RED LIST ASSESSMENT

Questionnaire

(please complete one questionnaire per taxon, extra sheets may be used)

1. SCIENTIFIC AND COMMON NAMES.

The IUCN Red List generally focuses at the species level. Subspecies, plant varieties, and subpopulations (as defined in the IUCN Red List Categories and Criteria. Version 3.1) may also be assessed and will be considered for inclusion in the IUCN Red List only if the species-level assessment is also available. Hybrids will not be considered for inclusion in the IUCN Red List. For currently undescribed species, please refer to the rules outlined in section 2.1 of current version of the *Guidelines for Using the IUCN Red List Categories and Criteria*.

1a. Scientific name (including authority details):

Colobus angolensis ssp. *palliatus* (Peters, 1868)

1b. Synonym/s (if there has been a taxonomic change in the last 5 years or if widely used):

1c. English Common Name (if known):

English – Peters' Angola Colobus, Peters's Angola Colobus, Tanzanian black-and-white Colobus

1d. Other Common Names (if known and state language):

Mbega-Sambaa (West Usambara Moutnains), Mkuluzu (sing.); Wakuluzu (pl.), Digo language, Kenya

2. HIGHER TAXONOMY

Note that the IUCN Red List does not record sub-families, sub-orders, etc. Only the taxonomic levels requested below should be provided. A taxonomic notes field is also provided to allow further details about taxonomy to be recorded – see section 4a.

2a. Kingdom	**2b. Phylum**	**2c. Class**
Animalia	Chordata	Mammalia

2c. Order	**2b. Family**
Primates	Cercopithecidae

3. COUNTRY, SUBCOUNTRY AND MARINE AREA OCCURRENCES

Provide a list of the **countries** and **subcountry units** (e.g., states, provinces, etc.) in which this taxon occurs. For marine taxa, also record names of FAO fisheries areas and (optional) Large Marine Ecosystems (LME).

Presence: For each country, subcountry or marine area, please record whether this taxon is extant, extinct, possibly extinct, or presence uncertain.

Origin: For each country, subcountry or marine area, please record whether this taxon is native, reintroduced, introduced, vagrant, or origin uncertain.

Note: A distribution map showing the extent of occurrence **MUST** also be attached.

See the current version of the *Guidelines for Using the IUCN Red List Categories and Criteria* for the IUCN definition of "extent of occurrence".

3a. Countries			**3b. Subcountry units** (if known)		
Country name	**Presence**	**Origin**	**Subcountry unit name**	**Presence**	**Origin**
Tanzania	Extant	Native	Pwani (Coast) District	Extant	Native
			Kilimanjaro District	Extant	Native
			Morogoro District	Extant	Native
			Tanga District	Extant	Native
Kenya	Extant	Native	Kwale District	Extant	Native
			Kilifi District	*Extinct*	Native

3c. Marine Areas		
FAO area name or LME	**Presence**	**Origin**

4. TEXT DOCUMENTATION

Provide a short narrative for each of the topics below to support the information used for the Red List assessment in section 5 and to complement and provide more detail for the Classification Scheme codes for habitats, threats, stresses and conservation actions recorded in Annex 1 (use additional sheets if required).

Please avoid using one-word answers in this section; the Red List assessment should be treated in the same way as a scientific paper, where the information is presented as clearly as possible for the reader, and all references used as cited within the text.

4a. Taxonomic Notes

Record any recent taxonomic changes or current taxonomic doubts or debates about the validity or identity of the taxon.

Colobus angolensis palliatus has recently been split taxonomically distinguishing the subspecies populations between those in Kenya from those in central and southern Tanzania. The subspecies split is founded on a genetic study which indicates that these groups are distinct due to "the degree of evolutionary distance between control region and cytochrome b haplotypes" (McDonald and Hamilton, 2010:722).

It is important to note that the study by McDonald and Hamilton sampled colobus from four locations, two in Kenya and one each from Central and Southern Tanzania, clarifying some genetic relationships between areas within their distribution however the data throughout its range remains incomplete (i.e. northern and coastal Tanzania). Because of this, we do not as yet have data informing where geographically the subspecies should be split. Due to this lack of information, and for the purposes of the IUCN Red List, the *C.a. palliatus* subspecies distinction from *C.a. sharpei* follows the original classification by Rahm, 1970, based upon differences of tail pelage (Rahm, 1970; Napier, 1985). The name *C.a.palliatus* thus remains for the population in Kenya and northern Tanzania including the coastal forests while the Tanzanian central and southern population is reclassified as *Colobus angolensis sharpei.*

For the purposes of this assessment, colobus refers only to *C.a. palliatus*.

