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Report on species/country combinations selected for review by the Animals Committee following CoP17

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Executive Summary

This report provides accounts for taxa that were selected in the CITES Review of Significant Trade (RST) process following CoP17, at AC29. It aims to assist the Animals Committee in categorising species based on the effects of international trade on selected species/country combinations and to highlight problems concerning the implementation of Article IV.

The UN Environment World Conservation Monitoring Centre (UNEP-WCMC) was asked by the CITES Secretariat to compile reviews for 19 animal species/country combinations that were selected within the RST following CoP17. All range States were consulted by the CITES Secretariat and asked to provide information on the scientific basis by which it had been established that exports were non-detrimental and compliant with Article IV, including details of the population status and threats to the relevant species within their country, as well as trade information, legal protection, and detailed of management and monitoring actions.

Species-country combinations were divided into three provisional categorisations (*'action is needed'*, *'unknown status'* and *'less concern'*), in accordance with paragraph 1e of Resolution Conf. 12.8 (Rev. CoP17) for review by the Animals Committee.

For the 19 species-country combinations included in the RST following CoP17:

- 13 were provisionally categorised as **'Action is needed'** on the basis that available information suggests that the provisions of Article IV, paragraph 2 (a), 3 or 6 (a), are not being implemented;
- 6 were provisionally categorised as **'Less concern'** on the basis that wild-sourced trade (codes W, R, U and source unreported) was not anticipated.

No species were categorised as 'Unknown status'. Full details of the categorisations for the 19 species/country combinations under review are provided in Table 1 (p. 3).

The selection of species at AC29 was the first time that species were selected within the RST process since the amendment of Resolution 12.8 (Rev. CoP17). Accordingly, "species-country combinations" (rather than a species from all range States) were selected for review by AC29 based on the trade reported by Parties, either by the exporter, or the importing States; the selection outputs in AC29 Doc. 13.3 A2 (Rev.1) listed the higher of the two trade volumes. However, on the basis of reported trade in wild, ranched and unknown sources, or trade reported without a source, several Parties were selected in the process that are non-range States for the species concerned. This is likely due to mis-reporting of trade, for example as direct exports rather than re-exports. These Parties were Mali, for *Poicephalus gulielmi*, and Benin, Ghana and Togo for *Uromastyx geyri*.

To avoid this situation arising during the RST selection process following CoP18, it is suggested that in any output of trade data, range States are distinguished in bold from other exporters that are non-range States.

Table 1: Recommended categorisations for species/country combinations that were selected within the Review of Significant Trade following CoP17 based on the effects of international trade and problems concerning the implementation of Article IV.

Species	Range State	IUCN	Summary	Recommendation
Gruiformes				
Gruidae				
<i>Balearica pavonina</i> (West African crowned crane)	Selection		Selected in the RST based on high volume trade 2011-2015 for a globally threatened species.	Action is needed
	Mali	VU	Assessed as globally Vulnerable on the basis of rapid population decline as a result of habitat loss and trapping for domestication or illegal international trade. In Mali, reported in the Inner Niger Delta, the Bafing Valley in the southwest, and the mid Niger river basin. The population in Mali was estimated at only 100 birds in 2004, down from an estimated 7000-8000 birds in 1985, with no birds recorded during a survey in 2014. Annual reports were submitted by Mali 2007-2014, but 2015-2016 have not yet been received. Direct exports 2007-2016 consisted of 177 live wild-sourced birds, as reported by Mali, with lower trade levels according to importers (120 birds over the same period, but with 90 in 2015-2016). Although the species is reported to be nationally protected and exports are prohibited, trade from Mali appears to have continued. Mali did not respond to the consultation relating to the RST. One expert suggested that recent exports were not wild-sourced birds originating from Mali, given the population size in the country. The basis for non-detriment findings for export of wild-sourced specimens of this species has not been provided, and any international trade is likely to impact the species survival in the country; therefore categorised as Action is needed.	
Psittaciformes				
Psittacidae				
<i>Amazona farinosa</i> (Mealy Parrot)	Selection		Selected in the RST based on high volume trade 2011-2015 for a globally threatened species.	Action is needed
	Global status	NT	Globally Near Threatened, with a widespread distribution. Global population size unknown, but declining moderately rapidly.	
	Guyana		Occurs in lowland forest areas across the country. Large populations may remain in undisturbed habitat. Considered reasonably common in the interior of the country by one author, but no information on population size or trends is available. Habitat loss is not a threat in the country, but impacts of trade are unknown. Annual reports were submitted by Guyana for all years 2007-2016. Exports 2007-2016 were predominantly in live, wild-sourced birds (3011 in total as reported by Guyana, and 1951 as reported by importers), and were considerably lower than the annual quota of 1100. Guyana responded to the consultation relating to the RST. Harvests are managed with closed seasons, but no management plan for the species exists, and surveys were reported to be underway to produce a national population estimate. Until such time as the results of the surveys are known, the basis for non-detriment findings for export of wild-sourced specimens and the establishment of the export quota does not appear robust, and the impact of trade on this species with unknown status in the country is unclear; therefore categorised as Action is needed.	

Species	Range State	IUCN	Summary	Recommendation
<i>Amazona farinosa</i> (Mealy Parrot). (cont.)	Suriname		Occurs in lowland rainforest and savannah in the country. Reported as common in the northern savannah and lowland forests, and reasonably common in the interior of the country but rare in the deep south savannah. Current population size unknown. No information on population trends, but habitat loss is not a threat in the country. Annual reports were submitted by Suriname for all years 2007-2015, but not yet for 2016. Exports 2007-2016 were predominantly in live, wild-sourced birds (1503 as reported by Suriname for commercial and breeding purposes, and 817 as reported by importers for the same purposes), and were within the quota of 450. No information on management available. The Management Authority of Suriname responded to the consultation relating to the RST noting the need for research studies, but reported that at present there was no functioning Scientific Authority in the country. The basis for non-detriment findings for export of wild-sourced specimens and the establishment of the export quota does not appear robust, and the impact of trade on this species with unknown status in the country is unclear; therefore categorised as Action is needed.	Action is needed
<i>Ara ararauna</i> (Blue-and-yellow Macaw)	Selection		Selected in the RST based on high volume trade 2011-2015.	
	Global status	LC	Globally Least Concern, with a widespread distribution. Global population size unknown, but declining.	
	Guyana		Widespread in Guyana, occurring in lowland forest, palm and riparian areas. One population in central Guyana reported as "healthy", and considered reasonably common in the interior by one author, but no information on population sizes or trend available. Annual reports were submitted by Guyana for all years 2007-2016. Exports 2007-2016 were predominantly live wild-sourced birds for commercial purposes (6512 as reported by Guyana, and 4759 as reported by importers). The quota of 792 appeared to be exceeded in 2016, according to importers. Guyana responded to the consultation relating to RST. Harvests are managed with closed seasons, but no management plan for the species exists, and surveys were reported to be underway to produce a national population estimate. Until such time that the results of the surveys are known, the basis for non-detriment findings for export of wild-sourced specimens and the establishment of the export quota does not appear robust, and the impact of trade on this species with unknown status in the country is unclear, therefore categorised as Action is needed	Action is needed
	Suriname		Widespread in Suriname, occurring in lowland forest areas across the country. Current population size unknown, but described by birders to be common in the lowland forests, reasonably common in the interior, and rare in savannah and rainforests above 400m. Population considered to have declined by one expert. Habitat loss is not a threat in the country. Annual reports were submitted by Suriname for all years 2007-2015, but not yet for 2016. Exports 2007-2016 were predominantly in live, wild-sourced birds for commercial purposes (4155 as reported by Suriname and 3384 as reported by importers); the quota of 650 appeared to be exceeded in 2014. No information on management available. The Management Authority of Suriname responded to the consultation relating to the RST noting the need for research studies, but reported that at present there was no functioning Scientific Authority in the country. The basis for non-detriment findings for export of wild-sourced specimens and the establishment of the export quota does not appear robust, and the impact of trade on this species with unknown status in the country is unclear; therefore categorised as Action is needed.	Action is needed
<i>Ara chloropterus</i> (Red-and-green Macaw)	Selection		Selected in the RST based on high volume trade 2011-2015.	
	Global status	LC	Globally Least Concern, with a widespread distribution. Global population size unknown, but declining.	

Species	Range State	IUCN	Summary	Recommendation
<i>Ara chloropterus</i> (Red-and-green Macaw) (cont.)	Guyana		Widespread in Guyana, occurring in lowland forest areas across the country. One population in central Guyana reported as “healthy”, and considered reasonably common in the interior by one author, but no information on population sizes or trend available. Habitat loss is not a threat in the country, but the impacts of trade are unknown. Annual reports were submitted by Guyana for all years 2007-2016. Exports 2007-2016 were predominantly live wild-sourced birds for commercial purposes (8335 in total as reported by Guyana, and 6147 reported by importers), and were within the annual quota of 990. Guyana responded to the consultation relating to RST. Harvests are managed with closed seasons, but no management plan for the species exists, and surveys were reported to be underway to produce a national population estimate. Until such time as results of the surveys are known, the basis for non-detriment findings for export of wild-sourced specimens and the establishment of the export quota does not appear robust, and the impact of trade on this species with unknown status in the country is unclear; therefore categorised as Action is needed.	Action is needed
	Suriname		Widespread in Suriname, occurring in lowland forest areas across the country. Current population size unknown, but described by birders to be common in the lowland forests, reasonably common in the interior, and rare in the coastal zone, and savannah. Population considered to have declined according to traders, and one expert. Habitat loss is not a threat in the country. Annual reports were submitted by Suriname for all years 2007-2015, but not yet for 2016. Exports 2007-2016 were predominantly in live, wild-sourced birds for commercial purposes (1112 as reported by Suriname and 777 as reported by importers), and were within the annual quota of 250. No information on management available. The Management Authority of Suriname responded to the consultation relating to RST noting the need for research studies, but reported that at present there was no functioning Scientific Authority in the country. The basis for non-detriment findings for export of wild-sourced specimens and the establishment of the export quota does not appear robust, and the impact of trade on this species with unknown status in the country is unclear; therefore categorised as Action is needed.	Action is needed
<i>Poicephalus gullelmi</i> (Red-fronted Parrot)	Selection		Selected in the RST based on high volume trade 2011-2015, and a sharp increase in trade from Mali in 2015.	
	Global status	LC	Assessed as Least Concern globally. Population size unknown, but suspected to be declining.	
	Democratic Republic of the Congo		Occurs across the north of the country, in the extreme southwest and as an isolated population in central DRC. Population size and status in the country is unknown; one preliminary opinion considered the species to be “common but local” in DRC, but stressed that further assessment was needed. Overexploitation was considered a threat to wildlife in DRC, and in 2001 levels of hunting of the species were noted to be high. Annual export quotas of 3000 live birds published 2007-2017, but reduced to 2500 in 2018. Trade was within quota 2007-2016. Annual reports were submitted by DRC for all years 2007-2016. Trade 2007-2018 comprised live, wild-sourced birds for commercial purposes (6455 as reported by DRC). Trade in live wild-sourced birds increased by more than eight times between 2015 and 2016, with 2850 reported exported in 2016. The species is listed as ‘partially protected’ in national legislation and hunting requires a permit. DRC responded to the consultation relating to the RST. It was noted that there was a lack of information available on this species, and the impact of trade could not be determined. Whilst the need for field studies to inform a species management plan was recognised, DRC noted a lack of resources and capacity within the country for national biodiversity management. The basis for non-detriment findings for export of increasing numbers of wild-sourced specimens of this species, which has unknown status in DRC, has not been provided, and the impact of trade is unclear, therefore categorised as Action is needed.	Action is needed
Mali		Not a range State for <i>P. gullelmi</i> , Discrepancies in annual reports have led to the species-country being selected in the RST. Exports of 2190 live wild-sourced birds were reported by Mali 2007-2016, with importers reporting 4810. Annual reports were submitted by Mali in all years 2007-2014, but not yet for 2015 and 2016. Mali did not respond to the consultation relating to the RST. However, on the basis that the species does not appear to occur in the country, categorised as Less concern.	Less concern	

Species	Range State	IUCN	Summary	Recommendation
Sauria				
Agamidae				
<i>Uromastyx geyri</i> (Saharan Spiny-tailed Lizard)	Selection		Selected in the RST based on high volume trade 2011-2015, and a sharp increase in trade from Togo in 2015.	
	Global status	-	Not assessed by the IUCN, but considered Near Threatened in a draft assessment. Population sizes unknown, but likely to be declining, possibly severely. Considered rare by one study.	
	Benin		Not a range State, as confirmed by Benin in response to the consultation (see distribution map on page 61). Discrepancies in annual reports have led to the species-country being selected in the RST. Exports of live, wild (80) and ranched (100) specimens were reported by Benin 2007-2016, with importers reporting higher levels of direct trade from Benin (908 wild-sourced and 215 ranched). Benin submitted all annual reports for 2007-2016. However, on the basis that the species does not occur in the country, categorised as Less concern.	Less concern
	Ghana		Not a range State, as confirmed by Ghana in response to the consultation (see distribution map on page 61). Discrepancies in annual reports have led to the species-country being selected in the RST. Exports of 350 live, wild-sourced specimens were reported by Ghana 2007-2016, with importers reporting higher levels of direct trade from Ghana (2956 wild-sourced and 500 ranched). Ghana submitted all annual reports for 2007-2016, except for 2016. However, on the basis that the species does not occur in the country, categorised as Less concern.	Less concern
	Mali		Restricted range in north-western Mali, and considered rare in the country. Threatened by over-collection for the national and international pet trade, domestic food and traditional medicinal products. Annual reports were submitted by Mali for all years 2007-2014, but not yet for 2015-2016. Trade 2007-2016 mainly comprised live, wild-sourced individuals (>38 000 specimens as reported by Mali and importers). Indirect trade from Mali was a third higher than direct exports (mainly live, wild-sourced individuals). No information on management available; Mali did not respond to the consultation relating to the RST. The basis for non-detriment findings for export of wild-sourced specimens for this apparently uncommon and declining species has not been provided, and international trade may be impacting the species; therefore categorised as Action is needed.	Action is needed
Togo		Not a range State, as confirmed by Togo in response to the consultation (see distribution map on page 61). Discrepancies in annual reports have led to the species-country being selected in the RST. Exports of 200 live, wild-sourced specimens were reported by Togo 2007-2016, with importers reporting higher levels of direct trade from Togo (1113 wild-sourced and 200 ranched). Togo submitted all annual reports for 2007-2016, except for 2016. However, on the basis that the species does not occur in the country, categorised as Less concern.	Less concern	
Chamaeleonidae				
<i>Brookesia minima</i> (Minute Leaf Chameleon)	Selection		Selected under the "Endangered species" criterion, as well as showing a sharp increase in trade from Madagascar in 2015.	Less concern
	Madagascar	EN	Classified as Endangered in the IUCN Red List, with a decreasing population trend. Endemic to north-west Madagascar, with a relatively small range, and occurring in fragmented habitat. Described as "not common" by one study. The primary threat is habitat loss driven by slash-and-burn agriculture and logging. Madagascar published an annual export quota of 150 live individuals 2014-2016. Trade 2007-2016 mainly in live, wild-sourced individuals (151 as reported by Madagascar and 56 by importers) and was well within quota. Madagascar submitted all annual reports for 2007-2016. A zero quota was published in 2017 due to a change in the species' IUCN Red List status. Madagascar responded to the consultation in 2017, indicating that a zero quota would be proposed for 2018. A quota of 150 live individuals was subsequently published erroneously for 2018, then corrected to zero following consultation with the country. On the basis of no anticipated legal trade in wild-sourced specimens due to the zero quota, categorised as Less concern. However, it is recommended that the scientific basis for any future (non-zero) quota is referred to the Animals Committee prior to being published on the CITES website, as current information indicates that any international trade would impact the species.	

Species	Range State	IUCN	Summary	Recommendation
<i>Brookesia peyrierasi</i> (Antongil Leaf Chameleon)	Selection		Selected under the “Endangered species” criterion, as well as showing a sharp increase in trade from Madagascar in 2015	Less concern
	Madagascar	EN	Classified as Endangered in the IUCN Red List, with a decreasing population trend and a fragmented population. Endemic to north-east Madagascar, with a relatively small range (3,774 km ²). Recorded in high densities in one location (Nosy Mangabe). Primary threats are habitat loss and fragmentation, driven by logging and mining. Madagascar submitted all annual reports for 2007-2016. Trade since 2013 (when it split from <i>B. minima</i>) was mainly in live, wild-sourced individuals (118 as reported by Madagascar, but with none reported by importers). Madagascar published an annual export quota of 150 live individuals for 2014- 2016, which increased to 250 in 2017. Madagascar responded to the consultation in 2017, indicating that a zero quota would be proposed for 2018. A quota of 150 live individuals was subsequently published erroneously for 2018, then corrected to zero following consultation with the country. On the basis of no anticipated legal trade in wild-sourced specimens due to the zero quota, categorised as Less concern. However it is recommended that the scientific basis for any future (non-zero) quota is referred to the Animals Committee prior to being published on the CITES website, as current information indicates that any international trade would impact the species.	
Testudines				
Geoemydidae				
<i>Cuora amboinensis</i> (South Asian Box Turtle)	Selection		Selected in the RST based on high volume trade 2011-2015 for a globally threatened species.	Action is needed
	Indonesia	VU	Widespread species. Assessed as globally Vulnerable, but preliminary results from a workshop in March 2018 indicated that the species qualifies for Endangered, based on a suspected overall population decline between 50 and 80 per cent across its wide range. Global population size unknown. Widespread in Indonesia, occurring in Sumatra, Kalimantan, Java, the Lesser Sundas, Sulawesi and the Moluccas. Population size in Indonesia unknown but considered vulnerable. Surveys conducted in 2006 indicated population declines and possible local extinctions around trade centres. Collection for international trade for consumption and traditional Chinese medicine was considered the main threat to the species and high levels of illegal trade were reported to represent a major threat to the species survival. Annual reports were submitted by Indonesia for all years 2007-2016. Trade 2007-2016 consisted of high levels of live, wild-sourced individuals (174 290 as reported by Indonesia). Annual export quotas in place for 18 000 live individuals 2007-2017 (except for a quota of 5490 live and 12 510 skins and skin products in 2016). Quota appears to have been exceeded in 2016, according to Indonesia. Indonesia responded to the consultation relating to the RST. The species is not protected by national legislation, but was reported to be managed by harvest and export quotas. The basis for non-detriment findings for export of wild-sourced specimens does not appear robust, and international trade appears to be impacting the species; therefore categorised as Action is needed.	

