West Papua, Indonesia, harvest of eggs for incubation and subsequent export of hatchlings as 'captive-bred' is managed by a quota system, while protective measures to prevent exploitation of mature animals is rarely enforced (Rhodin and Genorupa 2000, Samedi and Iskandar 2000, Georges *et al.* 2008, and references therein).

Significant subpopulations of pig-nosed turtles have been confirmed to inhabit Kakadu NP, Flora River Nature Park, and several Conservation Areas in the Northern Territory, Australia (Georges *et al.* 2008). It has been recorded from Papua New Guinea from Tonda WMA (Georges *et al.* 2008, and references therein), and Wasur and Lorentz National Parks in Indonesian Papua (Samedi and Iskandar 2000).

Future conservation priorities include further population status surveys across key parts of the range and biological and sociological research aimed at developing sustainable management schemes for harvest of eggs (and possibly a few adults) for subsistence consumption, and eggs/hatchlings for the pet trade**,** combined with increased enforcement of regulations to address illegal and unsustainable trade.

Priority areas for conservation of *C. insculpta* have been identified in the Kikori Region of Papua New Guinea (Eisemberg *et al*. 2015c). A monitoring, protection, and education program (Piku Project) has being implemented and is ongoing in the Kikori region since 2009. Conservation action led by the Piku Project in Kikori includes community engagement and awareness programs, in collaboration with local authorities and schools. Community initiatives also include the Wau Creek Protected Area, which is now locally recognized and undergoing the process of gazettal as a nationally recognized protected area. Wau Creek is one of the major upstream *C. insculpta* nesting areas. A ban on harvest of turtles and eggs has been implemented by its landowners (Rupahai clan), during the nesting season.

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Credits

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http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T3898A2884984.en

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Citation

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External Resources

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?
5. Wetlands (inland) -> 5.1. Wetlands (inland) - Permanent Rivers/Streams/Creeks (includes waterfalls)	Resident	Suitable	Yes
9. Marine Neritic -> 9.5. Marine Neritic - Subtidal Sandy-Mud	Breeding	Suitable	Yes

Threats

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

Threat	Timing	Scope	Severity	Impact Score
1. Residential & commercial development -> 1.1. Housing & urban areas	Ongoing	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
3. Energy production & mining -> 3.2. Mining & quarrying	Future	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.1. Intentional use: (subsistence/small scale) [harvest]	Ongoing	Majority (50-90%)	Rapid declines	Medium impact: 7
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.2. Intentional use: (large scale) [harvest]	Ongoing	Majority (50-90%)	Very rapid declines	High impact: 8
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
9. Pollution -> 9.3. Agricultural & forestry effluents -> 9.3.2. Soil erosion, sedimentation	Future	-	-	-
	Stresses:	1. Ecosystem stresses -> 1.2. Ecosystem degradation		

Conservation Actions in Place

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

Conservation Actions in Place
In-Place Research, Monitoring and Planning
Action Recovery plan: Yes
Systematic monitoring scheme: Yes
In-Place Land/Water Protection and Management

Conservation Actions in Place
Conservation sites identified: Yes, over part of range
Occur in at least one PA: Yes
Area based regional management plan: Yes
Invasive species control or prevention: Not Applicable
In-Place Species Management
Harvest management plan: No
Successfully reintroduced or introduced beningly: No
Subject to ex-situ conservation: No
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 Actions 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
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
4. Education & awareness -> 4.3. Awareness & communications
5. Law & policy -> 5.2. Policies and regulations
5. Law & policy -> 5.3. Private sector standards & codes
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.3. Sub-national level
6. Livelihood, economic & other incentives -> 6.2. Substitution

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 -> 1.5. Threats
1. Research -> 1.6. Actions
2. Conservation Planning -> 2.1. Species Action/Recovery Plan
2. Conservation Planning -> 2.3. Harvest & Trade Management Plan
3. Monitoring -> 3.1. Population trends
3. Monitoring -> 3.2. Harvest level trends
3. Monitoring -> 3.3. Trade trends

Additional Data Fields

Distribution
Continuing decline in area of occupancy (AOO): Yes
Continuing decline in extent of occurrence (EOO): Unknown
Extreme fluctuations in extent of occurrence (EOO): Unknown
Continuing decline in number of locations: Yes
Population
Population severely fragmented: No
Habitats and Ecology
Generation Length (years): 30-40
Movement patterns: Full 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.