4b. Distribution

Provide a summary of the current information available about the taxon's geographic range. Include a mention of important sites for this taxon.

The countries of occurrence for *Colobus angolensis palliatus* are Kenya and Tanzania. The distribution in general is the lowland and submontane forests in the Eastern Arc Mountain blocks of East and West Usambara, South Pare, Nguu, Nguru, Uluguru, the coastal forests of Tanzania north of the Rifiji River and the forests of south eastern Kenya.

The total area of occupancy (AOO) is estimated to be 1800 km^2 which represents the extent of forest in the Eastern Arc Mountains and selected areas in the coastal forests (see Table 4). The extent of occurrence (EOO) is approximately 75,000 km^2 (map attached).

As there is on-going exploitation of forest resources even in the protected areas, long-term substantial populations may only persist in Chome National Reserve and the forests of Saadani National Park, Tanzania and Shimba Hills National Reserve, Kenya because of the considerable size of these forests and because protection is better controlled at the national level due to the clear institutional mandate for conservation and consequently greater resources dedicated to these activities.

4c. Population

Provide a summary of the information available for size and trend of the global population. Information about sizes and trends of subpopulations or trends in particular regions of the taxon's range can also be included in this section. If no quantitative information on population sizes or trends is available, please record whether the species is common, abundant, rare, etc. If there really is no information at all about the population, please note this.

Areas of extirpation and possible extirpation of colobus

Coastal forests, south of Rifiji River, Tanzania
References to historic occurrence of colobus between the Rifiji and Ruvuma Rivers in Tanzania exist. Notes by Rodgers (1981) suggest that vegetation clearing and hunting colobus for skins extirpated this subspecies from the area post European settlement. Specific forests where colobus were likely present based on these reports include: Rondo Forest, Mbwemkuru River and Liwurungu Forest, Lindi District and Ngarama and Miandi Forest, Kilwa District.

Other coastal forest patches
One or two groups were sighted in 1993 in Pande Game Reserve, Tanzania though none were seen during a survey in 2003 suggesting that this is a recent extirpation of the subspecies (Doggart, 2003).

Taita Hills, Kenya
Colobus are not found in the Eastern Arc Mountain block of Taita Hills in Kenya. It is unknown whether colobus ever colonised this area.

Mkomazi National Park, Tanzania
In Rodgers 1981, a personal communication with Parker notes that colobus were present in Mkomazi in 1968 though recorded as absent by Harris in 1967 suggesting that colobus densities were very low and extirpation was almost complete.

North Pare, Tanzania
Colobus are absent from North Pare though there was an unconfirmed sighting of a group in Kindoroko Forest Reserve by F. Muturi (as noted in Cordeiro *et al.*, 2005) and skins of the colobus have been observed in use during ceremonial gatherings in that area. But, Rodgers (1981) indicates no records of their presence and this is confirmed in a biodiversity study in 2005, (Doggart *et al*., 2008) suggesting a recent extirpation of the subspecies in this area.

Coastal forests, north of Mombasa, Kenya
A colobus skin collected in 1901 from Kilifi District (held in the British Natural History Museum) and statements by elders clearly indicate colobus were previously present in the forests of the inland hills and ridges north of Mombasa. The last colobus was sighted in this area in 1979 in Araboke Sokoke forest (Anderson *et al.*, 2007). Outcomes from interviews suggest that forest clearance for settlement and hunting for skins and meat were reasons for their extirpation. Settlement patterns and cultural differences permitting the hunting of monkeys among the north coast Mijikenda communities and not in southern communities perhaps contributed to their persistence south of Mombasa (Anderson *et al.*, 2007).

Size of population

Colobus density varies considerably with forest size where small forest patches <1 km^2 are documented to have densities often greater than 100 individuals per square kilometre. Table 1 presents details of the studies where colobus densities are available.

Where sufficient data were available, forests were sorted into size categories and a listing of colobus densities was made for each, and then averaged (Table 2). The average density of forest areas greater than 1km^2 was then used to estimate the colobus population size (Table 4). Notably, this subspecies appears to have a delayed response to habitat loss represented by extreme densities in the very small forest patches.

Specific forest information for presence/absence of colobus can be downloaded at Colobus Conservation's Colobus Data Repository: http://www.colobusconservation.org/index.php/conservation/colobus-data-repository).

Table 1. Studies estimating colobus density.