Species	Range State	IUCN	Summary	Recommendation
Anguilliformes				
Anguillidae				
<i>Anguilla anguilla</i> (European Eel)	Selection		Selected in the RST under the “Endangered species” criterion, as well as meeting the criteria for ‘high volume trade’ 2011-2015 for a globally threatened species, and showing a sharp increase in trade in 2015, both globally and for Morocco and Tunisia.	
	Global status	CR	The species is considered to be a single spawning stock. It is Critically Endangered according to the IUCN, with declines in recruitment and population size as well as escapement of the species from rivers to the spawning site. ICES advice indicated that the species is outside safe biological limits. There are a range of threats to the global stock, including overexploitation, habitat destruction, migration obstructions, pollution, climate change, and disease. Annual advice from ICES since 2006 was that all anthropogenic impacts should be reduced as close to zero as possible. Widespread distribution across Europe and occurs in N. Africa. Regionally Endangered in N. Africa according to the IUCN, with a declining population trend and 50% decline in recruitment of glass eels in the past 10 years; further regional decline anticipated unless management action is taken.	
	Algeria		Occurs along coastal wetlands. Declines in spawner production estimated since the 1950s. One study suggested that production is very low compared to levels expected in pristine conditions, and preliminary modelling data suggested that the escapement of silver eels in 2014 was only 14.6% of pristine levels in Algeria. Annual reports submitted by Algeria in most years 2009-2016 (since species listing), but not yet for 2013 or 2016. Annual quota of 12 000 kg. Total trade 2009-2016 comprised 22 000 kg live, wild-sourced individuals as reported by Algeria and 15 000 kg as reported by importers. Algeria responded to the consultation relating to the RST. Some management measures implemented (e.g. restrictions to fishing gear and catch size limits), but no management plan exists. NDFs are considered particularly challenging for this species, however ICES have recommended several elements for making NDFs for <i>A. anguilla</i> (time-series population data or recruitment indices, effective management plan and indices reflecting a positive recruitment rate). These elements were not provided by Algeria. Fishing for international trade, along with other threats, appears to be impacting this regionally Endangered and declining species, and advice from ICES indicates that where there are uncertainties with regard to an NDF, a precautionary approach should be taken; therefore categorised as Action is needed.	Action is needed
Morocco			Found in rivers and lagoons as far south as the Draa basin. Declining in the country according to fishing statistics, spawner production estimates and fishermen. Annual reports submitted by Morocco in all years 2009-2016 (since species listing). High levels of trade 2009-2016, comprising 715 518 kg live, wild-sourced individuals and 4542 fingerlings, as reported by Morocco, and 35 161 kg as reported by importers. Trade increased 2009-2016 by 45 times. Morocco responded to the consultation relating to the RST. Fishing is restricted to the Sebou Estuary with a quota of 2000 kg glass eels and 7000 kg >30 cm; fishing is prohibited elsewhere. Additional management measures implemented (e.g. six months closed seasons and fishing gear restrictions). Escapement of silver eels in the Sebou was estimated by Morocco to be >40% of original biomass. Other preliminary modelling data suggested that the escapement of silver eels in 2014 was only 22.3% of pristine levels in Morocco. NDFs are considered particularly challenging for this species, however ICES have recommended several elements for making NDFs for <i>A. anguilla</i> (time-series population data or recruitment indices, effective management plan and indices reflecting a positive recruitment rate). These elements were not provided by Morocco. Fishing for international trade, along with other threats, appear to be impacting this regionally Endangered and declining species, and advice from ICES indicates that where there are uncertainties with regard to an NDF, a precautionary approach should be taken; therefore categorised as Action is needed.	Action is needed

Species	Range State	IUCN	Summary	Recommendation
<i>Anguilla anguilla</i> (European Eel) (cont.)	Tunisia		Occurs along the entire coast and inland waterways but considered more abundant in the north and north-east. Annual reports submitted by Tunisia in most years 2009-2016 (since species listing) but not yet for 2010 and 2012. A quota of 135 000 kg is in place, but the quota appears to have been exceeded in 2015 according to importers. High levels of trade 2009-2016, comprising 451 843 kg live wild-sourced individuals as reported by Tunisia, and 349 352 kg as reported by importers. Tunisia responded to the consultation relating to the RST. A management plan exists with four subunits, and a minimum market size of 30 cm is in place. Additional management measures implemented (e.g. closed seasons, prohibition on fishing elvers and fishing gear restrictions). Whilst some preliminary modelling results suggested that current escapement in Ichkeul Lake was >40% of pristine biomass, other modelling results suggested that the escapement of silver eels in 2014 was only 16.1% of pristine levels in Tunisia. NDFs are considered particularly challenging for this species, however, ICES have recommended several elements for making NDFs for <i>A. anguilla</i> (time-series population data or recruitment indices, effective management plan and indices reflecting a positive recruitment rate). These elements were not provided by Tunisia. Fishing for international trade, along with other threats, appears to be impacting this regionally Endangered and declining species, and advice from ICES indicates that where there are uncertainties with regard to an NDF, a precautionary approach should be taken; therefore categorised as Action is needed.	Action is needed

Introduction

The Review of Significant Trade (hereafter abbreviated to RST) was established to ensure that the provisions of the Convention (specifically Article IV, relating to non-detriment findings) are properly applied for Appendix II species in order to ensure that international trade in CITES-listed species is maintained within biologically sustainable levels. The procedure for the RST is set out in Resolution Conf. 12.8 (Rev. CoP17). The resolution “Directs the Animals and Plants Committees, in cooperation with the Secretariat and experts, and in consultation with range States, to review the biological, trade and other relevant information on Appendix-II species subject to significant levels of trade, to identify problems and solutions concerning the implementation of Article IV, paragraphs 2 (a), 3 and 6 (a).”

Paragraph 1 (d) ii) directs the Secretariat to compile, or appoint consultants to compile, a report about the biology and management of trade in the species, including any relevant information from the range State. The UN Environment World Conservation Monitoring Centre (UNEP-WCMC) was asked by the CITES Secretariat to compile reviews for species/country combinations that were selected within the RST following CoP17. This report provides an overview of conservation and trade status of 19 animal species-country combinations, provisionally classifying each into one of three categories defined in paragraph 1 (e) of Resolution Conf. 12.8 (Rev. CoP17) for review by the Animals Committee:

- **‘action is needed’** shall include species/country combinations for which the available information suggests that the provisions of Article IV, paragraph 2 (a), 3 or 6 (a), are not being implemented;
- **‘unknown status’** shall include species/country combinations for which the Secretariat (or consultants) could not determine whether or not these provisions are being implemented; and
- **‘less concern’** shall include species/country combinations for which the available information appears to indicate that these provisions are being met.

The recommendations for the 19 species-country combinations assessed can be found in Table 1 (p.3).

During the course of the review, it became clear that four species-country combinations that had been selected by the Animals Committee for inclusion within the RST following CoP17 did not appear to occur in the range State concerned, although trade had been reported. These were *Poicephalus gulielmi* (Mali), and *Uromastix geyri* (Benin, Ghana, and Togo).

Methods

Each taxon/country review provides the following information: history of the CITES Review of Significant Trade process; species characteristics, current distribution, conservation status, population trends and threats, recent trade (including CITES trade data and any available data on illegal trade), and management of the taxa in each range State, including any relevant legislation. The national legislation category as defined under the CITES National Legislation Project (CoP17 Doc. 22 Annex 3 (Rev.1)) for each range State is noted, based on the most recent update available (December 2017), at the time of writing. Where there are multiple range States reviewed for a particular species, an overview of global distribution, conservation status, threats, trade and management is also provided.

CITES trade data are provided for the period 2007-2016. Data were downloaded from the CITES Trade Database (trade.cites.org) on 27 February 2018. Unless otherwise specified, trade tables include all direct trade (i.e. excluding re-export data) in the taxa under review and include all sources, terms and units reported in trade. Trade volumes are provided as reported by both exporters and importers. Re-export data are noted separately, where appropriate. A list of CITES annual reports received from each range State included in the process, along with the date each became a Party to CITES, is provided in Table 2.

Table 2: Overview of annual report submissions by range States under review, 2007-2016

Country	Entry into force of CITES	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Algeria	21/02/1984	✓	✓	✓	✓	✓	✓	×	✓	✓	×
Benin	28/05/1984	✓	✓	✓	✓	✓	✓	✓	✓	✓	×
Democratic Republic of the Congo	18/10/1976	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ghana	12/02/1976	✓	✓	✓	✓	✓	✓	✓	✓	✓	×
Guyana	25/08/1977	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Indonesia	28/03/1979	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Madagascar	18/11/1975	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mali	16/10/1994	✓	✓	✓	✓	✓	✓	✓	✓	×	×
Morocco	14/01/1976	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Suriname	15/02/1981	✓	✓	✓	✓	✓	✓	✓	✓	✓	×
Togo	21/01/1979	✓	✓	✓	✓	✓	✓	✓	✓	✓	×
Tunisia	01/07/1975	✓	✓	✓	×	✓	×	✓	✓	✓	✓

Key: ✓: annual report received. ×: annual report not received.

All available Implementation reports to CITES¹ from each range State (from 2007 onwards, where available) were consulted for any information on confiscations/seizures. Two Parties reported significant seizures of species subject to this review; Indonesia for *Cuora amboinensis* (details are within the species review).

The CITES Management Authorities for each range State were contacted by the Secretariat in September 2017, and UNEP-WCMC contacted range States that had not provided a response in March 2018. Authorities were asked to provide information relevant to the formation of non-detriment findings, including distribution, conservation status, trade and management of each taxon. Where possible, national experts were also contacted to provide additional country-specific information. Responses were received from all range States (Algeria, Benin, Democratic Republic of Congo, Ghana, Guyana, Indonesia, Madagascar, Morocco, Suriname, Togo, and Tunisia) except for Mali, who had not responded to the consultation by the time of report submission (May 2017). A compilation of range State responses is provided in AC30 Doc. 12.2 Annex 1.

¹ Accessed from <https://cites.org/eng/resources/reports/biennial.php> on 13 April 2018.

Species reviews

Balearica pavonina: Mali

A. Summary

RST Selection	Selected in the RST based on high volume trade 2011-2015 for a globally threatened species.	
MALI:	<p>Assessed as globally Vulnerable on the basis of rapid population decline as a result of habitat loss and trapping for domestication or illegal international trade. In Mali, reported in the Inner Niger Delta, the Bafing Valley in the southwest, and the mid Niger river basin. The population in Mali was estimated at only 100 birds in 2004, down from an estimated 7000-8000 birds in 1985, with no birds recorded during a survey in 2014. Annual reports were submitted by Mali 2007-2014, but 2015-2016 have not yet been received. Direct exports 2007-2016 consisted of 177 live wild-sourced birds, as reported by Mali, with lower trade levels according to importers (120 birds over the same period, but with 90 in 2015-2016). Although the species is reported to be nationally protected and exports are prohibited, trade from Mali appears to have continued. Mali did not respond to the consultation relating to the RST. One expert suggested that recent exports were not wild-sourced birds originating from Mali, given the population size in the country. The basis for non-detriment findings for export of wild-sourced specimens of this species has not been provided, and any international trade is likely to impact the species survival in the country; therefore categorised as Action is needed.</p>	<p>RECOMMENDATION:</p> <p>Action is needed</p>

RST Background

Balearica pavonina (West African crowned crane) from Mali was selected as a priority species-country combination for review under the RST at AC29, (July 2017) (AC29 Com. 5 (Rev. by Sec.), AC29 Summary Record). *B. pavonina* was identified as a species that met a high volume trade threshold for globally threatened species, on the basis of trade data for the period 2011-2015; Mali was identified as the highest global exporter (AC29 Doc. 13.3 Annex 2 (Rev. 1)).

B. pavonina was previously included in the RST at AC24 (April, 2009) as an urgent case (AC24 Summary Record), and was retained in the process at AC25 for Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Cote d'Ivoire, the Democratic Republic of Congo, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, South Sudan, Sudan, Togo and Uganda (AC25 Doc. 9.5, AC25 Summary Record). The species was categorised as of 'urgent concern' for Guinea, of 'possible concern' for Nigeria, South Sudan and Sudan, and of 'least concern' for the remaining identified range States, including Mali. No trade had been reported from Mali since 2001 (AC26 Doc 12.2 Annex). Recommendations were issued for Guinea, Nigeria, South Sudan and Sudan (AC26 WG7 Doc. 1, AC26 Summary Record); Nigeria was removed from the process at SC63 (March, 2013) as the recommendations were deemed to have been complied

with (SC63 Doc. 14, SC63 Summary Record), however, no response was received from Guinea, South Sudan or Sudan and it was therefore recommended that Parties should suspend trade in *B. pavonina* from these countries. The suspensions for these three range States remain in place (Notif. No. 2018/006).

B. Species characteristics

Taxonomic note: Two subspecies are currently recognised by the CITES standard taxonomic reference: *B. p. pavonina* and *B. p. ceciliae* (Dickinson, 2003). *B. pavonina* is similar to *B. regulorum* (the Grey-Crowned Crane) which occurs in Eastern and Southern Africa; the two species were previously considered to form a single species (*B. pavonina*, Johnsgard, 1983) but were considered separate species by both the current and former CITES Standard references for birds (Sibley and Monroe, 1990; Dickinson, 2003).

Biology: *Balearica pavonina* (the Black-Crowned Crane) is an African waterbird with a distinctive large, gold crown, white wing coverts, black primaries, and a red and white cheek patch (Sinclair and Ryan, 2010). It reaches a height of 100-105 cm, and has a wingspan of 180-200 cm (Archibald *et al.*, 2013). It can be distinguished from *B. regulorum* by its paler grey body (especially at the neck) and vocalizations (del Hoyo *et al.*, 2014).

B. pavonina is found in both wet and dry open habitats, but prefers a mixture of shallow wetlands and grasslands (Meine and Archibald, 1996). It is largely a year-round resident, but will move from large permanent wetlands, where it often flocks in large numbers, to smaller temporary wetlands during the rainy season (Meine and Archibald, 1996). Daily and seasonal movements of up to several dozen km have been recorded (Meine and Archibald, 1996). The species is a generalist omnivore, feeding primarily on small grain crops, small plants, small invertebrates, and small vertebrates (Williams *et al.*, 2003).

B. pavonina breeds during the rainy season (May to December in west Africa, July to January in east Africa) (Williams *et al.*, 2003). The species builds circular nests from grasses and sedges, usually on the ground in open but shallow marshes (Meine and Archibald, 1996). The average clutch size is 2.5 eggs/nest (Williams *et al.*, 2003). Young birds can fly at around three months of age, but stay with their parents until their seventh to ninth month (Walkinshaw, 1964). Age at sexual maturity remains undetermined (Archibald *et al.*, 2013).

C. Country reviews

Mali

Distribution: *B. pavonina* occurs in two distinct sub-populations, each composed of a separate subspecies: *B. p. pavonina* is limited to scattered populations in sub-Saharan west Africa, from Senegambia to Lake Chad, whereas *B. p. ceciliae* is found from Chad to Sudan, South Sudan, Ethiopia, Eritrea, and N. Kenya, especially in the basin of the upper River Nile (Archibald *et al.*, 2013). Birds in Mali belong to the western subspecies (*B. p. pavonina*) and have been reported along the Inner Niger River Delta (central Mali) (Kone *et al.*, 2007; Meine and Archibald, 1996; Borrow and Demey, 2014; del Hoyo *et al.*, 2014), the Bafing Valley in the southwest (Williams *et al.*, 2003), and the mid Niger River basin in the southeast (Williams *et al.*, 2003). Breeding has been confirmed in the Inner Niger Delta and the mid Niger River basin, but the breeding status of the species in the Lower Bafing Valley is unknown (Williams *et al.*, 2003). Interviews with crane captors in Mali state that the Toguere-Koumbe commune in the Tenenkou subdistrict was recognised as the best breeding habitat for cranes in the Inner Niger Delta (Kone *et al.*, 2007). The species habitat was considered to be highly fragmented (Beilfuss *et al.*, 2007; Kone *et al.*, 2007).

Population status and trends: The global population of *B. pavonina* was estimated to be between 28 000 and 47 000 mature individuals (BirdLife International, 2018). The western sub-population (*B. p. pavonina*) was estimated to number c. 15 000 individuals in 2004 (Beilfuss *et al.*, 2007), and to have declined between 0-25% since 1985 (BirdLife International, 2016). The species is listed as globally Vulnerable by the IUCN, on the basis of rapid population decline recorded by recent surveys as a result of habitat loss and trapping for domestication or illegal international trade (BirdLife International, 2016). According to Wetlands International’s database of ‘Waterbird Population Estimates’, the population of *B. p. pavonina* in 2010 was estimated to be 5000 – 15 000 individuals (Morrison, *in litt.*, 2012, in: Wetlands International, 2018).

Previous global population assessments were conducted in 2000 and 2001, where range-wide surveys of the species undertaken at 187 sites in 20 African countries estimated a total population of approximately 42 000 individuals (~14 500 *B. p. pavonina* and ~27 500 *B. p. ceciliae*) (Williams *et al.*, 2003). This estimate was lower than population estimates from 1994 (65 500-77 500 individuals) (Urban, 1996), mainly due to a revision of the estimated population size of *B. p. ceciliae*. The most recent IUCN assessment calculated a worst-case decline of 30-49% over 45 years (BirdLife International, 2016), though uncertainty regarding the current population size and trend for the eastern sub-population could mean the true figure is higher.

In Mali, the population of *B. p. pavonina* was considered to have “declined precipitously”, and it was reported that the country had listed it as endangered (Kone *et al.*, 2007). An overview of population estimates and trends for the species in Mali since 1985 is provided in Table 1, with the most recent published estimate indicating that only 100 birds were thought to remain in the country (Beilfuss *et al.*, 2007). Representatives of the International Crane Foundation reported that “no cranes were recorded at all” during a count in 2014 in the country (Dodman *in litt.* to UNEP-WCMC, 2018).

Table 1: Overview of population estimates and trends for *B. p. pavonina* in Mali, 1985-2004

Source	Year	Estimate	Notes
Urban, 1988	Early 1970s	50000	Estimate only refers to the Niger River in Mali. Figure is a report from students at the School of Training for Wildlife Specialists, Garoua, Cameroon. The reliability is unknown.
Urban, 1988	1985	7000-8000	
Urban 1996	1994	3000-5000	
Meine and Archibald 1996	1996	>1000	
Williams 2003	2000-2001	>600	Declining in all areas surveyed except Sibou Niala (increasing) and Senou (along the Niger River), where the trend is unknown. During 1999-2001, only one first year bird was recorded (T. Dodman <i>in litt.</i> to UNEP-WCMC, 2018).
Beilfuss <i>et al.</i> 2007	2004	100	50 of the estimated 100 cranes remaining were found in the Inner Niger Delta

Interviews with crane captors in Mali in 2001 reported that the majority (86%) of captors had noticed a decline in the number of cranes in the Inner Niger Delta, and that they directly attributed the decline to crane capture (Kone *et al.*, 2007).

Threats: On a global level, *B. pavonina* is considered to be threatened by habitat loss as a result of the overexploitation, conversion and degradation of wetlands; the cutting of roost trees; drought and desertification; nest disturbance and egg removal; bushfires; subsistence hunting; and the capture of individuals for domestication and the live crane trade (Williams *et al.*, 2003; Kone *et al.*, 2007). Collisions with overhead power lines, indiscriminate pesticide application and political instability have also been considered to pose a threat (K. Morrison *in litt.* to UNEP-WCMC, 2011).

Within Mali, the species is considered to be under pressure from habitat loss, periods of cyclical drought, the disturbance of nesting sites, and the illegal capture of cranes for domestication and trade (Kone *et al.*, 2007). Some authors considered trade to be the principal threat to the species within the country (Kone *et al.*, 2007), after intensive capture started in the late 1960s. Surveys in the Inner Niger Delta conducted in 2001 reported that there were more cranes in captivity in the region than there were remaining in the wild (Kone *et al.*, 2007). Between 1998 and 2000, a total of 524 cranes were reported to have been captured in the Inner Niger Delta, even though the total population in the area may only have numbered 1500 individuals (Kone *et al.*, 2007). Most of these were captured in the subdistricts of Tenenkou and Youwarou (Kone *et al.*, 2007). 400 birds were estimated to be in captivity in Bamako (Kone *et al.*, 2007).

Crane domestication is encouraged by local traditions in many parts of West Africa, and “considerable” demand for *B. pavonina* has been reported from North Africa, the Middle East, and Europe (Williams *et al.*, 2003). A study conducted in the Inner Niger Delta in Mali reported that the average purchase price for *B. pavonina* from captors ranged from EUR 20-25 (Kone *et al.*, 2007), whereas the average price in national markets was EUR 159. There have been no records of successful breeding in captivity (Williams *et al.*, 2003; Kone *et al.*, 2007) and mortality during the capture and selling process has been reported to be high (Kone *et al.*, 2007). Cranes tend to be captured as chicks (Williams *et al.*, 2003), but interviews conducted in Bamako, Mali revealed that the majority of crane holders in the city preferred to receive their cranes as adults (Kone *et al.*, 2007). Captors in the Inner Niger Delta were reported to try to sell their cranes quickly to traders at local markets; only a few individuals (from a sample of 23) captured cranes exclusively for their own household use (Kone *et al.*, 2007).

Kone *et al.* (2007) reported that many crane owners in Mali had a low awareness of the laws prohibiting trade and domestic holding, and that the majority were not willing to stop the activity. Only 7% of respondents suggested they would be willing to free their cranes in order to preserve and protect the species (Kone *et al.*, 2007). Kone *et al.* (2007) also reported some evidence of a trade in crane body parts for use in traditional healing; however, prices for parts were lower than the selling prices of live cranes, so it was principally considered to be a market derived from cranes that died either during the capture and trade process, or later in captivity. Interviews with crane owners revealed that in Bamako, the capital, birds were held for sale or export from the country (Kone *et al.*, 2007).

Representatives of the IUCN Crane Specialist Group noted that there has been “no evidence of captures in the last few years” (Morrison *in litt.* to UNEP-WCMC, 2018). Political instability is considered to have kept local community members away from most of the key Black Crowned Crane areas in Mali, and current drought conditions are thought to have reduced available wetland habitat (Morrison *in litt.* to UNEP-WCMC, 2018). The International Crane Foundation received two reports of traders still potentially active in Mali; a trader in Terenkou, who had recently exported three cranes, and a large animal breeder in Bamako (Morrison *in litt.* to UNEP-WCMC, 2018).

Trade: *B. pavonina* was listed in CITES Appendix II on 1st August 1985 as part of the family listing for Gruidae. Mali has submitted all annual reports to CITES for the period 2007-2014, but not yet for 2015-2016. Mali has not published any export quotas for this species.

Direct trade in *B. pavonina* from Mali 2007-2016 entirely comprised live, wild-sourced animals (Table 1). Mali reported export of 177 live animals to China 2011-2014, 52% for commercial purposes and 48% for zoological purposes (Table 1). China, the sole importer, reported trade in 120 live animals with peak quantities reported in 2015 (Table 1). No indirect trade in *B. pavonina* originating in Mali was reported 2007-2016.

Table 2: Direct exports of live *Balearica pavonina* from Mali, 2007-2016. Mali has submitted annual reports 2007-2014, but not yet for 2015-2016. All direct trade was wild-sourced and reported by number.

Purpose	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
B	Exporter									-	-	
	Importer									60	30	90
T	Exporter					46		46		-	-	92
	Importer											
Z	Exporter						55		30	-	-	85
	Importer					10	20					30

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

B. pavonina's low population size in Mali and political instability in former areas of capture meant it was considered unlikely that recently exported cranes were live-caught (Dodman *in litt.* to UNEP-WCMC, 2018). Four possibilities suggested by the International Crane Foundation and IUCN Crane Specialist Group are that (a) birds are being exported from the existing population in captivity (of wild origin); (b) birds may be breeding in captivity (though, as of 2007, there were no reports of successful captive-breeding according to Kone *et al.* (2007) (Dodman *in litt.* to UNEP-WCMC, 2018)); (c) Mali has become a country of transit for cranes in trade; or (d) insurgents in the region had captured and sold individuals (Morrison *in litt.* to UNEP-WCMC, 2018). The region's borders were noted to be very porous, and crane areas in Guinea and Senegal were likely to be just as accessible to Bamako as crane areas in Mali's Inner Niger Delta (Dodman *in litt.* to UNEP-WCMC, 2018).

Management: Mali became a Party to CITES on 18th July 1994, with entry into force on 16th October 1994 (CITES, 2018).

B. pavonina was listed in Annex I of Law No. 95-031 on the management of wildlife and habitats as a fully protected species on 15th November 1995. Hunting is forbidden except when given authorisation for exceptional circumstances (scientific purposes, for example) and holding domestic cranes is illegal. According to Kone *et al.* (2007), the National Directorate for the Preservation for Natural Reserves banned the export of cranes from Mali in 1998. However, interviews conducted by Kone *et al.* (2007) revealed that few crane owners were aware of the legislation, and exports have apparently continued (Kone *et al.*, 2007; see trade section).

In light of recorded declines, Kone *et al.* (2007) suggested that several actions were urgently needed to restore a viable population of *B. pavonina* in Mali. They suggested that laws concerning the legal status of the species needed to be translated into local languages, an extensive awareness programme be put in place, the potential for captive-breeding and reintroduction be investigated, and that the species should be upgraded to CITES Appendix I. Some of these recommendations have been put in place by the International Crane Foundation, including an education and public awareness campaign, translating relevant laws and regulations into local languages, and compensating or providing alternative economic opportunities to locals who liberated their cranes (Diagana *et al.*, 2006).

Through its national legislation project, the CITES Secretariat categorised the national legislation in Mali as legislation that is believed generally to meet one to three of the four requirements for effective implementation of CITES (CITES Secretariat, 2017).

The CITES Authorities in Mali were consulted as part of this review, but no response was received.

As noted above, *B. pavonina* is currently subject to SC recommendations to suspend trade from Guinea, South Sudan and Sudan.

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

Research by Kone *et al.* (2007) suggested that the illegal capture of *B. pavonina* for domestication and trade is the major threat facing the species in Mali. Anecdotal evidence from the IUCN Crane Specialist Group also suggested that cranes exported from Mali may have been captured in other countries (Morrison *in litt.* to UNEP-WCMC, 2018).

E. References

- Archibald, G.W., Meine, C.D., Kirwan, G.M. and Garcia, E.F.J. 2013. Black Crowned-crane (*Balearica pavonina*). In: del Hoyo, J., Elliott, A., Sargatal, J., Christie, D.A. and de Juana, E. (Eds.). *Handbook of the Birds of the World Alive*. Lynx Ediciones, Barcelona. 356 pp.
- Beilfuss, R.D., Dodman, T. and Urban, E.K. 2007. The status of cranes in Africa in 2005. *Ostrich*, 78(2): 175–184.
- BirdLife International 2016. IUCN Red List of Threatened Species, Version 3.1. *Balearica pavonina*. Available at <http://www.iucnredlist.org/details/22692039/0>. [Accessed: 13/03/2018].
- BirdLife International 2015. *Species factsheet: Balearica pavonina*. Available at: <http://www.birdlife.org/>. [Accessed: 13/03/2018].
- Borrow, N. and Demey, R. 2014. *Field guide to the birds of western Africa*. Christopher Helm, London. 592 pp.
- CITES 2018. *List of contracting Parties*. Available at: https://www.cites.org/eng/disc/parties/chronolo.php?order=field_country_official_name&sort=asc. [Accessed: 11/04/2018].
- CITES Secretariat 2017. *Status of legislative progress for implementing CITES*. Available at: https://cites.org/sites/default/files/eng/prog/Legislation/CITES_national_legislative_status_table.pdf. [Accessed: 18/04/2018].
- Diagana, C.H., Dodman, T. and Sylla, S.I. 2006. *Conservation action plans for the Black Crowned Crane Balearica pavonina and Black Stork Ciconia nigra in Africa*. Boere, G.C., Galbraith, C.A. and Stroud, D.A. (Eds.). The Stationary Office, Scottish Natural Heritage, Edinburgh, United Kingdom. 608–612 pp.
- Dickinson, E.C. 2003. *The Howard and Moore complete checklist of the birds of the world*. 3rd Ed. Christopher Helm Publishers Ltd., London, UK. 461 pp.
- Dodman, T. 2018. Tim Dodman (International Crane Foundation) *in litt.* to UNEP-WCMC, 13 April 2018
- del Hoyo, J., Collar, N.J., Christie, D.A., Elliott, A. and Fishpool, L.D.C. 2014. *HBW and BirdLife International illustrated checklist of the birds of the world. Volume 1: Non-passerines*. Lynx Edicions, Barcelona. 903 pp.
- Kone, B., Fofana, B., Beilfuss, R. and Dodman, T. 2007. The impact of capture, domestication and trade on Black Crowned Cranes in the Inner Niger Delta, Mali. *Ostrich*. 78(2): 195–203.
- Meine, C.D. and Archibald, G.W. 1996. *The Cranes: Status Survey and Conservation Action plan*. IUCN, Gland, Switzerland, and Cambridge, UK. 294 pp.
- Morrison, K. 2011. Kerry Morrison (IUCN Crane Specialist Group) *in litt.* to UNEP-WCMC, 17 October 2011.
- Morrison, K. 2018. Kerry Morrison (IUCN Crane Specialist Group) *in litt.* to UNEP-WCMC, 13 April 2018
- Sibley, C.G. and Monroe, B.L. 1990. *Distribution and Taxonomy of Birds of the World*. Yale University Press, Yale, CT, USA
- Sinclair, I. and Ryan, P. 2010. *Birds of Africa*. 2nd Ed. Struik Nature, Cape Town, South Africa. 767 pp.
- Urban, E.K. 1996. Status of cranes in Africa. In: Beilfuss, R.D., Tarboton, W.R., Gichuki, N.N. and Foundation, I.C. (Eds.). *Proceedings of the Sixth Pan-African Ornithological Congress*. Wildlife Training Institute, Nairobi, Kenya. 53–59.
- Urban, E.K. 1988. Status of cranes in Africa. In: Backhurst, G.C. (Ed.). *Proceedings of the Sixth Pan-African Ornithological Congress. Nairobi, Kenya*. 315–329.
- Walkinshaw, L.H. 1964. The African Crowned Cranes. *The Wilson Bulletin*, 76(4): 355–377.
- Wetlands International 2018. *Waterbird Population Estimates*. Available at: <http://wpe.wetlands.org/>.

[Accessed: 04/04/2018].

Williams, E., Beilfuss, R. and Dodman, T. 2003. *Status survey and conservation action plan for the Black Crowned Crane *Balearica pavonina**. 72 pp. Available at: <https://www.savingcranes.org/status-survey-and-conservation-planning-for-black-crowned-cranes.html>. [Accessed: 26/09/2013].

Amazona farinosa: Guyana, Suriname

A. Summary

RST Selection Selected in the RST based on high volume trade 2011-2015 for a globally threatened species.

Global status Globally Near Threatened, with a widespread distribution. Global population size unknown, but declining moderately rapidly.

GUYANA: Occurs in lowland forest areas across the country. Large populations may remain in undisturbed habitat. Considered reasonably common in the interior of the country by one author, but no information on population size or trends is available. Habitat loss is not a threat in the country, but impacts of trade are unknown. Annual reports were submitted by Guyana for all years 2007-2016. Exports 2007-2016 were predominantly in live, wild-sourced birds (3011 in total as reported by Guyana, and 1951 as reported by importers), and were considerably lower than the annual quota of 1100. Guyana responded to the consultation relating to the RST. Harvests are managed with closed seasons, but no management plan for the species exists, and surveys were reported to be underway to produce a national population estimate. Until such time as results of the surveys are known, the basis for non-detriment findings for export of wild-sourced specimens and the establishment of the export quota does not appear robust, and the impact of trade on this species with unknown status in the country is unclear; therefore categorised as Action is needed.

RECOMMENDATION:

Action is needed

SURINAME: Occurs in lowland rainforest and savannah in the country. Reported as common in the northern savannah and lowland forests, and reasonably common in the interior of the country but rare in the deep south savannah. Current population size unknown. No information on population trends, but habitat loss is not a threat in the country. Annual reports were submitted by Suriname for all years 2007-2015, but not yet for 2016. Exports 2007-2016 were predominantly in live, wild-sourced birds (1503 as reported by Suriname for commercial and breeding purposes, and 817 as reported by importers for the same purposes), and were within the quota of 450. No information on management available. The Management Authority of Suriname responded to the consultation relating to the RST noting the need for research studies, but reported that at present there was no functioning Scientific Authority in the country. The basis for non-detriment findings for export of wild-sourced specimens and the establishment of the export quota

RECOMMENDATION:

Action is needed

does not appear robust, and the impact of trade on this species with unknown status in the country is unclear, therefore categorised as Action is needed.

RST Background

Amazona farinosa (Mealy Amazon) from Guyana and Suriname were selected as priority species-country combinations for review under the RST at AC29, (July 2017) (AC29 Com. 5 (Rev. by Sec.), AC29 Summary Record). *A. farinosa* was identified as a species that met a high volume trade threshold for globally threatened species, on the basis of trade data for the period 2011-2015, and Guyana and Suriname were identified as the major global exporters (AC29 Doc. 13.3 Annex 2 (Rev. 1)).

A. farinosa was previously selected for RST at AC14 (May, 1998) post CoP10 (AC14 Summary Record). At AC15 (July, 1999) thirteen range States were categorised as 'least concern', whilst Guyana was categorised as of 'possible concern'. It was recommended that Guyana should i) adopt an annual export quota of no greater than 1100 individuals (as suggested in a report of the CITES field project on 'the Status, management and trade of parrots in the Co-operative Republic of Guyana'), ii) establish and implement a field reporting system to record origin of harvested birds, iii) establish a population monitoring system, iv) consult with the SA to base future harvests and export quotas on the methods used in the field project and systems developed in ii) and iii), and v) maintain traditionally practised trapping and export seasons (Doc. AC.16.7.1 Annex 1). Under a secondary recommendation, the MA of Guyana was requested to consult with the MA of Suriname to achieve co-ordinated harvest and export seasons to minimise illegal cross-border movement of birds. Guyana subsequently notified the Parties of its 2001 export quota of 1100 live (Notif. No. 2001/019, Annex), and has published export quotas annually for the same amount. It was reported at SC45 (2001) that a field reporting system was being established, a field survey was currently under way, and that Guyana would continue to liaise with the Secretariat on the establishment of quotas and controls over harvesting (SC45 Doc. 12, AC17 Doc. 7.1). It was concluded that no further action was required, provided that the Secretariat was kept informed of the implementation of recommendations ii) - v) (SC45 Doc. 12, AC17 Doc. 7.1). No further updates were provided by the Secretariat.