Forest	Forest type	Country	Group size	Mean group size	Density (individuals/km^{-2})	Reference
Zaraninge	coastal forest	Tanzania			74.0 ± 3.9	Kiwia, 2006
Kisiju	coastal forest	Tanzania			Primary forest: 144 Secondary: 6 Cultivation: 1.6	Banda, 1994
West Usambara	Eastern Arc	Tanzania	5-12	7	4.40-45.18	Preston, 2011
All forests Kwale District	coastal forest	Kenya	1-13	5.63± .15 (not incl. solitary individuals)	4.33-129	Anderson, 2004
Kaya Forests	coastal forest	Kenya	1-9	4.9 ± .44	13.6-670	Swart, 2010
Diani	coastal forest	Kenya	1-12	7.8	46	Colobus Conservation unpubl. data

Table 2. Forest size with corresponding colobus density from studies noted in Table 1.

Forest size (km^2)	Colobus density (km^{-2})	No. forest areas	Average colobus density (km^{-2}) for all age categories
<0.1	670, 543, 293, 272, 206, 200, 195, 194, 192, 183, 149, 139, 129, 98, 79, 78, 67, 58, 26, 20, 13	21	181
0.1 – 0.99	133, 128, 125, 120, 109, 108, 95, 94, 83, 80, 77, 68, 51, 50, 30, 30, 26, 23, 18, 18, 17, 10, 9, 6	24	63
1-5	144, 32, 25, 24, 21, 14, 12, 9, 8, 8, 8, 7, 6, 6, 5, 4, 4	17	20
6-20	74, 46, 18, 10, 9, 9, 9, 8, 8, 6, 5, 4, 3	13	16
21-50	25, 20	2	23
51-100	45, 33	2	39
>100	15	1	15

Three studies provide information on group composition where the percentage of population representing mature individuals could be estimated for the purposes of this assessment. These are presented in Table 3. However, the colobus groups in the Kaya forests of Kenya studied by Swart (2010) are under considerable threat due to very small forest sizes and consequently, the number of mature to immature individuals noted is likely an extreme value and does not reflect typical group composition. Because of this, the percentage of mature individuals of a group calculated as 53.55%, was taken as an average of Anderson (2004) and the unpublished data of Colobus Conservation. Anderson is a more comprehensive survey covering all forests studied by Swart as well as all other forest areas in Kwale District of Kenya.

Table 3. Group composition information for colobus.

Forest block	No. groups	Mean group size	Ratio: non-adult to adult	% mature	Reference
Kwale District: coastal forest, Kenya	287	5.63±0.15	2.24:3.09	54.9	Anderson, 2004
Diani, coastal forest, Kenya	65	7.08	1.1:1.2	52.2	Colobus Conservation unpubl. data
Kaya forests: coastal forest, Kenya	23	4.9	1.21:3.39	69.2	Swart, 2010

The colobus population for each forest block was calculated from the data presented in Tables 2 and 3. A standard *mature individuals km^{-2}* was generated by taking the average density of forest patches >1km^2 and multiplying this by the average percent of adults in a group giving an inferred population density of 12.1 mature colobus/km^{-2}.

22.6 individuals km^{-2} x 53.55% mature individuals = 12.1 mature colobus/km^{-2}

Table 4 estimates the population of colobus in the forest blocks of the Eastern Arc Mountains and the coastal forests of Tanzania and Kenya. The total population is estimated at about 21,000 mature individuals. Tanzania holds the majority of the population whereas only 10% of the population is located in Kenya.

Table 4. Colobus population by forest block as inferred from densities and group composition.

Forest block	Forest area km^2 as of year 2000	Population of mature individuals as of year 2000
Eastern Arc[1]		
Usambara: East	263	3,182
Usambara: West	323	3,908
Pare: South	139	1,682
Nguu	188	2,275
Nguru	297	3,594
Uluguru	279	3,376
Coastal forest: Tanzania	68[2]	823
Coastal forest: Kenya	244[3]	2,142
TOTAL	**1,801 (AOO)**	**20,982**

1. Hall, *et al.,* 2009
2. Burgess and Clarke, 2000
3. Anderson, 2004

Trend of population

The trend of the colobus population was inferred from measurements of deforestation. Rates of colobus reduction and deforestation were considered to have a linear correlation. Though there is a density compression occurring in very small forests, forests with this size range are mostly limited to the Kenyan population and have been counted through direct observation. Forests in Tanzania are generally larger than 1 km^2 so should reflect the average colobus density noted of larger forests.

Table 5. Forest cover decline between 1955 and 2000, with correlated estimates of colobus population loss of mature individuals only. (Eastern Arc: Hall *et al*., 2009; coastal forest Tanzania: Burgess and Clarke, 2000; coastal forest Kenya: Anderson, 2004).