B. Species characteristics

Taxonomic note: Dickinson (2003), the CITES standard reference for *Amazona farinosa*, listed three subspecies: *A. f. guatemalae*, *A. f. virenticeps*, and *A. f. farinosa*, all of which are also listed in a more recent, updated edition (Dickinson and Remsen Jr, 2013). Russello and Amato (2004) listed the three aforementioned subspecies, and added *A. f. inornata* as a fourth subspecies; and Forshaw (1989) listed *A. f. chapmani* as an additional fifth subspecies.

However, analysis of mitochondrial and nuclear DNA by Wenner *et al.* (2012) revealed two distinct monophyletic groups, one comprising the Central American subspecies *A. f. guatemalae* and *A. f. virenticeps*, the other comprising birds from South America. Data were reported to support recognition of Central American and South American individuals as separate species (Wenner *et al.*, 2012). Subsequently, other authors such as del Hoyo *et al.* (2014, in: BirdLife International, 2016a), Donegan *et al.* (2016) and Gill and Donsker (2016) consider *A. farinosa* and *A. guatemalae* separate species. Whilst recent scientific literature refers to the two separate species, they are referred to here as subspecies of *A. farinosa*, but the nomenclature used in the cited source is given in square brackets.

At AC30, options for adopting new CITES standard nomenclatural references will be outlined for proposal to CoP18; this will include the suggestion to split *A. farinosa* into the two species *A. farinosa* and *A. guatemalae*.

Biology: *A. farinosa* is a large parrot measuring 38 cm (Forshaw, 1989) to 43 cm, and weighing 535 to 766 g (Collar *et al.*, 2018). The species is generally a dull green colour, but with yellow feathers on the head, some red feathers on the edge of the wings, and a pale tinge to the back of the head and upper back (Collar *et al.*, 2018). A hobbyist website reported that *A. farinosa* was commonly confused with *A. ochrocephala* in South America, but that *A. farinosa* is larger and usually has less yellow on the crown (although this is not always the case) (Beauty of Birds, 2011b).

A. farinosa was reported to inhabit extensive tracts of lowland tropical evergreen forest, palm stands, deciduous and gallery woodland, secondary growth near forests, sand-ridge forest (Collar *et al.*, 2018), montane forest, rainforest, partially cleared areas with scattered trees and mangroves, preferring forest edges [*A. f. guatemalae*] (Beauty of Birds, 2011a), and dense humid lowland forest [*Amazona guatemalae*] (del Hoyo *et al.*, 2018). Collar *et al.* (2018) commented that in general the species was found below 500 m, however, the species was noted occurring at higher elevations of up to 1200 m (Juniper and Parr, 1998), 1500 m (BirdLife International, 2016a), or 1600 m above sea level (Rodner *et al.*, 2000; Donegan, 2012).

It was reported to be a non-migratory species (BirdLife International, 2016a); Naka (2004) commented that *A. farinosa* did not appear to leave a resident area north of Manaus in Brazil, and del Hoyo *et al.* (2018) stated that the subspecies *A. f. guatemalae* [*Amazona guatemalae*] was considered a permanent resident of Oaxaca in Mexico, and that no movements had been reported elsewhere in the species' range. However, Collar *et al.* (2018) stated that populations in Colombia appeared to move in other parts of the range. Similarly, the subspecies *A. f. guatemalae* [*A. guatemalae*] was reported to travel long distances seasonally (Bjork, 2004; De Labra-Hernández and Renton, 2017; O'Shea, 2018), for example from northern Guatemala to southern Mexico, according to food availability (Bjork, 2004).

It was noted that the species usually occurs in pairs or flocks of up to 20 individuals (Juniper and Parr, 1998), although typically no more than 4-8 birds (Ridgely and Greenfield, 2001). However, *A. farinosa* was reported to form large communal nests of several hundred birds outside the breeding season (Juniper and Parr, 1998).

Females produce clutches of approximately three eggs (Juniper and Parr, 1998; Collar *et al.*, 2018). Nests were found to be made in large, old primary forest trees [*A. guatemalae*] (De Labra-Hernández and Renton, 2016), in holes from 3- 30 m above the ground [*A. guatemalae*] (del Hoyo *et al.*, 2018), and eggs were reported to be incubated for 26-27 days (Collar *et al.*, 2018). Individuals of *Amazona* spp. were reported to have low rates of reproduction, low survival of chicks and fledglings, late age of first reproduction, and large proportions of non-breeding adults (González, 2003). Renton *et al.* (2015) commented that previous studies had indicated that there may be a low density of suitable nest cavities for large-bodied psittacines, and that suitable cavities for nests may be concentrated in specific habitats where the agonistic behaviours of breeding pairs may limit access to cavity resources. Individuals were noted to have a generation length of 12.3 years (BirdLife International, 2016a). *A. farinosa* was reported to feed upon seeds and fruits of palms (Collar *et al.*, 2018), figs, berries, nuts [*A. f. guatemalae*] (Beauty of Birds, 2011a) and various other fruits, seeds, buds, flowers and nectar (BirdLife International, 2016a).

Distribution: *A. farinosa* was reported to be distributed throughout Central and South America (Russello and Amato, 2004).

The subspecies *A. farinosa farinosa* [*A. farinosa*] was described as being “widespread from eastern Panama, south and east through Colombia, Venezuela, Guyana, Suriname, French Guiana, Ecuador,

Peru, Bolivia and Brazil” (del Hoyo *et al.*, 1997, in: BirdLife International, 2016a). The species’ extent of occurrence was estimated to be 11.9 million km² (BirdLife International, 2016a). São Sebastião Island in southeast Brazil was observed to be the species’ southern breeding limit (Guix *et al.*, 1999).

The subspecies *A. f. guatemalae* [*A. guatemalae*] was reported to be distributed across Central America from southern Mexico through Belize, Guatemala, Honduras, Nicaragua, Costa Rica, and western Panama (BirdLife International, 2016b). Its extent of occurrence was estimated to be 919 000 km², but declining, and its area of occupancy and the number of locations were also reported to be declining continuously (BirdLife International, 2016b).

Population status and trends: *A. f. farinosa* [*A. farinosa*] is categorised as Near Threatened in the IUCN Red List on the basis of anticipated habitat loss (based on a model of future deforestation in the Amazon basin by Soares-Filho *et al.* (2006) and the susceptibility of the newly split species to hunting and trapping; accordingly it was estimated that the species would undergo a suspected moderately rapid population decline of 25-29% over 37 years, or three generations from 2002 (BirdLife International, 2016a). The species has a declining population trend (BirdLife International, 2016a) and was predicted to lose between 17.9 % (Bird *et al.*, 2012) and 28.2 % (BirdLife International, 2016a) of suitable habitat within its distribution range over three generations.

Juniper and Parr (1998) reported that populations of *A. farinosa* (pre-taxonomic split) had declined in some areas (e.g. Central America and western Ecuador) due to deforestation, and Aguilar (2001, in: Ferrer-Paris *et al.*, 2014) and Hilty (2003) commented that populations appeared to be decreasing despite their large distribution ranges. O’Shea (pers. comm. to UNEP-WCMC, 2018) commented that he had not observed a “notable decline” in the species in the Guianas over the last 18 years, but that “they clearly undergo local declines around mining settlements, which are becoming more widespread”.

Previously, *A. farinosa* (before the taxonomic split) was previously described as “locally common” (Forshaw, 2010) and “fairly common” (Stotz *et al.*, 1996).

A. f. guatemalae [*A. guatemalae*] is also categorised as Least Concern, with a declining population trend (BirdLife International, 2016b).

Threats: BirdLife International (2016a) described accelerating rates of deforestation in the Amazon basin as the primary threat to *A. f. farinosa* [*A. farinosa*], as land was reported to be cleared for cattle ranching and soy production (BirdLife International, 2016a), facilitated by new roads (Soares-Filho *et al.*, 2006; Bird *et al.*, 2012). However, O’Shea (pers. comm. to UNEP-WCMC, 2018) reported that plenty of habitat for the species remained.

BirdLife International (2016a) noted that trapping pressure for trade was assumed to be widespread, with trade levels described as generally moderate, and heavy in some countries (del Hoyo *et al.*, 1997; Collar *et al.*, 2018).

O’Shea (pers. comm. to UNEP-WCMC, 2018) considered that trapping for household pets and international trade was the species’ primary threat and noted that it was only occasionally hunted for food, except in the far southern regions in the territories of the Trio and Wayana communities. Juniper and Parr (1998) stated that the species was taken for food in some areas due to its large size, and it was reportedly “heavily hunted for food in French Guiana” (Collar *et al.*, 2018).

The species was included in a list of species used in illegal, unsustainable and/ or extensive trade (TRAFFIC North America, 2009). Gastañaga *et al.* (2011) commented that *A. farinosa* was an illegally traded species. One live individual of *A. farinosa* was reported to have been illegally traded and

subsequently seized by authorities between 1992 and 2011 in the state of Amazonas, Brazil (Rodrigues do Nascimento *et al.*, 2015).

The species was reportedly not common in the Bolivian Santa Cruz Los Pozos pet market, but commanded the second highest price of USD 500- 875 (Herrera and Hennessey, 2007). Gastañaga *et al.* (2011) conducted market surveys in eight Peruvian cities, spending one day in each of the four seasons in each city's market from July 2007 to July 2008, and counted a total of 27 individuals of *A. farinosa* for sale, 23 of which were in Pucallpa in central-eastern Peru.

Overview of trade and management: *A. farinosa* was listed in CITES Appendix II on 6th June 1981, as part of the family listing for Psittacidae. According to the CITES Trade Database, global direct trade in *A. farinosa* predominantly comprised live birds with 6371 birds reported by exporters and 3897 reported by importers 2007–2016, the majority of which were wild-sourced for commercial purposes. Trade in live *A. farinosa* fluctuated, peaking in 2015 as reported by exporting countries (1344 birds) and in 2012 as reported by importing countries (654 birds).

It was reported that some of the species' habitat was protected, such as Peru's Manu National Park (del Hoyo *et al.*, 1997, in: BirdLife International, 2016a), but BirdLife International (2016a) proposed that greater areas of suitable habitat should be formally protected. Additionally, BirdLife International (2016a) proposed that awareness raising activities should be conducted to reduce hunting, trapping and trade, and that surveys were required to monitor trends in population and rates of forest loss.

González (2003) reported that despite being banned by national laws since 1973, the harvesting and domestic trade of psittacines was still common in the north-eastern Peruvian Amazon.

To address threats, Berkunsky *et al.* (2017) suggested that priority should be given to reducing the capture of wild parrots for the pet trade, and protecting populations located at agricultural frontiers.

C. Country reviews

Guyana

Distribution: Braun *et al.* (2007) confirmed the occurrence of *A. farinosa* in Guyana, stating that the species occurred in lowland forest "including both *terra firme* and seasonally flooded forest". The Management Authority (MA) of Guyana (*in litt.* to CITES Secretariat, 2017) noted that suitable habitats are currently available for the species throughout Guyana, including in human settlements on the coast, where individuals reportedly visit in flocks of mixed species to feed. Ridgely *et al.* (2005) included *A. farinosa* in a list of species present in Iwokrama Forest in central Guyana.

Population status and trends: Large populations were reported to persist in the less disturbed parts of the species' overall range, including in Guyana (del Hoyo *et al.*, 1997, in: BirdLife International, 2016a). Berkunsky *et al.* (2017) reported that they had been unable to find population trend data for any parrot populations in Guyana. The MA of Guyana (*in litt.* to CITES Secretariat, 2017) stated that although there has been no numerical estimate of the national population in Guyana, it is believed to be unlikely that the national population is in decline, due to the low threat levels in the country, and noted that traders reported no difficulty in locating the species (MA of Guyana, *in litt.* to CITES Secretariat, 2017). In a country field checklist, Braun *et al.* (2007) described the species as "common" in Guyana, noting that more than 20 individuals could be encountered daily in prime habitat and season, although no further details were provided. O'Shea (pers. comm. to UNEP-WCMC, 2018) stated that the species was "reasonably common" in the interior of the country, but that there was "no good long-term dataset that could shed light on population size or recent trends". Braun *et al.* (2000, in:

Hanks, 2005) devised a scale to measure species' abundance, with 5 indicating "most abundant" and 1 indicating "most rare", on which *A. farinosa* measured 5. Thiolly (1992) found a higher abundance of *A. farinosa* in Guianan rainforests which had been selectively logged 1-2 years earlier (4.1 individuals per 100 0.25-ha sample plots), than in undisturbed primary rainforest (3.4 individuals per 100 0.25-ha sample plots). The MA of Guyana (*in litt.* to CITES Secretariat, 2017) noted that the species was often part of mixed-species groups that destroy harvests of common fruits.

Threats: The MA of Guyana (*in litt.* to CITES Secretariat, 2017) reported that threats to the species in Guyana were estimated to be low because the species was not locally utilised in any significant ways, and international demand had decreased since 2005. According to the CITES Trade Database, exports have declined since 2005, when Guyana exported 556 live wild-sourced individuals, to around 300 live birds annually. Hanks (2005) reported that in 2003, the species had a trapper price of USD 6, a trader price of USD 11, and an official export value of USD 72.

Guyana's forest ecosystems were also reported to cover over 80 % of its land mass, with average deforestation rates below 0.1 % for several years (Martino *et al.*, 2016, in: MA of Guyana, *in litt.* to CITES Secretariat, 2017). FAO (2015) reported a national reduction of forest area in Guyana of 0 % from 1990 to 2015.

Trade: CITES annual reports were submitted for all years by Guyana for the period 2007-2016. Guyana's annual reports for 2011 and 2012 covered the period April 2011 to April 2012 and April 2012 to April 2013, respectively. The annual report received for 2013 covered April-December 2013. Guyana published export quotas for trade in live *A. farinosa* on an annual basis 2007-2017 (Table 1). Quotas published in 2010-2013 covered trade across multiple years. Trade in *A. farinosa* did not exceed quotas published by Guyana for the period 2007-2016 (Table 1).

The MA of Guyana (*in litt.* to CITES Secretariat, 2017) reported that an annual quota of 1100 individuals had been in place for decades and exports had been, on average, 91% of the quota over the past five years, and the higher quota in 2014 was a result of cutting the 2013 export year short, to align the licensing year with the calendar year.

Table 1: CITES export quotas for live *Amazona farinosa* from Guyana, 2007-2017, and global direct exports as reported by countries of import and Guyana, 2007-2016. Guyana has submitted all annual reports 2007-2016.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Quota	1100	1100	1100	1100 ²	1100 ³	1100 ⁴	1100 ⁵	1725	1100	1100	1100
Reported by Guyana	223	314	179	383	354	403	219	230	415	301	-
Reported by importer	185	47	110	146	280	293	254	344	235	232	-

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

According to data in the CITES Trade Database, direct trade in *A. farinosa* from Guyana predominantly consisted of live, wild-sourced birds for commercial purposes, with 3011 reported by Guyana and 1951 reported by importing countries 2007-2016 (Table 2). Direct exports reported by Guyana were variable 2007-2016 while importer reported trade increased from 2008 to a peak in 2012, followed by a decline in subsequent years.

² The export quotas of Guyana cover the period from 9 March 2010 to 8 March 2011

³ The export quotas of Guyana cover the period from 4 April 2011 to 3 April 2012

⁴ The export quotas of Guyana cover the period from 4 April 2012 to 3 April 2013

⁵ The export quotas of Guyana cover the period from 4 April 2013 to 3 April 2014

Table 2: Direct exports of *Amazona farinosa* from Guyana, 2007-2016. Guyana has submitted all annual reports 2007-2016. Quantities rounded to one decimal place where appropriate.

Term	Unit	Purpose	Source	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total		
feathers	-	T	W	Exporter									18	3	21		
				Importer													
live	-	B	W	Exporter													
				Importer			8			16	9	5	31	69			
		P	W	Exporter					1						1	2	
				Importer						1				1	2		
		T	W	Exporter	223	314	175	383	349	403	219	230	415	300	3011		
				Importer	185	47	102	146	276	292	238	235	230	200	1951		
		Z	W	Exporter			4		4							8	
				Importer					4			100				104	
		specimens	I	M	W	Exporter				0							0
						Importer				<0.1							
S	W			Exporter						0		0	0		0		
				Importer						<0.1		<0.1	<0.1		<0.1		
T	W			Exporter	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	
				Importer			<0.1										<0.1
-	M			W	Exporter												
					Importer				40			12					52
	S			I	Exporter												
					Importer	11											11
	W	W	Exporter									6		10	26		
			Importer	10												26	
T	W	Exporter						3	2						5		
		Importer						5							5		

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Low levels of indirect trade in *A. farinosa* originating in Guyana were reported 2007–2016, primarily comprising live, wild-sourced birds for commercial purposes (Table 3).

Table 3: Indirect exports of *Amazona farinosa* originating in Guyana, 2007-2016. All indirect trade was in live birds.

Purpose	Source	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
P	W	Exporter					10	1		1			12
		Importer								1			1
Q	W	Exporter						1	1				2
		Importer											
T	C	Exporter								6			6
		Importer											
W	W	Exporter	2	13		15				6		61	97
		Importer	20	15								61	96

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Management: Guyana became a Party to CITES on 27th May 1977, with entry into force on 25th August 1977 (CITES, 2018).

The MA of Guyana (*in litt.* to CITES Secretariat, 2017) stated that *A. farinosa* is protected in several protected or managed areas (although none were specified), and there is currently no species-specific management plan on the basis of the population status in Guyana. The MA of Guyana (*in litt.* to CITES Secretariat, 2017) noted that the Wildlife Conservation and Management Commission has commenced work on monitoring populations of traded species of psittacines including *A. farinosa* to produce an estimation of the population of these species in Guyana, although *A. farinosa* had not been highlighted

as one requiring special attention because of reduced abundance. The MA of Guyana (*in litt.* to CITES Secretariat, 2017) added that the species was “otherwise monitored by its performance in trade”.

The MA of Guyana (*in litt.* to CITES Secretariat, 2017) reported that harvesting for the trade in wild-caught birds takes place from 01 June to 31 December each year, and harvesting is not permitted from January to May, (coinciding with the breeding and nesting season).

Guyana’s Wildlife Conservation and Management Act 2016 addresses the protection, management, sustainable use and trade of Guyana’s wildlife, and states that all trappers and commercial exporters, apart from those who trap for “sustenance”, must be licensed annually by the Management Authority and accurate records must be kept (Government of Guyana, 2016). The Act applies to all of Guyana’s wildlife, and *A. farinosa* is included in the Second Schedule (Government of Guyana, 2009, 2016), corresponding with a CITES Appendix II listing. However, the species is not included in the Schedules of Guyana’s Wild Birds Protection Act (Government of Guyana, 1997) or the Wildlife Import and Export Act (Government of Guyana, 2013).

O’Shea (pers. comm. to UNEP-WCMC, 2018) commented that “enforcement of existing laws is weak”.

Through its national legislation project, the CITES Secretariat categorised the national legislation in Guyana as legislation that is believed generally to meet all four requirements for effective implementation of CITES (CITES Secretariat, 2017).

Suriname

Distribution: *A. farinosa* was confirmed to occur in Suriname (Mittermeier *et al.*, 1990; Rodner *et al.*, 2000; Milensky *et al.*, 2005). Haverschmidt (1968), Juniper and Parr (1998) and Collar *et al.* (2018) noted that flocks came to the coastal sand-ridge forests (in the north) in July and August. The species was recorded in a 2005 survey of the Kabalebo Nature Resort, west-central Suriname (Whitney, 2005) and in a 2010 survey of the Kwamalasamutu region, southwest Suriname (O’Shea *et al.*, 2011).

Population status and trends: Berkunsky *et al.* (2017) stated that they had been unable to find population trend data for any parrot populations in Suriname. O’Shea (pers. comm. to UNEP-WCMC, 2018) commented that the species was “reasonably common” in the interior of the country, but that there was “no good long-term dataset that could shed light on population size or recent trends”. Based on the distribution of 316 observations, generally collected by experienced birders, *A. farinosa* was considered “common” in the northern savannah zone and the rainforest zone under 400 m, “uncommon” in the coastal zone and rainforest zone above 400 m, and “rare” in the Sipaliwini savannah in the deep south (Ribot, 2017). Previously, Haverschmidt (1968) described it as “rather common in forests.” The species was reported to be “rare” in Brownsberg Nature Park (Fitzgerald *et al.*, 2002).

Threats: No specific information on threats to *A. farinosa* in Suriname could be found. However, FAO (2015) reported a national reduction of forest area in Suriname of 0 % from 1990 to 2015.

Trade: CITES annual reports were submitted for all years by Suriname for the period 2007-2015; no annual report had been submitted for 2016 at the time of writing. Suriname published export quotas for live *A. farinosa* 2007-2014 and 2016-2017 (Table 4); trade in *A. farinosa* did not exceed these quotas 2007-2016 (Table 4).

Table 4: CITES export quotas for live wild-sourced *Amazona farinosa* from Suriname, 2007-2017, and global direct exports as reported by countries of import and Suriname, 2007-2016. Suriname has submitted all annual reports 2007-2015; Suriname's annual report for 2016 had not been received at the time of writing.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Quota	450	450	450	450	450	450	450	450	-	450	450
Reported by Suriname	53	187	67	119	263	242	105	172	312	-	-
Reported by importer		50	40	24	228	126	97	35	86	161	-

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

According to data in the CITES Trade Database, direct trade in *A. farinosa* from Suriname predominantly consisted of live, wild-sourced birds for commercial purposes, with 1198 reported by Suriname 2007-2015 and 648 reported by importing countries 2008-2016 (Table 5). Direct exports of live, wild-sourced birds for commercial purposes fluctuated 2007-2016. Trade peaked in 2015 according to data reported by Suriname with more than double the levels reported in 2014 (227 birds) and in 2016 according to importer reported data (161 birds) with an increase of more than 150% compared to 2015.

Table 5: Direct exports of *Amazona farinosa* from Suriname, 2007-2016. Suriname has submitted all annual reports 2007-2015, Suriname's annual report for 2016 had not been received at the time of writing. All direct trade was wild-sourced.

Term	Purpose	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total	
feathers	S	Exporter				30				150	100	-	280	
		Importer												
	T	Exporter										-		
		Importer									100			100
live	B	Exporter		4	6	12	78	36	21	63	85	-	305	
		Importer					90	54			25		169	
	P	Exporter	1										-	1
		Importer					30							30
	S	Exporter							2				-	2
		Importer												
	T	Exporter	52	183	61	107	185	190	84	109	227		-	1198
		Importer		50	40	24	108	72	97	35	61	161		648
	-	Exporter							14					14
		Importer												
specimens	B	Exporter				1							-	1
		Importer												
	S	Exporter		20	21	30	166		4					242
		Importer												

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Low levels of indirect trade in *A. farinosa* originating in Suriname were reported 2007-2016 and solely comprised live, wild-sourced birds for commercial purposes (Table 6).

Table 6: Indirect exports of *Amazona farinosa* originating in Suriname, 2007-2016. All indirect trade was in live, wild-sourced birds for commercial purposes.

Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Exporter		10					12	16		41	79
Importer								16		41	57

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Management: Suriname became a Party to CITES on 17th November 1980, with entry into force on 15th February 1981 (CITES, 2018).

Suriname's Nature Conservation Act 1954 aims to protect and preserve the country's natural resources through a network of nature reserves, in which catching and hunting wildlife is forbidden (Government of Suriname, 1954a). The Hunting Act 1954 forbids the capture, killing and sale of species included in the national list of protected species (Government of Suriname, 1954b). However, no information was located on the protection status of *A. farinosa*, and it is therefore likely that the species is not protected.

The Ministry of Labour, Technological Development and Environment was reported to be responsible for Suriname's environmental policy, while the Ministry of Physical Planning, Land and Forest Management and the Ministry of Agriculture, Animal Husbandry and Fisheries are responsible for the management of wild and domesticated biodiversity (ATM, 2013). All birds may be hunted all year round in the southern half of the country with no limit on the number of individuals that may be taken, and from July to November in the northern part of the country, with a limit of five individuals per bag (Government of Suriname, 2012). However, O'Shea (pers. comm. to UNEP-WCMC, 2018) commented that "enforcement of existing laws is weak".

All birds appear to be protected under the Game Law (denoting that their capture, killing or commercial use is prohibited), apart from those designated as game species, "cage species" (to be trapped alive) or harmful species, for which seasons and bag sizes are established (Government of Suriname, 1954b). *A. farinosa* is classified as a cage species, with bag limits of five birds applying during the hunting season (July to November; season closed December to July) in the northern zone (Government of Suriname, 2012). Protection also reportedly exists for species within the southern zone (Government of Suriname, 2012), as laid down in the Hunting Decree of 2002 (Ottema, 2009; Government of Suriname, 2012).

The CITES Secretariat categorised the national legislation in Suriname as legislation that is believed generally to meet one to three of the four requirements for effective implementation of CITES (CITES Secretariat, 2017). Suriname enacted and submitted CITES legislation to the Secretariat for analysis in November 2017 (CITES Secretariat, 2017).

The Management Authority (MA of Suriname) pers. comm. to Secretariat and UNEP-WCMC, 2018) noted that they had undertaken interviews with trappers, but that the results were not yet available. It was reported that the Ministry of Physical Planning, Land and Forest Management was aware that research studies were needed, and that this would be done by the University of Suriname, however the CITES Scientific Authority that had been established in 2016 was no longer functioning in the country (MA of Suriname, pers. comm. to Secretariat and UNEP-WCMC, 2018).

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

Illegal trade in this species was highlighted (see 'Threats').

E. References

- Aguilar, H.F. 2001. Algunas notas sobre el loro real *Amazona ochrocephala* (Gmelin) (Psittacidae: Psittacinae). Arinien Venezuela. *Revista de Ecología Latino-Americana*, 8: 17–39.
- ATM 2013. *Republic of Suriname National Biodiversity Action Plan (NBAP) 2012-2016*. Ministry of Labour, Technological Development and Environment (ATM), Paramaribo, Suriname. 84 pp.
- Beauty of Birds 201a. *Blue-crowned Mealy Amazon Parrot or Guatemalan Mealy Amazon*. Available at: <https://www.beautyofbirds.com/bluecrownedmealyparrots.html>. [Accessed: 05/03/2018].
- Beauty of Birds 201b. *Mealy Amazon Parrot*. Available at: <https://www.beautyofbirds.com/mealyparrots.html>. [Accessed: 02/02/2018].
- Berkunsky, I., Quillfeldt, P., Brightsmith, D.J., Abbud, M.C., Aguilar, J.M.R.E., Alemán-Zelaya, U.,

- Aramburú, R.M., Arce Arias, A., Balas McNab, R., Balsby, T.J.S. *et al.* 2017. Current threats faced by Neotropical parrot populations. *Biological Conservation*, 214: 278–287.
- Bird, J.P., Buchanan, G.M., Lees, A.C., Clay, R.P., Devey, P.F., Yépez, I. and Butchart, S.H.M. 2012. Integrating spatially explicit habitat projections into extinction risk assessments: A reassessment of Amazonian avifauna incorporating projected deforestation. *Diversity and Distributions*, 18(3): 273–281.
- BirdLife International 2014a. *Amazona farinosa*. *The IUCN Red List of Threatened Species 2014*: e.T45430572A45430613. Available at: <http://dx.doi.org/10.2305/IUCN.UK.2014-%0A2.RLTS.T45430572A45430613.en%0D>. [Accessed: 28/02/2018].
- BirdLife International 2016a. *Amazona farinosa*. *The IUCN Red List of Threatened Species 2016*: e.T45430572A95154014. Available at: <http://www.iucnredlist.org/details/full/45430572/o>. [Accessed: 27/02/2018].
- BirdLife International 2014b. *Amazona guatemalae*. *The IUCN Red List of Threatened Species 2014*: e.T45430583A45430936. Available at: <http://dx.doi.org/10.2305/IUCN.UK.2014-2.RLTS.T45430583A45430936.en>. [Accessed: 05/03/2018].
- BirdLife International 2016b. *Amazona guatemalae*. *The IUCN Red List of Threatened Species 2016*: e.T45430583A95154327. Available at: <http://www.iucnredlist.org/details/full/45430583/o>. [Accessed: 05/03/2018].
- Bjork, R. 2004. *Delineating pattern and process in tropical lowlands: Mealy Parrot migration dynamics as a guide for regional conservation planning*. PhD dissertation. Oregon State University, Corvallis, Oregon. 226 pp.
- Braun, M.J., Finch, D.W., Robbins, M.B. and Schmidt, B.K. 2007. *A field checklist of the birds of Guyana*. Smithsonian Institution, Washington D. C. 36 pp.
- Braun, M.J., Finch, D.W., Robbins, M.B. and Schmidt, B.K. 2000. *A field checklist of the birds of Guyana*. Smithsonian Institution, Washington, D. C. 27 pp.
- CITES 2018. *List of contracting Parties*. Available at: https://www.cites.org/eng/disc/parties/chronolo.php?order=field_country_official_name&sort=asc. [Accessed: 11/04/2018].
- CITES Secretariat 2017. *Status of legislative progress for implementing CITES*. Available at: https://cites.org/sites/default/files/eng/prog/Legislation/CITES_national_legislative_status_table.pdf. [Accessed: 11/04/2018].
- Collar, N., Bonan, A., Boesman, P. and Kirwan, G.M. 2018. Southern Mealy Amazon (*Amazona farinosa*). In: del Hoyo, J., Elliott, A., Sargatal, J., Christie, D.A. and de Juana, E. (Eds.). *Handbook of the birds of the world alive*. Lynx Edicions, Barcelona. (retrieved from <https://www.hbw.com/node/54754> on 02 March 2018).
- Dickinson, E.C. 2003. *The Howard and Moore complete checklist of the birds of the world*. 3rd Edition. Christopher Helm Publishers Ltd., London, UK.
- Dickinson, E.C. and Remsen Jr, J.V. 2013. *The Howard and Moore Complete Checklist of the Birds of the World*. 4th edition. Volume 1: Non-Passerines. Aves Press, Eastbourne, United Kingdom. 461 pp.
- Donegan, T., Verhelst, J.C., Ellery, T., Cortés-Herrera, O. and Salaman, P. 2016. Revision of the status of bird species occurring or reported in Colombia 2016 and assessment of BirdLife International's new parrot taxonomy. *Conservación Colombiana*, (24): 12–36.
- Donegan, T.M. 2012. Range extensions and other notes on the birds and conservation of the Serranía de San Lucas, an isolated mountain range in northern Colombia. *Bulletin of British Ornithologists' Club*, 132(3): 140–161.
- FAO 2015. *Global Forest Resources Assessment 2015. Desk reference*. Food and Agriculture Organization of the United Nations, Rome, Italy. 244 pp.
- Ferrer-Paris, J.R., Sánchez-Mercado, A., Rodríguez-Clark, K.M., Rodríguez, J.P. and Rodríguez, G.A. 2014. Using limited data to detect changes in species distributions: Insights from Amazon parrots in Venezuela. *Biological Conservation*, 173: 133–143.
- Fitzgerald, K.A., De Dijn, B.P.E. and Mitro, S. 2002. *Ecological research & monitoring program 2001–2006*. STINASU - Foundation for Nature Conservation in Suriname, Paramaribo, Suriname. 96 pp.
- Forshaw, J.M. 1989. *Parrots of the world*. Christopher Helm, London.
- Forshaw, J.M. 2010. *Parrots of the World*. A & C Black, London. 328 pp.
- Gastañaga, M., Macleod, R., Hennessey, B., Núñez, J.U., Puse, E., Arrascue, A., Hoyos, J., Chambi, W.M., Vasquez, J. and Engblom, G. 2011. A study of the parrot trade in Peru and the potential importance

- of internal trade for threatened species. *Bird Conservation International*, 21(1): 76–85.
- Gill, F.B. and Donsker, D.B. 2016. *IOC World Bird List (v 8.1)*. doi 10.14344/IOC.ML.6.2. Available at: www.worldbirdnames.org. [Accessed: 15/03/2018].
- González, J. a 2003. Harvesting, local trade, and conservation of parrots in the Northeastern Peruvian Amazon. *Biological Conservation*, 114(3): 437–446.
- Government of Guyana 2009. *Environmental Protection (Wildlife Management and Conservation) Regulations, 2009*. Government of Guyana National Printers Ltd, Georgetown. 45 pp.
- Government of Guyana 1997. *Wild Birds Protection Act*. 9 pp.
- Government of Guyana 2016. *Wildlife Conservation and Management Bill*. 153 pp.
- Government of Guyana 2013. *Wildlife Import and Export Act*. 135 pp.
- Government of Suriname 2012. *Hunting calendar*. Ministerie van Ruimtelijke Ordening, Grond- en Bosbeheer. *Jachtkalender*. Available at: <http://www.gov.sr/media/741247/jachtkalender.pdf>. [Accessed: 15/03/2018].
- Government of Suriname 1954a. *Law of 3 April 1954, containing provisions for the protection and preservation of Suriname's natural monuments (GB 1954 no. 26), as it reads after the in modifications made to GB 1954 no. 105, SB 1980 no. 116, SB 1992 no. 80*. 3 pp.
- Government of Suriname 1954b. *Law of 3 April 1954 on provisions for the protection of fauna and arrangement of hunting in Suriname (GB 1954 no. 25), as it reads after the therein modifications made to GB 1954 no. 106, GB 1971 no. 61, SB 1980 no. 99, SB 1980 No. 116, SB 1982 No. 159 an*. 8 pp.
- Guix, J.C., Martín, M. and Mañosa, S. 1999. Conservation status of parrot populations in an Atlantic rainforest area of southeastern Brazil. *Biodiversity and Conservation*, 8: 1079–1088.
- Hanks, C.K. 2005. *Spatial Patterns in Guyana's Wild Bird Trade*. University of Texas. 111 pp.
- Haverschmidt, F. 1968. *Birds of Surinam*. Oliver and Boyd, Edinburgh. 474 pp.
- Herrera, M. and Hennessey, B. 2007. Quantifying the illegal parrot trade in Santa Cruz de la Sierra, Bolivia, with emphasis on threatened species. *Bird Conservation International*, 17: 295–300.
- Hilty, S.L. 2003. *Birds of Venezuela*. Christopher Helm A & C Black, London, UK. 876 pp.
- del Hoyo, J., Collar, N. and Kirwan, G.M. 2018. Northern Mealy Amazon (*Amazona guatemalae*). In: del Hoyo, J., Elliott, A., Sargatal, J., Christie, D.A. and de Juana, E. (Eds.). *Handbook of the birds of the world alive*. Lynx Edicions, Barcelona. (retrieved from <https://www.hbw.com/node/467504> on 05 March 2018).
- del Hoyo, J., Collar, N.J., Christie, D.A., Elliott, A. and Fishpool, L.D.C. 2014. *HBW and BirdLife International illustrated checklist of the birds of the world. Volume 1: Non-passerines*. Lynx Edicions, Barcelona. 903 pp.
- del Hoyo, J., Elliott, A. and Sargatal, J. 1997. *Handbook of the birds of the world - Volume 4: Sandgrouse to Cuckoos*. Lynx Editions, Barcelona, Spain. 679 pp.
- Juniper, T. and Parr, M. 1998. *Parrots: a guide to the parrots of the world*. Pica Press, Robertsbridge, UK.
- De Labra-Hernández, M.Á. and Renton, K. 2017. Factors influencing density of the Northern Mealy Amazon in three forest types of a modified rainforest landscape in Mesoamerica. *Avian Conservation and Ecology*, 12(1): Art 5. 1-16.
- De Labra-Hernández, M.Á. and Renton, K. 2016. Importance of Large, Old Primary Forest Trees in Nest-Site Selection by the Northern Mealy Amazon (*Amazona guatemalae*). *Tropical Conservation Science*, 1–10.
- Management Authority of Guyana 2017. CITES Management Authority of Guyana, Wildlife Conservation and Management Commission *in litt.* to UNEP-WCMC, 30 November 2017.
- Management Authority of Suriname. 2018. pers. comm. to Secretariat and UNEP-WCMC. 14th March 2018 and 11th April 2018.
- Martino, D., Bholanath, P., Dewnath, N., Persaud, J. and Rampersaud, P. 2016. Chapter 4: Land. *State of the Environment Report 2016*
- Milensky, C., Hinds, W., Aleixo, A. and Lima, M.C. 2005. Birds. In: Hollowell, T. and Reynolds, R.P. (Eds.). *Checklist of the terrestrial vertebrates of the Guiana shield*. Bulletin of the Biological Society of Washington, 13. 43–76.
- Mittermeier, R.A., Malone, S.A.J., Plotkin, M.J., Baal, F.L.J., Mohadin, K., MacKnight, J., Werkhoven, M. and Werner, T.B. 1990. *Conservation Action Plan for Suriname*. Conservation International, Ministry of Natural Resources, Suriname Forest Service, World Wildlife Fund, Foundation for Nature Preservation in Suriname (STINASU) and University of Suriname, Washington, D. C. 45pp.
- Naka, L.N. 2004. Structure and organization of canopy bird assemblages in Central Amazonia. *The Auk*,