Forest block	Forest cover km^2 (No. mature colobus) 1955	Forest cover km^2 (No. mature colobus) 1975	Forest cover km^2 (No. mature colobus) 1955-1975	Forest cover km^2 (No. mature colobus) 2000	Forest cover km^2 (No. mature colobus) 1975-2000
Eastern Arc[1]					
Usambara: East	425 (5,142)	299 (3,618)	126 (1,524)	263 (3,182)	36(436)
Usambara: West	579 (7,006)	348 (4,211)	231 (2,795)	323 (3,908)	25 (303)
Pare: North	36 (436)	27 (327?)	9 (109?)	26 (0)	1 (327)
Pare: South	195 (2,360)	147 (1,779)	48 (581)	139 (1,682)	8 (97)
Nguu	207 (2,504)	198 (2,396)	9 (108)	188 (2,275)	10 (121)
Nguru	Est. 350[2] (4,235)	Est. 37 (448)	297 (3,594)	16 (194)	313 (3,787)
Uluguru	338 (4,090)	321 (3,884)	17 (206)	279 (3,376)	42 (508)
Subtotal:	*2,130 (25,773)*	*1,653 (20,002)*	*477 (5,771)*	*1,489 (18,017)*	*138 (1,985)*
Coastal forest: Tanzania[3]	?	?	?	68[4] (823)	Likely significant
Coastal forest: Kenya	?	?	?	244[5] (2,142)	Likely significant
TOTAL	**?**	**?**	**?**	**1,801 (20,982)**	**?**

Table 6. Percent loss of mature colobus 1955 – 1975 and 1975 – 2000 and projected 3-generation change.

Forest block	No. mature colobus 1955	No. mature colobus 1975	No. mature colobus 2000	Population reduction 1955-1975	Population reduction 1975 – 2000	Projected 3-generation change
Eastern Arc Mountains	25,773	20,002	18,017	22.4% with likely extirpation from North Pare Mountains	9.9%	Estimated – 30%
Coastal Forest Tanzania	?	?	823	Significant including extirpation from Mkomazi National Park	Significant including extirpation from Pande Game Reserve	Inferred – 30%
Coastal Forest Kenya	?	?	2,142	?	Significant including extirpation north of Mombasa	Inferred – 30%
Overall			20,982			30% reduction

In the Eastern Arc Mountains, an estimated 30% of mature colobus monkeys have been lost since 1955, accounting for approximately 8,000 individuals in the past three generations. In the coastal forests of both Tanzania and Kenya, evidence of local extirpations in these areas suggest that colobus loss is significant.

In the coastal forests of Kenya, it is likely that the colobus populations will be lost in all small (<1km^2) forest fragments due to on-going exploitation of resources of the area. This would account for about 7% of the mature population remaining in Kenya. Loss of these groups would lead to highly fragmented sub-populations in the few remaining larger forests greatly increasing the risk of extirpation.

In the coastal forests of Tanzania, almost all patches with colobus are more than 1 km^2 however forest exploitation continues unabated in these areas.

Due to on-going deforestation throughout the colobus range, declines in the population are expected to continue at the existing rate of at least 30% over the next three generations with heavier impacts in the coastal forests in both Tanzania and Kenya due to proximity of forests to centers of human population, to good transportation infrastructure and to areas with elevational accessibility.

Current population trend (tick (✓) one box only)	Increasing	
	Decreasing	x
	Stable	
	Unknown	

4d. Habitats and Ecology

Provide a summary of the habitats occupied by the taxon, highlighting essential habitats and ecological requirements. It is not necessary to know the details of behavioural traits, etc. unless these are relevant to the taxon's Red List status (e.g., it has a particular life cycle, growth pattern or behaviour that makes it vulnerable to specific threats).

Colobus angolensis palliatus is found in lowland and submontane forest of the Eastern Arc Mountains and the Northern Zanzibar-Inhambane floristic region (White, 1976) of the coastal forests of Kenya and Tanzania. Within these areas, colobus have been observed in primary, semi-degraded, degraded forest, scrubland, croplands, mangrove and suburban areas.

These monkeys are a large bodied (adult females: av. 7.4 kg, range 5-10kg., N=35; adult males: av. 9.0 range 7-12kg. N=3: Colobus Conservation, unpubl. data) arboreal primate living in small groups generally with four to seven individuals with one to three adult males, adult females and immatures (Kenyan data, Anderson, 2004 and Colobus Conservation, unpubl. data). Like other colobines, *C.a. palliatus* is mainly folivorous. Cellulose digestion requires significant periods of resting during the day. This has been documented in activity budget studies in two populations, Shimoni, Kenya (Wijtten *et al.*, 2012) and East Sagara, West Usambaras (Dunham, 2011; 2013) and indicates that a significant proportion of the day is spent resting (62% and 68.5% respectively).