- 121(1): 88–102.
- O’Shea, B. 2018. Dr Brian O’Shea pers. comm. to UNEP-WCMC, 06 March 2018.
- O’Shea, B.J., Alonso, L.E. and Larsen, T.H. 2011. *A Rapid Biological Assessment of the Kwamalasamutu region, Southwestern Suriname*. RAP Bulletin of Biological Assessment. Conservation International, Arlington, VA, USA. 160 pp.
- Otte, O.H. 2009. Suriname. In: Devenish, C., Díaz Fernández, D.F., Clay, R.P., Davidson, I. and Yépez Zabala I., A. (Eds.). *Important Bird Areas Americas - Priority sites for biodiversity conservation*. BirdLife International (Conservation Series No. 16), Quito, Ecuador. 345–350.
- Renton, K., Salinas-Melgoza, A., De Labra-Hernández, M.Á. and de la Parra-Martínez, S.M. 2015. Resource requirements of parrots: nest site selectivity and dietary plasticity of Psittaciformes. *Journal of Ornithology*, 156(S1): S73–S90.
- Ribot, J.H. 2017. *Birds in Suriname, South America: Mealy parrot (Amazona farinosa)*. Available at: <http://www.surinamebirds.nl/php/bird.php?amfa>. [Accessed: 01/03/2018].
- Ridgely, R.S., Agro, D. and Joseph, L. 2005. Birds of Iwokrama Forest. In: *Proceedings of the Academy of Natural Sciences of Philadelphia*. Vol. 154. 109–121.
- Ridgely, R.S. and Greenfield, P.J. 2001. *The Birds of Ecuador: Volume 1. Status, Distribution and Taxonomy*. Christopher Helm, London. 848 pp.
- Rodner, C., Lentino, M. and Restall, R. 2000. *Checklist of the birds of northern South America: an annotated checklist of the species and subspecies of Ecuador, Colombia, Venezuela, Aruba, Curacao, Bonaire, Trinidad & Tobago, Guyana, Suriname and French Guiana*. Pica Press, Sussex. 136 pp.
- Rodrigues do Nascimento, C.A., Esteves Czaban, R. and Nóbrega Alves, R.R. 2015. Trends in illegal trade of wild birds in Amazonas state, Brazil. *Tropical Conservation Science*, 8(4): 1098–1113.
- Russello, M.A. and Amato, G. 2004. A molecular phylogeny of Amazona: Implications for Neotropical parrot biogeography, taxonomy, and conservation. *Molecular Phylogenetics and Evolution*, 30: 421–437.
- Soares-Filho, B.S., Nepstad, D.C., Curran, L.M., Cerqueira, G.C., Garcia, R.A., Ramos, C.A., Voll, E., McDonald, A., Lefebvre, P. and Schlesinger, P. 2006. Modelling conservation in the Amazon basin. *Nature*, 440(7083): 520–523.
- Stotz, D.F., Fitzpatrick, J.W., Parker, T.A. and Moskovits, D.K. 1996. *Neotropical birds: ecology and conservation*. University of Chicago Press, Chicago, Illinois. 502 pp.
- Thiolly, J.-M. 1992. Influence of selective logging on bird species diversity in a Guianan rainforest. *Conservation Biology*, 6(1): 47–63.
- TRAFFIC North America 2009. *Wildlife Trade Control: CAFTA-DR regional gap analysis report*. TRAFFIC North America. Washington DC. World Wildlife Fund. 67 pp.
- Wenner, T.J., Russello, M.A. and Wright, T.F. 2012. Cryptic species in a Neotropical parrot: genetic variation within the *Amazona farinosa* species complex and its conservation implications. *Conservation Genetics*, 13: 1427–1432.
- Whitney, B.M. 2005. *Kabalebo Nature Resort preliminary bird and mammal survey. 7-10 March 2005*.

Ara ararauna: Guyana, Suriname

A. Summary

RST Selection Selected in the RST based on high volume trade 2011-2015.

Global status Globally Least Concern, with a widespread distribution. Global population size unknown, but declining.

GUYANA: Widespread in Guyana, occurring in lowland forest, palm and riparian areas. One population in central Guyana reported as “healthy”, and considered reasonably common in the interior by one author, but no information on population sizes or trend available. Annual reports were submitted by Guyana for all years 2007-2016. Exports 2007-2016 were predominantly live wild-sourced birds for commercial purposes (6512 as reported by Guyana, and 4759 as reported by importers). The quota of 792 appeared to be exceeded in 2016, according to importers. Guyana responded to the consultation relating to RST. Harvests are managed with closed seasons, but no management plan for the species exists, and surveys were reported to be underway to produce a national population estimate. Until such time as results of the surveys are known, the basis for non-detriment findings for export of wild-sourced specimens and the establishment of the export quota does not appear robust, and the impact of trade on this species with unknown status in the country is unclear; therefore categorised as Action is needed.

RECOMMENDATION:

Action is needed

SURINAME: Widespread in Suriname, occurring in lowland forest areas across the country. Current population size unknown, but described by birders to be common in the lowland forests, reasonably common in the interior, and rare in savannah and rainforests above 400m. Population considered to have declined by one expert. Habitat loss is not a threat in the country. Annual reports were submitted by Suriname for all years 2007-2015, but not yet for 2016. Exports 2007-2016 were predominantly in live, wild-sourced birds for commercial purposes (4155 as reported by Suriname and 3384 as reported by importers); the quota of 650 appeared to be exceeded in 2014. No information on management available. The Management Authority of Suriname responded to the consultation relating to the RST noting the need for research studies, but reported that at present there was no functioning Scientific Authority in the country. The basis for non-detriment findings for export of wild-sourced specimens and the establishment of the export quota does not appear robust, and the impact of trade on this species with unknown

RECOMMENDATION:

Action is needed

status in the country is unclear; therefore categorised as Action is needed.

RST Background

Ara ararauna (Blue-and-gold macaw) from Guyana and Suriname were selected as priority species-country combinations for review under the RST at AC29, July 2017 (AC29 Com. 5 (Rev. by Sec.), AC29 Summary Record). *A. ararauna* was identified as a species that met a high volume trade threshold, on the basis of trade data for the period 2011-2015 (AC29 Doc. 13.3 Annex 2 (Rev. 1)).

Previously, *A. ararauna* was selected for RST at AC5 (August, 1991), post CoP7. At AC9 (September, 1993) the species was categorised as of 'possible concern' in 12 range States, with recommendations issued for Guyana and Suriname. At AC14 (May, 1998), *A. ararauna* was selected a second time for the RST post CoP10 (AC14 Summary Record). At AC15 (July, 1999) eleven range States were categorised as 'least concern', whilst Guyana was categorised as of 'possible concern'. It was recommended that Guyana should i) adopt an annual export quota of no greater than 792 individuals (as suggested in a report of the CITES field project on 'the Status, management and trade of parrots in the Co-operative Republic of Guyana'), ii) establish and implement a field reporting system to record origin of harvested birds, iii) establish a population monitoring system, iv) consult with the SA to base future harvests and export quotas on the methods used in the field project and systems developed in ii) and iii), and v) maintain traditionally practised trapping and export seasons (Doc. AC.16.7.1 Annex 1). Under a secondary recommendation, the MA of Guyana was requested to consult with the MA of Suriname to achieve co-ordinated harvest and export seasons to minimise illegal cross-border movement of birds. Guyana subsequently notified the Parties of its 2001 export quota of 990 live (Notif. No. 2001/019, Annex), and has published export quotas annually for the same amount. It was reported at SC45 (2001) that, as recommended, a field reporting system was being established, a field survey was currently under way and that Guyana would continue to liaise with the Secretariat on the establishment of quotas and controls over harvesting (SC45 Doc. 12, AC17 Doc. 7.1). It was concluded that no further action was required, provided that the Secretariat was kept informed of the implementation of recommendations ii) - v) (SC45 Doc. 12, AC17 Doc. 7.1). No further updates were provided by the Secretariat.

B. Species characteristics

Biology: *A. ararauna* is a large macaw measuring 75 to 83 cm (Juniper and Parr, 1998), but may be up to 86 cm (Forshaw, 1989), or 90 cm (Low, 1990). It was described as blue viewed from above and yellow from below (Sick, 1993) with a long tail and a large black bill (Juniper and Parr, 1998).

The species was reported to inhabit wooded areas near water, including the edge of lowland humid forest, gallery forest in savannah, savannah with scattered trees and palms, swamp forest, *Mauritia* palm swamp (Juniper and Parr, 1998), the canopy above *terra firme* forest (Naka, 2004), seasonally flooded forest, rainforest margins, and deciduous woodlands up to 500 m above sea level, and occasionally up to 1500 m above sea level (Abramson and Speer, 1996). Rodner *et al.* (2000) described the altitudinal range of *A. ararauna* as "lower tropical", from sea level until approximately 800 to 900 m above sea level. *A. ararauna* was observed occurring in pairs, family parties of 3-4 individuals, or flocks of up to 25 (Juniper and Parr, 1998) or 30 to 50 individuals (Abramson and Speer, 1996; Ridgely and Greenfield, 2001) for feeding and roosting in non-breeding season (Abramson and Speer, 1996).

The species was reported to feed quietly, high in the canopy (Hilty and Brown, 1986), with individuals' diets consisting of various local fruits, especially those from palms, nuts, leaf buds (Juniper and Parr, 1998), seeds and vegetable matter (Abramson and Speer, 1996). It was commented that *A. ararauna*

often commuted long distances between feeding and roosting sites (Hilty and Brown, 1986; Hilty, 2003), according to food availability (Ragusa-Netto, 2006), but it was described as “not a migrant” by BirdLife International (2012). *A. ararauna* was reported to have a generation length of 12.7 years (BirdLife International, 2012). The species was noted to produce a clutch of one to four eggs (Abramson and Speer, 1996); and to nest in either *Mauritia flexuosa* or *Ireartea deltoidea* palms (Renton and Brightsmith, 2009), in high holes in February to March in Suriname, December to February in Colombia, November to January in Peru (Juniper and Parr, 1998; Brightsmith, 2005), and February to May or June in Guyana (Forshaw, 1989). The species was reported to have 50 to 72 % nest success and produce 0.5 to 1.0 fledglings per pair (Brightsmith and Bravo, 2006). Individuals in captivity were reported to reach sexual maturity after 2.5-3 years (Abramson and Speer, 1996).

According to Juniper and Parr (1998), the species could potentially be confused with *Ara glaucogularis*, which is smaller and rarer, and with which *A. ararauna* sometimes forms mixed flocks (Juniper and Parr, 1998). However, Abramson and Speer (1996) speculated that any confusion resulted from the lack of *A. glaucogularis* in captivity, as when the species were viewed together, the size difference was reported to be very obvious (Abramson and Speer, 1996).

Distribution: The species was described as having a large range in northern South America (Abramson and Speer, 1996; Low, 1990), with an estimated extent of occurrence of 10 200 000 km² (BirdLife International, 2016), an increase of 2 470 000 km² from the earlier estimate of 7 730 000 km² four years previously (BirdLife International, 2012). *A. ararauna* was reported to be distributed from eastern Panama (Juniper and Parr, 1998; del Hoyo *et al.*, 2014) east to Pará in north Brazil (Dickinson and Remsén Jr, 2013), and south through Colombia, east (del Hoyo *et al.*, 2014) and southernmost Venezuela (Crease, 2009), the Guianas, east Ecuador, east Peru, north (del Hoyo *et al.*, 2014) and east Bolivia (Dickinson and Remsén Jr, 2013), and the tropical lowlands of South America (Juniper and Parr, 1998; del Hoyo *et al.*, 2014), to southeast Brazil, Paraguay (Meyer de Schauensee, 1982), and north Argentina (Dickinson, 2003). It was noted that the species had been reintroduced to Trinidad (Oehler *et al.*, 2001), where it had reportedly gone extinct, and that it was probably extinct in west Ecuador (del Hoyo *et al.*, 2014) and probably locally extinct in southeast Brazil (Forshaw, 2010).

Population status and trends: *A. ararauna* is categorised as Least Concern in the IUCN Red List on the basis of the species’ “extremely large range”, and because despite the apparent declining population trend, the decline was not believed to be sufficiently rapid, nor the population size sufficiently small, to meet the criteria for Vulnerable (BirdLife International, 2012, 2016). *A. ararauna* was predicted to lose between 17.9 % (Bird *et al.*, 2012) and 35.3 % (BirdLife International, 2012, 2016) of suitable habitat within its distribution range over 38 years (three generations) from 2002, based on the model of Amazonian deforestation by Soares-Filho *et al.* (2006). BirdLife International (2012, 2016) estimated that due to the species’ tolerance of fragmentation, degradation, and edge-effects and the extent of overall losses, the population would decline by < 25 % over the same time period.

In 1993, the global population was estimated to consist of > 100 000 individuals and assessed as in decline, based on fieldwork and anecdotal field information (Lambert *et al.*, 1993). Four years later, the species was described as “common still in much of range, with a density of 1 pair/km² in Manu National Park, Peru. However, less numerous at edges of range, and declining with habitat loss in many of these peripheral areas” (Collar, 1997), and as “uncommon” by Stotz *et al.* (1996). Forshaw (2010) described it as “locally common”.

O’Shea (pers. comm. to UNEP-WCMC, 2018) commented that he had not observed a “notable decline” in the species in the Guianas over the last 18 years, but that “they clearly undergo local declines around mining settlements, which are becoming more widespread”.

Threats: BirdLife International (2012, 2016) stated that *A. ararauna* was “heavily traded”, and the species was described as being “among the 15 most heavily traded species of Neotropical psittacines” (Roet *et al.*, 1982, Thomsen and Brautigam, 1991, in: Renton, 2002). It was reported that *A. ararauna* was overharvested for the pet trade and could be seriously threatened long term (González, 2003; Montemaggiore *et al.*, 2005). Throughout its range, trade was reported to have “greatly affected more accessible populations” (Abramson and Speer, 1996). The species was noted to have experienced range decline in accessible areas in the 1980s and 1990s due to legal and illegal trapping for trade, hunting, and habitat loss (Forshaw, 1989; Low, 1990; Juniper and Parr, 1998). Trapping for international trade and local demand was reported to have depleted populations in many accessible areas, even where habitat remained little disturbed (Ridgely, 1981). Wetmore (1968) previously reported that the species was captured for consumption in Panama.

O’Shea (pers. comm. to UNEP-WCMC, 2018) commented that trapping for household pets and international trade was the species’ primary threat but that the species was only occasionally hunted for food, except in the far southern regions in the territories of the Trio and Wayana communities. O’Shea (pers. comm. to UNEP-WCMC, 2018) suggested that since *A. ararauna* nests in palm snags in savannah regions, they may be more vulnerable to trapping than other parrot species, since savannah areas have a higher concentration of human settlements than the surrounding forest landscape, and any nests are easier to see. Young birds were reportedly taken out of nest holes, as adult birds were noted to be very sensitive after capture and mortality was often high while individuals adapted to captivity (Roth, *in litt.* to CITES Secretariat, 1985). In the north-eastern Peruvian Amazon it was reported that the species had a high mortality rate, with 48.4 % of nestlings dying during the harvesting process (González, 2003).

The species was reported to be sold for high prices, including in the UAE for AED 3500 (EUR 774) per bird (Soorae *et al.*, 2008), and in the EU for EUR 1600 per pair in 2004 (Theile *et al.*, 2004).

The species has been reported in illegal trade, with seizures including one individual in Argentina in 1996, eight eggs in Taiwan in 2008, one individual in Malaysia in 2010, and two individuals in Mexico in 2015 seized (TRAFFIC, 2009). Of the 345 live birds seized internally within the EU in 2016, 72 % were parrots, such as *A. ararauna* (TRAFFIC, 2017). In 2003, a man was arrested for smuggling individuals into the United States (USFWS, 2004). Between 1992 and 2011, five live individuals were seized in Brazil by the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) in the state of Amazonas (Rodrigues do Nascimento *et al.*, 2015).

Historically, habitat degradation and destruction were regarded as the more serious threat (Ridgely, 1981). Destruction of swamp forest habitat was reported as a threat in French Guiana (Tostain *et al.*, 1992). O’Shea (pers. comm. to UNEP-WCMC, 2018) reported that plenty of habitat for the species remained. Harvesting for tail feathers was previously considered a serious threat in Panama (Delgado, 1985).

Overview of trade and management: *A. ararauna* was listed in CITES Appendix II on 6th June 1981, as part of the family listing for Psittacidae. According to data in the CITES Trade Database, global direct trade in *A. ararauna* predominantly comprised live birds with 51 770 birds reported by exporters and 23 359 reported by importers 2007–2016. Trade in live *A. ararauna*, as reported by exporters, increased year on year until 2014 to a peak of 11 621 live birds, after which trade subsequently declined; trade in live birds, as reported by importers, peaked in 2016 with 4327 birds. The majority of trade in live birds was captive-bred (74% according to exporter countries and 58% according to importers).

González (2003) commented that despite being banned by national laws since 1973, the harvesting and domestic trade of psittacines was still common in the north-eastern Peruvian Amazon. In east Peru, a

lack of suitable nesting sites was reported to have limited the population, so nesting habitat was successfully created by decapitating *Mauritia* palms (Collar, 1997).

The species was noted to occur in many protected areas and to be widespread in captivity (Juniper and Parr, 1998), with reports that the species was the “most commonly bred macaw in the United States” (Abramson and Speer, 1996). To address threats, Berkunsky *et al.* (2017) suggested that priority should be given to reducing the capture of wild parrots for the pet trade, and protecting populations located at agricultural frontiers.

In 1981, CoP3 Prop. 40 (redundant, based on the inclusion of the family in Appendix II) reported that the species was legally protected in Trinidad and Brazil, and that its export was prohibited in Colombia, Peru and Venezuela.

C. Country reviews

Guyana

Distribution: The species appears to occur throughout most of Guyana, except for areas in the west of the country towards the border with Venezuela (del Hoyo *et al.*, 2014). It was reported that the species was present in lowland forest, palm and riparian areas in the country (Braun *et al.*, 2000, in: Hanks, 2005). The Management Authority (MA) of Guyana (*in litt.* to CITES Secretariat, 2017) reported that suitable habitat for the species was found throughout the country, including human settlements where the species was reported to feed.

Population status and trends: Ridgely *et al.* (2005) reported that the Iwokrama Forest in central Guyana had a “healthy population”. Berkunsky *et al.* (2017) reported that they had been unable to find population trend data for any parrot populations in Guyana. O’Shea (pers. comm. to UNEP-WCMC, 2018) stated that the species was “reasonably common” in the interior of the country, but that there was “no good long-term dataset that could shed light on population size or recent trends”. It was reported by Hanks (2005) that traders in the northwest of the country claimed that individuals were becoming rarer, and more expensive.

Braun *et al.* (2000, in: Hanks, 2005) devised a scale to measure species’ abundance, with 5 indicating “most abundant” and 1 indicating “most rare”, on which *A. ararauna* measured 4. The species was described as “very common” in northwest Guyana, but “much less numerous” in the south (Juniper and Parr, 1998). In a country field checklist, it was considered by Braun *et al.* (2007) to be “fairly common”, with “5-20 individuals encountered daily in prime habitat and season”, although no method of establishing this estimation was mentioned.

Historically, Young (1929) reported that the species was common in coastal secondary forest and on the Abary savannahs in north Guyana, however in 1972 Forshaw and Cooper (1989) failed to observe *A. ararauna* near Georgetown or in the Mabaruma district in north Guyana, and were informed by local people that it was not plentiful in these areas.

The MA of Guyana (*in litt.* to CITES Secretariat, 2017) considered that the species was unlikely to be declining due to a low level of threats, and noted that traders reported no difficulty in locating the species.

Threats: The MA of Guyana (*in litt.* to CITES Secretariat, 2017) stated that the only threat in Guyana was harvesting for trade, but added that the evidence suggested that this threat was not significant. Hanks (2005) reported that the species was harvested in several regions, including the east coast (Charity in Pomeroun-Supernaan region, Mabaruma in Barima Waini region), and in Lethem (in the

Upper Takutu-Upper Essequibo Region) in the southwest of the country. In the northwest, trappers were reported to go on “lengthy” trips to collect the species on the Courantyne River (Hanks, 2005); in the southwest the species was noted to be collected from the Rupununi River.

The species was reported not to be utilised locally in any significant way (MA of Guyana, *in litt.* to CITES Secretariat, 2017). Habitat loss was not reported as a major threat to the species (BirdLife International, 2016), and Guyana’s forest ecosystems were reported to cover over 80 % of its land mass, with average deforestation rates below 0.1 % for several years (Martino *et al.*, 2016, in: MA of Guyana, *in litt.* to CITES Secretariat, 2017). FAO (2015) reported a national reduction of forest area in Guyana of 0 % from 1990 to 2015.

The species was reported to be smuggled across the border between Guyana and Suriname, in both directions (Duplaix, 2001), although it is not clear if illegal trade between the two countries is a current threat.

Trade: CITES annual reports were submitted for all years by Guyana for the period 2007-2016. Guyana’s annual reports for 2011 and 2012 covered the period April 2011 to April 2012 and April 2012 to April 2013, respectively. The annual report received for 2013 covered April-December 2013. Guyana published export quotas for trade in live *A. ararauna* on an annual basis 2007-2017 (Table 1). Quotas published in 2010-2013 covered trade across multiple years. Trade appeared to exceed the quota published by Guyana in 2016, according to importer reported data (Table 1). The MA of Guyana (*in litt.* to CITES Secretariat, 2017) reported that an annual quota of 792 individuals had been in place for decades and exports had been, on average, 27% of the quota over the past five years, and the higher quota in 2014 was a result of cutting the 2013 export year short, to align the licensing year with the calendar year.

Table 1: CITES export quotas for live wild-sourced *Ara ararauna* from Guyana, 2007-2017, and global direct exports as reported by countries of import and Guyana, 2007-2016. Guyana has submitted all annual reports 2007-2016.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Quota	792	792	792	792 ⁶	792 ⁷	792 ⁸	792 ⁹	931	792	792	792
Reported by Guyana	428	601	651	570	624	728	633	860	742	741	-
Reported by importers	294	206	469	306	514	529	653	818	674	968	-

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

According to data in the CITES Trade Database, direct trade in *A. ararauna* from Guyana predominantly consisted of live, wild-sourced birds for commercial purposes, with 6512 reported by Guyana and 4759 reported by importing countries 2007-2016 (Table 2). Direct exports of live, wild-sourced birds for commercial purposes increased between 2007 and 2016, by 73 per cent as reported by Guyana and by nearly three times according to importing countries.

⁶ The export quotas of Guyana cover the period from 9 March 2010 to 8 March 2011

⁷ The export quotas of Guyana cover the period from 4 April 2011 to 3 April 2012

⁸ The export quotas of Guyana cover the period from 4 April 2012 to 3 April 2013

⁹ The export quotas of Guyana cover the period from 4 April 2013 to 3 April 2014

Table 2: Direct exports of *Ara ararauna* from Guyana, 2007–2016. Guyana has submitted all annual reports 2007–2016. All trade was wild-sourced. Quantities rounded to one decimal place, where appropriate.

Term	Unit	Purpose	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total		
live	-	B	Exporter													
			Importer			8	11	40	49	25	88	64	147	432		
		P	Exporter													
			Importer			6									6	
		T	Exporter	428	601	626	570	583	728	633	860	742	741	6512		
			Importer	279	160	461	224	433	460	628	699	594	821	4759		
	Z	Exporter			25		41							66		
		Importer	15	40		71	41	20		31	16			234		
	specimens	l	M	Exporter												
				Importer				<0.1							<0.1	
			S	Exporter	<0.1											<0.1
				Importer			<0.1					<0.1	<0.1			<0.1
T			Exporter	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.2	0.2	<0.1		0.8	
			Importer		<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		0.2	
-		M	Exporter													
			Importer				15		3		8	8		34		
		S	Exporter													
			Importer	3					3	17	4	41	20	88		
		T	Exporter		20		31	4	10						65	
			Importer				2	6			9	13		8	38	

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Moderate levels of indirect trade in *A. ararauna* originating in Guyana were reported 2007–2016, primarily comprising live, wild-sourced birds for commercial purposes (Table 3).

Table 3: Indirect exports of *Ara ararauna* originating in Guyana, 2007–2016. All indirect trade was in live birds.

Purpose	Source	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
B	W	Exporter				10		4					14
		Importer									20		20
P	W	Exporter			4	5	18	6	3				42
		Importer						1	1				2
Q	W	Exporter		2	2	3	2	3	4		5	2	23
		Importer					2	2	1		2	3	10
T	C	Exporter	22					20		10			52
		Importer											
	W	Exporter	1	4	49	105	77	61	73	34	42	40	486
		Importer	6	4	48	29	4	34	43	2		61	231
Z	C	Exporter											
		Importer			12								12
	W	Exporter					10	4					14
		Importer				36							36

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

The MA of Guyana (*in litt.* to CITES Secretariat, 2017) reported that trade was “only minimally affected by the closure of the European market in 2005 and quickly rebounded”.

Management: Guyana became a Party to CITES on 29th May 1977, with entry into force on 25th August 1977 (CITES, 2018).

The MA of Guyana (*in litt.* to CITES Secretariat, 2017) stated that *A. ararauna* occurs in several protected or managed areas, (although none were specified), and there is currently no species-specific management plan in place for the species on the basis of the population status in Guyana. The MA of Guyana (*in litt.* to CITES Secretariat, 2017) noted that the Wildlife Conservation and Management Commission had commenced work on monitoring populations of traded species of psittacines to produce an estimation of the population of these species in Guyana, however *A. ararauna* had not been highlighted as one requiring special attention because of reduced abundance. The MA of Guyana (*in litt.* to CITES Secretariat, 2017) added that the species is “otherwise monitored by its performance in trade”.

The MA of Guyana (*in litt.* to CITES Secretariat, 2017) reported that harvesting for the trade in wild-caught birds takes place from 01 June to 31 December each year, and harvesting is not permitted from January to May (coinciding with the breeding and nesting season).

Guyana’s Wildlife Conservation and Management Act 2016 addresses the protection, management, sustainable use and trade of Guyana’s wildlife, and states that all trappers and commercial exporters, apart from those who trap for “sustenance”, must be licensed annually by the Management Authority and accurate records must be kept (Government of Guyana, 2016). The Act applies to all of Guyana’s wildlife, and *A. ararauna* is included in the Second Schedule (Government of Guyana, 2009, 2016). However, the species is not included in the Schedules of Guyana’s Wild Birds Protection Act (Government of Guyana, 1997) or the Wildlife Import and Export Act (Government of Guyana, 2013).

O’Shea (pers. comm. to UNEP-WCMC, 2018) commented that “enforcement of existing laws is weak”.

Through its national legislation project, the CITES Secretariat categorised the national legislation in Guyana as legislation that is believed generally to meet all four requirements for effective implementation of CITES (CITES Secretariat, 2017).

Suriname

Distribution: *A. ararauna* appears to occur throughout the entire country, according to a species range map by BirdLife International and Handbook of the Birds of World (del Hoyo *et al.*, 2014). The species was noted to occur in both the north and the deep south of the country (Ribot, 2017), and in the Kabalebo Nature Resort in west-central Suriname (Whitney, 2005) and the Kwamalasamutu region in southwest Suriname (O’Shea *et al.*, 2011).

Population status and trends: Berkunsky *et al.* (2017) reported that they had been unable to find population trend data for any parrot populations in Suriname. O’Shea (pers. comm. to UNEP-WCMC, 2018) stated that the species was “reasonably common” in the interior of the country, but that there was “no good long-term dataset that could shed light on population size or recent trends”.

Based on the distribution of 354 observations, generally collected by experienced birders, *A. ararauna* was considered “common” in the coastal zone, the Sipaliwini savannah in the deep south and in rainforest zone under 400 m and “rare” in the northern savannah zone and in the rainforest zone above 400 m (Ribot, 2017). It was reported to be “rare” in Brownsberg Nature Park (Fitzgerald *et al.*, 2002). Ottema (pers. comm. to UNEP-WCMC, 2018) considered that *A. ararauna* was previously common in the whole country, particularly in the coastal areas, but estimated population declines of >50% in coastal areas, >90% in eastern parts of the country, and of around 20% in the west.

Historically, the species was described as “the most numerous large macaw in coastal Suriname” (Juniper and Parr, 1998) and Haverschmidt (1968) described the species as the most numerous of the large macaws in the coastal region of Suriname where undisturbed large forests remained; although Donahue and Pierson (1982) described it as uncommon.

Threats: Poaching was noted to be a major problem in Suriname, particularly in the coastal zone, with few hunters abiding by the legislation on hunting (Ottema, 2009), and individuals were reported to be smuggled across the border between Guyana and Suriname, in both directions (Duplaix, 2001). Ottema (pers. comm. to UNEP-WCMC, 2018) considered that hunting for local trade remained a threat to the species in Suriname. FAO (2015) reported a national reduction of forest area in Suriname of 0 % from 1990 to 2015.

Trade: CITES annual reports were submitted for all years by Suriname for the period 2007-2015; no annual report had been submitted for 2016 at the time of writing. Suriname published export quotas for live *A. ararauna* 2007-2014 and 2016-2017 (Table 4). Trade in *A. ararauna* as reported by Suriname appeared to exceed quotas published by Suriname in 2014 by five live birds (Table 4).

Table 4: CITES export quotas for live wild-sourced *Ara ararauna* from Suriname, 2007-2016, and global direct exports as reported by countries of import and Suriname, 2007-2016. Suriname has submitted all annual reports 2007-2015.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Quota	650	650	650	650	650	650	650	650	-	650	650
Reported by Suriname	206	303	183	273	609	644	548	655	734	-	-
Reported by importer	84	122	150	172	323	350	326	564	723	570	-

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

According to data in the CITES Trade Database, direct trade in *A. ararauna* from Suriname predominantly consisted of live, wild-sourced birds with 4155 birds reported by Suriname and 3384 reported by importing countries. According to both Suriname and importing countries, approximately two thirds of live birds were for commercial purposes and the vast majority of the remainder for breeding purposes. Trade in live birds increased 2007-2016, peaking in 2015 with an increase of 356 % from 2007.

Table 5: Direct exports of *Ara ararauna* from Suriname, 2007-2016. All trade was reported in number. Suriname has submitted all annual reports 2007-2015.

Term	Purpose	Source	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total		
feathers	P	W	Exporter									2	-	2		
			Importer													
	S	W	Exporter				78							-	78	
			Importer													
	T	W	Exporter												-	
			Importer											250	250	
live	B	C	Exporter											-		
			Importer				20								20	
		W	Exporter	34	16	56	126	317	287	152	164	249		-	1401	
			Importer	36		80	38	195	199	60	138	257	169		1172	
	P	W	Exporter												-	
			Importer					6							6	
	S	W	Exporter							2					-	
			Importer													
	T	I	Exporter												-	
			Importer			10										10
		W	Exporter	172	281	127	127	292	296	336	436	485		-	2552	
			Importer	48	122	70	134	122	151	266	426	466	395		2200	
		-	Exporter									4				-
			Importer													
	Z	W	Exporter		6		20		59	60	55				-	
			Importer											6	6	
		-	Exporter									11			-	
			Importer													
	specimens	S	W	Exporter	13	196	105	133	511	75	11	160	104		-	
			Importer													1308

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Low levels of indirect trade in *A. ararauna* originating in Suriname were reported 2007-2016 and comprised live birds, which were primarily wild-sourced for commercial purposes (Table 6).

Table 6: Indirect exports of *Ara ararauna* originating in Suriname, 2007-2016. All indirect trade was in live birds.

Purpose	Source	Reported by	2007	2008	2009	2010	2011	2012	2013	2015	2016	Total
B	W	Exporter							6			6
		Importer						20			20	40
P	W	Exporter		1	4		6		2		1	14
		Importer										
Q	W	Exporter			2	1	1	2	3	7	2	18
		Importer							1	3	4	8
T	C	Exporter		18								18
		Importer										
	W	Exporter	9	15	21		54	57		23	168	347
		Importer	10	4	4	2			7		112	139
Z	W	Exporter	1									1
		Importer										

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Management: Suriname became a Party to CITES on 17th November 1980, with entry into force on 15th February 1981 (CITES, 2018).

Suriname's Nature Conservation Act 1954 aims to protect and preserve the country's natural resources through a network of nature reserves, in which catching and hunting wildlife is forbidden (Government

of Suriname, 1954a). The Hunting Act 1954 forbids the capture, killing and sale of species included in the national list of protected species (Government of Suriname, 1954b). However, no information was located on the protection status of *A. ararauna*, and it is therefore likely that the species is not protected. The Ministry of Labour, Technological Development and Environment was reported to be responsible for Suriname's environmental policy, while the Ministry of Physical Planning, Land and Forest Management and the Ministry of Agriculture, Animal Husbandry and Fisheries are responsible for the management of wild and domesticated biodiversity (ATM, 2013). All birds may be hunted all year round in the southern half of the country with no limit on the number of individuals that may be taken, and from July to November in the northern part of the country, with a limit of five individuals per bag (Government of Suriname, 2012). However, O'Shea (pers. comm. to UNEP-WCMC, 2018) commented that "enforcement of existing laws is weak".

All birds appear to be protected under the Game Law (denoting that their capture, killing or commercial use is prohibited), apart from those designated as game species, "cage species" (to be trapped alive) or harmful species, for which seasons and bag sizes are established (Government of Suriname, 1954b). Protection also reportedly exists for species within the southern zone (Government of Suriname, 2012), as laid down in the Hunting Decree of 2002 (Ottema, 2009; Government of Suriname, 2012). Ottema (pers. comm. to UNEP-WCMC, 2012) considered the hunting legislation inadequate for *A. ararauna*, which was considered to be affected by the current levels of hunting.

The CITES Secretariat categorised the national legislation in Suriname as legislation that is believed generally to meet one to three of the four requirements for effective implementation of CITES (CITES Secretariat, 2017). Suriname enacted and submitted CITES legislation to the Secretariat for analysis in November 2017 (CITES Secretariat, 2017).