C.a. palliatus is a forest species and accordingly, canopy cover has been found to be a significant predictor of likelihood of presence in the Kenyan population (Anderson, 2004) and presumably also for the subspecies as a whole. However, this subspecies has demonstrated dietary flexibility eating low-quality foods and exotic species when required enabling niche occupation in heavily degraded forest and utilizing food resources in non-forest vegetation types.

Studies in Diani. Kenya comparing degraded and semi-intact forest indicate that home ranges are similar between the two forest types (about 5 ha) though overall, home ranges of groups living in degraded forest were slightly smaller and had more overlap with other groups than those in the more intact patches (O'Dwyer, 2011). This study also showed that in recently degraded habitat there is a higher density of colobus compared to that found in more pristine forest areas. This pattern was also documented by Anderson (2004) in forest patches of the Kenyan coastal forests. These data suggest that colobus groups become increasingly crowded in forest patches before extirpation or the threat to the forest is reduced or discontinued.

Interestingly, neither the density nor diversity of all trees, colobus food trees or major food trees predicted persistence of colobus in forest patches in Kenya (Anderson, 2004). Colobus utilization of exotic species for food when native species are removed, coupled with small home ranges enable the colobus to persist even in very small forest patches (e.g. 1 ha, Jego North, Kenya, Anderson 2004 unpub. data).

As has been noted in the Kenyan population, colobus are able to utilise the habitat between forest fragments for food and for moving between food patches (Anderson, 2004). This may be one of the more important aspects of their ecology in terms of rapid recolonization of forest patches when a threat is removed, or continual colonisation from a

population sink in areas that are continually under threat. This recolonisation effect is likely to occur more effectively when the distance between forest fragments is short or at greater distances when remaining habitat structure is similar to the original forest type. Indeed, colobus are known to cross open country terrestrially (*pers. obs*.) which allows travel through vegetation types such as scrubland and agricultural land with annual crops. Colobus have been seen up to 4.2 km from forest patches (Anderson, 2004).

For conservation planning, villages should be considered reasonable barriers for recolonisation in or out of an area because of the possibility of harassment by people (*pers. obs*). This issue becomes increasingly more important when villages effectively surround forest patches. Additionally, forest fragments far from its nearest neighbor without forest-similar habitat structure between them, should be considered to have reduced genetic exchange between colobus groups.

Elevation in m above sea level	**Upper limit:**	2000	**Depth in m below sea level**	**Upper limit:**	
	Lower limit:	0		**Lower limit:**	

4e. Use and Trade

Provide a summary of any utilization of and/or trade in the taxon (at local, national and international levels). Please remember that the taxon may be utilized or be the focus of local, national or international trade, but if these activities are carried out sustainably they may not actually be a threat to the species; it is therefore useful to record whether this utilization/trade is a likely threat to the global population; this information helps to identify species that are important for human livelihoods, but which may be under threat from factors other than utilization or trade.

If unknown or there is no trade in the taxon, please state this.

Hunting has been identified as a possible contributor to the historic extirpation of colobus north of Mombasa, Kenya and between the Rifiji and Ruvuma Rivers, Tanzania, both occurring at significant rates in the early 1900s.

Presently, hunting of colobus has been noted to occur on a subsistence and commercial basis in the Uluguru Mountains (specifically Mkangala, Uluguru South, Ngambaula and Mangala: Frontier-Tanzania, 2005) and for subsistence in the East Usambara Mountains (Kwamarimba/Longuza area: Cunneyworth, 1996; Bombo East I: Frontier Tanzania, 2002) and West Usambara Mountains (Preston, 2011).

For the Uluguru Mountains, it has been suggested that religious differences affect the hunting practices of the people in this area. Communities living adjacent to Uluguru North are predominantly Muslim and are prohibited to hunt whereas communities next to Uluguru South are predominantly Christian and do hunt. As noted in *Section 4d* of this paper, the colobus spend approximately 65% of their day resting for digestion. This low activity level coupled with a small home range would make them easily hunted.

Colobus are not crop raiders however misconceptions about colobus behavior and diet sometimes leads to them being killed for reasons other than for meat or skins (*pers. obs.*).

Overall, colobus are not hunted extensively or intensely therefore currently hunting does not appear to be a major threat to the subspecies.

4f. Threats

Provide a summary of the major threats affecting, or likely to affect, the taxon. Try to indicate whether these threats are historic threats that caused past population declines, or current threats affecting the population now, and whether they are likely to affect the population in future.

Please record as much detail about the threats as possible, including the main cause of the threat (the driver), the threat itself, the scale of the threat (e.g., is most of the global population affected, or is the threat affecting only small parts of the population), and the stress this threat places on the taxon (e.g., habitat degradation, loss of breeding sites, loss of prey base, direct mortality, etc.).

Many of the forests where colobus occur have some legal status limiting access to resources however few forests are well protected on the ground (see specific forest threats in the Colobus Conservation, Colobus Data Repository: http://www.colobusconservation.org/index.php/conservation/colobus-data-repository). For example, in south eastern Kenya, there was no significant difference in forest loss and tree damage between those patches that were gazetted and those that were un-gazetted (Anderson, 2004).

The threats identified to the subspecies are those that are related to habitat degradation and habitat loss rather than threats related to the colobus directly. Specifically, unsustainable extraction of poles and timber, agricultural encroachment, charcoal production and fire are noted as major threats to the habitat throughout the colobus range.

In the Tanzanian coastal forests and presumably the other forests within the colobus range, timber extraction has been and continues to increase for the national and overseas markets (Ahrends, 2005; Preston, 2011). As many of the forests have some level of protection, this industry is largely illegal. Though a nation-wide ban on round wood export effective July 2004 appears to have reduced some of the extraction, illegal logging continues (EAWLS, 2012). In addition, with increased transport infrastructure, accessing and removing forest products has become more cost effective thus putting previously remote forests under greater extraction pressure (Ahrends, 2005). As commercial timber is exhausted, pressure from charcoal production increases, utilising indiscriminately remaining tree species of all sizes for supplying the growing urban populations (Ahrends, 2005). For example, Pugu Hills has been almost entirely deforested for the market in Dar es Salaam (Ahrends, 2005; The Arc Journal, No. 18, 2005).

Accidental fire damage from land clearing activities and intentional burning for developing grazing land also occurs throughout the colobus range and was noted frequently in biodiversity survey reports as the main cause of lack of forest regeneration and consequently conversion of forest patches to grassland or scrubland (i.e. Clarke and Stubblefield, 1995; Doody *et al*., 2001; Beharrell *et al*., 2002; Bracebridge, 2006).

Throughout the colobus range, the main threats are similar and are based on poor and rapidly growing human populations adjacent to the forest areas. This, coupled with on-going depletion of forest products outside the protected area system, contributes to the land conflict. Because habitat loss in all parts of the range is likely to continue, colobus persistence in the smaller forest patches is likely not sustainable in the near future.

In summary, the causes of degradation and loss of forest where colobus persist include:

1. Weak law enforcement leading to unsustainable exploitation of all forest products;
2. Weak law enforcement leading to agricultural encroachment;
3. Increasing pole, timber and charcoal demand locally, nationally and internationally;
4. Increasing access to forests from better transportation infrastructure;
5. No fire breaks or fire break maintenance around forest areas.

4g. Conservation Actions

Provide a summary of the conservation actions currently in place, and **realistic** actions needed to mitigate the major threats to the taxon (if any). This section should not be used to record a full “wish list” of conservation actions for the species; please try to restrict recommendations to those actions that could realistically be implemented and have a good chance of improving the status of the taxon.

The range of *C.a. palliatus* is considered to be one of the eleven “hyperhot” priorities for conservation investment by Conservation International (Brooks *et al*., 2002). Many of the forests within the colobus' range are also recognised as Important and Endemic Bird Areas (ICBP), Centres of Plant Diversity (WWF and IUCN) and Globally Important Ecoregions (WWF). Because of this, substantial funding has been put into conservation activities of the Eastern Arc Mountains over the past two decades by overseas governments with local and national government partnerships. The coastal forests of Kenya and Tanzania have received some funds within this mandate but to a lesser degree.

The only conservation actions specifically being carried out for the subspecies is by Colobus Conservation which works to minimize human-primate conflicts in the suburban area of Diani Beach, Kenya.

Re-submission of the application and subsequent nomination of the Eastern Arc Mountains as a World Heritage Site would provide higher levels of protection for part of the mountain range, approximately 890 km^2 of colobus forest habitat where colobus currently exist (Ministry of Natural Resources and Tourism, Tanzania, 2010).

5. DATA FOR RED LIST CRITERIA

Record the available data for population sizes, trends, decline rates, ranges, etc. to compare against the IUCN Red List Criteria thresholds.

For full IUCN definitions of “population size”, “subpopulation”, “mature individuals”, “generation length”, “reduction”, “continuing decline”, “extreme fluctuation”, “severely fragmented”, “extent of occurrence”, “area of occupancy”, “location”, and “quantitative analysis”, please refer to the current version of the *Guidelines for Using the IUCN Red List Categories and Criteria*.

5a. Data for criterion A: rate of population reduction

Generation length (please state the unit used).	12 years	**Time period used for criterion A** (tick (✓) one box only)	10 years		
			3 generations	x	Time period: 36 years

Criteria A1 and A2: **% population size reduction over the last 10 yrs or 3 generations:**	30%	**Data quality:**	Observed	x			
			Estimated	x			
			Inferred	x			
			Suspected	x			
Are the causes of this reduction understood? (tick (✓) one box only)	Yes	x	**Have the causes of the reduction now ceased?** (tick (✓) one box only)	Yes		**Is the reduction reversible?** i.e., is the population now showing signs of recovery? (tick (✓) one box only)	Yes
	No			No	x		No
	Unknown			Unknown			Unknown x

Past population reduction rate based on (select any combination):	Direct observation	x
	Index of abundance	
	Decline in area of occupancy, extent of occurrence, and/or habitat quality	x
	Actual or potential levels of exploitation	
	Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites	

Criterion A3: **% population size reduction over the next 10 yrs or 3 generations** (max. 100 years in future):	30%	**Data quality:**	Projected	x
			Suspected	

Future population reduction rate based on (select any combination):	Index of abundance	
	Decline in area of occupancy, extent of occurrence, and/or habitat quality	x
	Actual or potential levels of exploitation	
	Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites	

Criterion A4: **% population size reduction over the longer time period of 10 yrs or 3 generations, where some time falls in the past and some is projected in to the future** (max. 100 yrs in future):	**30%**	**Data quality:**	Observed	
			Estimated	
			Inferred	
			Projected	x
			Suspected	

Population reduction rate based on (select any combination):	Direct observation	x
	Index of abundance	
	Decline in area of occupancy, extent of occurrence, and/or habitat quality	x
	Actual or potential levels of exploitation	
	Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites	

5b. Data for criterion B: restricted range

Criterion B1: Extent of occurrence (EOO) in km²:	75,000	**Criterion B2: Area of occupancy (AOO)** in km²:	1,800		
Is the population severely fragmented? (tick (✓) one box only)	Yes:		If yes, justify this statement in the population text box (refer to habitat fragmentation AND the dispersal abilities of the taxon).	**Number of locations:**	
	No:	x			
	Unknown:				

Extent of occurrence	**Continuing decline**	x	Observed:	
			Inferred:	
			Projected:	x
	Extreme fluctuation			
Area of occupancy	**Continuing decline**	x	Observed:	
			Inferred:	
			Projected:	x
	Extreme fluctuation			
Area, extent and/or quality of habitat	**Continuing decline**	x	Observed:	
			Inferred:	
			Projected:	x
Number of locations or subpopulations	**Continuing decline**	x	Observed:	
			Inferred:	
			Projected:	x
	Extreme fluctuation			
Number of mature individuals	**Continuing decline**	x	Observed:	
			Inferred:	
			Projected:	x
	Extreme fluctuation			

5c. Data for criterion C: small population size and continuing decline

Population size Number of mature individuals in the global population:	20,982

Is there continuing decline in the population? (tick one box only)	Yes	**x**	**Rate of continuing decline known?** (tick one box only)	Yes	**x**
	No			No	
	Unknown			Unknown	

Estimated continuing decline % within 3 years or 1 generation (whichever is the longer time period; max. 100 years in future)**:**	**10%**
Estimated continuing decline % within 5 years or 2 generation (whichever is the longer time period; max. 100 years in future)**:**	**20%**
Estimated continuing decline % within 10 years or 3 generation (whichever is the longer time period; max. 100 years in future)**:**	**30%**

Number of mature individuals in largest subpopulation:	3,900	**% of mature individuals in largest subpopulation**	18.6%

Extreme fluctuations in number of mature individuals:	Yes	
	No	x
	Unknown	

5d. Data for criterion D: small population size or restricted range

Population size Number of mature individuals in the global population:	20,982

Area of occupancy (AOO) in km²:	1,800	**Number of locations**:	8 main areas	**Is there a plausible threat that could rapidly push the taxon towards extinction?**	Yes	
					No	*x*
					Unknown	

5e. Data for criterion E: quantitative analysis

Has a quantitative analysis predicting probability of extinction been carried out? (e.g. Population Viability Analysis)	Yes	
	No	x
	Unknown	
Probability (%) of extinction within the next 10 years or 3 generations (use the longer time period; max. 100 years in future)		
Probability (%) of extinction within the next 20 years or 5 generations (use the longer time period; max. 100 years in future)		
Probability (%) of extinction within the next 100 years		

6. RED LIST ASSESSMENT

Assess the taxon using the information and data recorded in section 4 and 5, and following the *IUCN Red List Categories and Criteria: version 3.1.* and current version of the *Guidelines for Using the IUCN Red List Categories and Criteria* for guidance on applying the IUCN criteria.

6a. Red List Category & Criteria

Tick (✓) one of the following Red List categories, For taxa qualifying for a threatened category (CR, EN or VU), record all criteria and subcriteria met. For the NT category, record all criteria and subcriteria nearly met:

	Extinct (EX)	Date last seen in wild (day/month/year)	
	Extinct in the Wild (EW)	Date last seen in wild (day/month/year)	
	Critically Endangered (CR)	Criteria met for CR	
	Endangered (EN)	Criteria met for EN	
X	**Vulnerable (VU)**	Criteria met for VU	A2(c), A3(c)
	Near Threatened (NT)	Criteria nearly met for NT	
	Least Concern (LC)		
	Data Deficient (DD)		
	Not Evaluated (NE)		

Is this taxon Possibly Extinct? (applies to CR taxa only)

Yes	
No	
Unknown	

6b. Rationale for the assessment

Provide a summary of the reasons why the taxon qualifies for the category and criteria recorded in section 6a. Include any population or range information used, inferences, assumptions, etc. For NT specify what criteria were nearly met and for DD state what little information is known. Please refer to the *IUCN Red List Categories and Criteria: version 3.1.* and the current version of the *Guidelines for Using the IUCN Red List Categories and Criteria* for guidance on definitions of terms and applying the IUCN criteria).

Review of reports and biodiversity surveys indicates that *Colobus angolensis palliatus* should be considered vulnerable under criteria A2(c) due to its documented past population reduction throughout its entire range. Due to on-going deforestation in all forest blocks, it is suggested that the rate of decline in the population will remain at 30% over the next three generations fulfilling the requirements for criteria A2(c) and A3(c).

Notes of consideration include:

- Extirpation in a number of areas has already been documented in both Kenya and Tanzania;
- Many of the reports and biodiversity surveys indicating presence/absence of colobus are at least ten years old and many almost twenty years old, therefore this information may represent an over-estimation of the area of occupancy due to on-going deforestation in these areas;
- High colobus density in the smallest forest patches (<1km^2) suggests that in many areas colobus have not recovered from past habitat threats and that these patches are likely not sustainable over the next three generations;
- This assessment has assumed a standard colobus density in all forest blocks however it has been noted from the literature that in the Nguu and Nguru Mountains, colobus are rare. These areas therefore are likely under greater risk of extirpation over the next three generations;
- As the area of occupancy is about 1800 km^2, risks of increasing fragmentation due to local extirpation or isolation in forest patches is a significant risk to genetic flow between sub-populations;
- Coastal forests in both Tanzania and Kenya are under very high risk of local extirpation however though most of the forest areas have some level of protection, law enforcement controlling deforestation is limited.

Assessment Date:

DD	MM	YYYY
18	07	2013

Assessors' Names:

Given Name(s)	Family Name	Email Address	Institution
Pamela May Karen	Cunneyworth	pam@colobusconservation.org	Colobus Conservation, Diani Beach, Kenya
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6c. Changes in Red List status

Check the IUCN Red List web site (www.iucnredlist.org) to find out whether the taxon has previously been assessed.

Has this taxon been assessed for a previous IUCN Red List? Yes: x; No: ; Unknown:

If yes, what was the previous assessment? Least Concern

If yes, has the taxon changed category since its last assessment? Yes: x; No:

If no, have the criteria changed? Yes: ; No:

Reason for change in category:

Genuine change	Recent change		**Non-genuine change**	New/better information available: x
	Change since first assessment			Taxonomic change: x
				Incorrect application of criteria previously:
				Criteria thresholds changed since previous assessment:

7. LITERATURE REFERENCES

Provide a list of all published and unpublished reference sources used for the information recorded above. Please provide full references, and try to avoid abbreviations (e.g., write *Conservation Biology* rather than *Cons. Biol.*).

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