The MA of Suriname (pers. comm. to Secretariat and UNEP-WCMC, 2018) noted that they had undertaken interviews with trappers, but that the results were not yet available. It was reported that the Ministry of Physical Planning, Land and Forest Management was aware that research studies were needed, and that this would be done by the University of Suriname, however the CITES Scientific Authority that had been established in 2016 was no longer functioning in the country (MA of Suriname, pers. comm. to Secretariat and UNEP-WCMC, 2018).

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

Illegal trade in this species was highlighted (see 'Threats'), with particular reference to Guyana and Suriname.

E. References

- Abramson, J. and Speer, B.L. 1996. *The large Macaws, their care, breeding and conservation*. Thomsen, J.B. (Ed.). Raintree Publications, Fort Bragg, California. 552 pp.
- ATM 2013. *Republic of Suriname National Biodiversity Action Plan (NBAP) 2012-2016*. Ministry of Labour, Technological Development and Environment (ATM), Paramaribo, Suriname. 84 pp.
- Berkunsky, I., Quillfeldt, P., Brightsmith, D.J., Abbud, M.C., Aguilar, J.M.R.E., Alemán-Zelaya, U., Aramburú, R.M., Arce Arias, A., Balas McNab, R., Balsby, T.J.S. *et al.* 2017. Current threats faced by Neotropical parrot populations. *Biological Conservation*, 214: 278–287.
- Bird, J.P., Buchanan, G.M., Lees, A.C., Clay, R.P., Develey, P.F., Yépez, I. and Butchart, S.H.M. 2012. Integrating spatially explicit habitat projections into extinction risk assessments: A reassessment of Amazonian avifauna incorporating projected deforestation. *Diversity and Distributions*, 18(3): 273–281.
- BirdLife International 2012. *Ara ararauna*. *The IUCN Red List of Threatened Species 2012*: e.T22685539A39035530. Available at: <http://dx.doi.org/10.2305/IUCN.UK.2012->

- <http://www.iucnredlist.org/details/full/22685539/0>. [Accessed: 28/03/2018].
- BirdLife International 2016. *Ara ararauna*. *The IUCN Red List of Threatened Species* 2016: e.22685539A93078598. Available at: <http://www.iucnredlist.org/details/full/22685539/0>. [Accessed: 28/03/2018].
- Braun, M.J., Finch, D.W., Robbins, M.B. and Schmidt, B.K. 2000. *A field checklist of the birds of Guyana*. Smithsonian Institution, Washington, D. C. 27 pp.
- Braun, M.J., Finch, D.W., Robbins, M.B. and Schmidt, B.K. 2007. *A field checklist of the birds of Guyana*. Smithsonian Institution, Washington D. C. 36 pp.
- Brightsmith, D. and Bravo, A. 2006. Ecology and management of nesting blue-and-yellow macaws (*Ara ararauna*) in Mauritia palm swamps. *Biodiversity and Conservation*, 15: 4271–4287.
- Brightsmith, D.J. 2005. Parrot nesting in southeastern Peru: seasonal patterns and keystone trees. *The Wilson Bulletin*, 117(3): 296–305.
- CITES 2018. *List of contracting Parties*. Available at: https://cites.org/eng/disc/parties/chronolo.php?order=field_country_official_name&sort=asc. [Accessed: 15/03/2018].
- CITES Secretariat 2017. *Status of legislative progress for implementing CITES*. Available at: https://cites.org/sites/default/files/eng/prog/Legislation/CITES_national_legislative_status_table.pdf. [Accessed: 11/04/2018].
- Collar, N.J. 1997. Family Psittacidae (parrots). In: Hoyo, J. del, Elliott, A. and Haffer, J.H. (Eds.). *Handbook of the birds of the world. Volume 4: Sandgrouse to Cuckoos*. Lynx Edicions, Barcelona, Spain. 280–477.
- Crease, A. 2009. Avian range extensions from the southern headwaters of the río Caroní, Gran Sabana, Bolívar, Venezuela. *Cotinga*, 31: 5–19.
- Delgado, B.F.S. 1985. Present situation of the forest birds of Panama. In: *ICBP Technical Publication No. 4*. Geneva, Switzerland. 77–93.
- Dickinson, E.C. 2003. *The Howard and Moore complete checklist of the birds of the world. 3rd Edition*. Christopher Helm Publishers Ltd., London, UK.
- Dickinson, E.C. and Remsen Jr, J.V. 2013. *The Howard and Moore Complete Checklist of the Birds of the World. 4th edition. Volume 1: Non-Passerines*. Aves Press, Eastbourne, United Kingdom. 461 pp.
- Donahue, P.K. and Pierson, J.E. 1982. *Birds of Suriname, an annotated checklist*. J. E. Pierson, New York. 31 pp.
- Duplaix, N. 2001. *Evaluation of the animal and plant trade in the Guianas: preliminary findings*.
- FAO 2015. *Global Forest Resources Assessment 2015. Desk reference*. Food and Agriculture Organization of the United Nations, Rome, Italy. 244 pp.
- Fitzgerald, K.A., De Dijn, B.P.E. and Mitro, S. 2002. *Ecological research & monitoring program 2001–2006*. STINASU - Foundation for Nature Conservation in Suriname, Paramaribo, Suriname. 96 pp.
- Forshaw, J. and Cooper, W. 1989. *Parrots of the World, 3rd (revised) edn*. Weldon Publishing, Willoughby, NSW. 616 pp.
- Forshaw, J.M. 1989. *Parrots of the world*. Christopher Helm, London.
- Forshaw, J.M. 2010. *Parrots of the World*. A & C Black, London. 328 pp.
- González, J. a 2003. Harvesting, local trade, and conservation of parrots in the Northeastern Peruvian Amazon. *Biological Conservation*, 114(3): 437–446.
- Government of Guyana 2009. *Environmental Protection (Wildlife Management and Conservation) Regulations, 2009*. Government of Guyana National Printers Ltd, Georgetown. 45 pp.
- Government of Guyana 1997. *Wild Birds Protection Act*. 9 pp.
- Government of Guyana 2016. *Wildlife Conservation and Management Bill*. 153 pp.
- Government of Guyana 2013. *Wildlife Import and Export Act*. 135 pp.
- Government of Suriname 2012. *Hunting calendar. Ministerie van Ruimtelijke Ordening, Grond- en Bosbeheer. Jachtkalender*. Available at: <http://www.gov.sr/media/741247/jachtkalender.pdf>. [Accessed: 15/03/2018].
- Government of Suriname 1954a. *Law of 3 April 1954, containing provisions for the protection and preservation of Suriname's natural monuments (GB 1954 no. 26), as it reads after the in modifications made to GB 1954 no. 105, SB 1980 no. 116, SB 1992 no. 80*. 3 pp.
- Government of Suriname 1954b. *Law of 3 April 1954 on provisions for the protection of fauna and arrangement of hunting in Suriname (GB 1954 no. 25), as it reads after the therein modifications made to GB 1954 no. 106, GB 1971 no. 61, SB 1980 no. 99, SB 1980 No. 116, SB 1982 No. 159 an*. 8 pp.

- Hanks, C.K. 2005. *Spatial Patterns in Guyana's Wild Bird Trade*. University of Texas. 111 pp.
- Haverschmidt, F. 1968. *Birds of Surinam*. Oliver and Boyd, Edinburgh. 474 pp.
- Hilty, S.L. 2003. *Birds of Venezuela*. Christopher Helm A & C Black, London, UK. 876 pp.
- Hilty, S.L. and Brown, W.L. 1986. *A guide to the birds of Colombia*. Princeton University Press, Princeton, New Jersey.
- del Hoyo, J., Collar, N.J., Christie, D.A., Elliott, A. and Fishpool, L.D.C. 2014. *HBW and BirdLife International illustrated checklist of the birds of the world. Volume 1: Non-passerines*. Lynx Edicions, Barcelona. 903 pp.
- Juniper, T. and Parr, M. 1998. *Parrots: a guide to the parrots of the world*. Pica Press, Robertsbridge, UK.
- Lambert, F., Wirth, R., Seal, U.S., Thomsen, J.B. and Ellis-Joseph, S. 1993. *Parrots: An action plan for their conservation 1993-1998*. BirdLife International, Cambridge, United Kingdom. 143 pp.
- Low, R. 1990. *Macaws: a complete guide*. Merehurst Limited, London. 144 pp.
- Management Authority of Guyana 2017. CITES Management Authority of Guyana, Wildlife Conservation and Management Commission *in litt.* to CITES Secretariat, 30 November 2017.
- Management Authority of Suriname. 2018. pers. comm. to Secretariat and UNEP-WCMC. 14th March 2018 and 11th April 2018.
- Martino, D., Bholanath, P., Dewnath, N., Persaud, J. and Rampersaud, P. 2016. Chapter 4: Land. *State of the Environment Report 2016*,
- Meyer de Schauensee, R. 1982. *A guide to the birds of South America*. The Academy of Natural Sciences of Philadelphia, Philadelphia, USA. 498 pp.
- Montemaggiore, A., Capula, M., Gippoliti, S., Marsden, S.J., Mertens, A., Rondinini, C., Salerno, G. and Sorace, A. 2005. *A study of species which are subject to import restrictions according to the article 4.6 of Regulation 338/97*. Rome, Italy. 981 pp.
- Naka, L.N. 2004. Structure and organization of canopy bird assemblages in Central Amazonia. *The Auk*, 121(1): 88–102.
- O'Shea, B.J., Alonso, L.E. and Larsen, T.H. 2011. *A Rapid Biological Assessment of the Kwamalasamutu region, Southwestern Suriname*. RAP Bulletin of Biological Assessment. Conservation International, Arlington, VA, USA. 160 pp.
- O'Shea, B. 2018. Dr Brian O'Shea (Collections Manager for Ornithology, North Carolina Museum of Natural Science) pers. comm. to UNEP-WCMC, 06 March 2018.
- Oehler, D.A., Boodoo, D., Plair, B., Kuchinski, K., Campbell, M., Lutchmedial, G., Ramsubage, S., Maruska, E.J. and Malowski, S. 2001. Translocation of blue and gold macaw *Ara ararauna* into its historical range on Trinidad. *Bird Conservation International*, (11): 129–141.
- Otte, O.H. 2009. Suriname. In: Devenish, C., Díaz Fernández, D.F., Clay, R.P., Davidson, I. and Yépez Zabala I., A. (Eds.). *Important Bird Areas Americas - Priority sites for biodiversity conservation*. BirdLife International (Conservation Series No. 16), Quito, Ecuador. 345–350.
- Otte, O. H. 2012. Otte H. Ottema, STINASU (Stichting voor Natuurbehoud in Suriname), pers. comm. to UNEP-WCMC, 15/09/2012.
- Otte, O. H. 2018. Otte H. Ottema. pers. comm. to UNEP-WCMC. 25/04/2018.
- Ragusa-Netto, J. 2006. Dry fruits and the abundance of the blue and yellow macaw (*Ara ararauna*) at a cerrado remnant in central Brazil. *Ornitologia Neotropical*, 17: 491–500.
- Renton, K. 2002. Seasonal Variation in Occurrence of Macaws along a Rainforest River. *Journal of Field Ornithology*, 73(1): 15–19.
- Renton, K. and Brightsmith, D.J. 2009. Cavity use and reproductive success of nesting macaws in lowland forest of southeast Peru. *Journal of Field Ornithology*, 80(1): 1–8.
- Ribot, J. 2017. *Birds in Suriname, South America: Blue and yellow macaw (Ara ararauna)*. Available at: <http://www.surinamebirds.nl/php/bird.php?arar>. [Accessed: 29/03/2018].
- Ridgely, R.S. 1981. The current distribution and status of mainland and neotropical parrots. In: Parquier, R.F. (Ed.). *Conservation of New World Parrots*. ICBP Technical Publication No.1. Smithsonian Press, Washington D. C. 233–384.
- Ridgely, R.S., Agro, D. and Joseph, L. 2005. Birds of Iwokrama Forest. In: *Proceedings of the Academy of Natural Sciences of Philadelphia*. Vol. 154. 109–121.
- Ridgely, R.S. and Greenfield, P.J. 2001. *The birds of Ecuador: Volume 2*. Christopher Helm, London. 740 pp.
- Rodner, C., Lentino, M. and Restall, R. 2000. *Checklist of the birds of northern South America: an annotated checklist of the species and subspecies of Ecuador, Colombia, Venezuela, Aruba, Curacao*,

- Bonaire, Trinidad & Tobago, Guyana, Suriname and French Guiana*. Pica Press, Sussex. 136 pp.
- Rodrigues do Nascimento, C.A., Esteves Czaban, R. and Nóbrega Alves, R.R. 2015. Trends in illegal trade of wild birds in Amazonas state, Brazil. *Tropical Conservation Science*, 8(4): 1098–1113.
- Roet, E.C., Mack, D.S. and Duplaix, N. 1982. Psittacines imported by the United States (October 1979–June 1980). In: Pasquier, R.F. (Ed.). *Conservation of New World parrots: proceedings of the ICBP parrot working group meeting, St Lucia 1980*. Smithsonian Institution/ ICBP Technical Publication No. 1, Washington D. C. 21–56.
- Roth, P. *in litt.* to CITES Secretariat, 17 December 1985.
- Sick, H. 1993. *Birds in Brazil: A Natural History*. Princeton University Press, Princeton, New Jersey.
- Soares-Filho, B.S., Nepstad, D.C., Curran, L.M., Cerqueira, G.C., Garcia, R.A., Ramos, C.A., Voll, E., McDonald, A., Lefebvre, P. and Schlesinger, P. 2006. Modelling conservation in the Amazon basin. *Nature*, 440(7083): 520–523.
- Soorae, P.S., Hemeri, A. Al, Shamsi, A. Al and Suwaidi, K. Al 2008. A Survey of the Trade in Wildlife as Pets in the United Arab Emirates. *TRAFFIC Bulletin*, 22(1): 41–46.
- Stotz, D.F., Fitzpatrick, J.W., Parker, T.A. and Moskovits, D.K. 1996. *Neotropical birds: ecology and conservation*. University of Chicago Press, Chicago, Illinois. 502 pp.
- Theile, S., Steiner, A. and Kecse-Nagy, K. 2004. *Expanding borders: new challenges for wildlife trade controls in the European Union*. TRAFFIC Europe, Brussels, Belgium. 40 pp.
- Thomsen, J.B. and Brautigam, A. 1991. Sustainable use of neotropical parrots. In: Robinson, J.G. and Redford, K.H. (Eds.). *Neotropical wildlife use and conservation*. University of Chicago Press, Chicago, Illinois. 359–380.
- Tostain, O., Dujardin, J.L., Énard, C. and Thiollay, J.M. 1992. *Oiseaux de Guyane*. Société d'Études Ornithologiques, Paris. 222 pp.
- TRAFFIC 2017. *Overview of important seizures in the European Union. January to December 2016*. Briefing prepared by TRAFFIC for the European Commission. 12 pp.
- TRAFFIC 2009. Vol. 16 No. 3 (March 1997) to Vol. 29 No. 2 (October 2017). *A compilation of seizures and prosecutions reported in the TRAFFIC Bulletin, 1997–2009*, 1–344.
- USFWS 2004. Éxito del USFWS. In: *The TRAFFIC Report*. United States Fish and Wildlife Service (USFWS). 7.
- Wetmore, A. 1968. *The Birds of the Republic of Panama, part 2. Columbidae (Pigeons) to Picidae (Woodpeckers)*. Smithsonian Institution Press, Washington D. C. 605 pp.
- Whitney, B.M. 2005. *Kabalebo Nature Resort preliminary bird and mammal survey. 7–10 March 2005*.
- Young, C.G. 1929. A contribution to the ornithology of the coastland of British Guiana, Part 2. *Ibis*, 12(5): 1–38.

Ara chloropterus: Guyana, Suriname

A. Summary

RST Selection Selected in the RST based on high volume trade 2011-2015.

Global status Globally Least Concern, with a widespread distribution. Global population size unknown, but declining.

<p>GUYANA: Widespread in Guyana, occurring in lowland forest areas across the country. One population in central Guyana reported as “healthy”, and considered reasonably common in the interior by one author, but no information on population sizes or trend available. Habitat loss is not a threat in the country, but the impacts of trade are unknown. Annual reports were submitted by Guyana for all years 2007-2016. Exports 2007-2016 were predominantly live wild-sourced birds for commercial purposes (8335 in total as reported by Guyana, and 6147 reported by importers), and were within the annual quota of 990. Guyana responded to the consultation relating to RST. Harvests are managed with closed seasons, but no management plan for the species exists, and surveys were reported to be underway to produce a national population estimate. Until such time as the results of the surveys are known, the basis for non-detriment findings for export of wild-sourced specimens and the establishment of the export quota does not appear robust, and the impact of trade on this species with unknown status in the country is unclear; therefore categorised as Action is needed.</p>	<p>RECOMMENDATION: Action is needed</p>
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<p>SURINAME: Widespread in Suriname, occurring in lowland forest areas across the country. Current population size unknown, but described by birders to be common in the lowland forests, reasonably common in the interior, and rare in the coastal zone and savannah. Population considered to have declined according to traders, and one expert. Habitat loss is not a threat in the country. Annual reports were submitted by Suriname for all years 2007-2015, but not yet for 2016. Exports 2007-2016 were predominantly in live, wild-sourced birds for commercial purposes (1112 as reported by Suriname and 777 as reported by importers), and were within the annual quota of 250. No information on management available. The Management Authority of Suriname responded to the consultation relating to RST noting the need for research studies, but reported that at present there was no functioning Scientific Authority in the country. The basis for non-detriment findings for export of wild-sourced specimens and the establishment of the export quota does not</p>	<p>RECOMMENDATION: Action is needed</p>
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appear robust, and the impact of trade on this species with unknown status in the country is unclear, therefore categorised as Action is needed.

RST Background

Ara chloropterus (Red-and-green macaw) from Guyana and Suriname were selected as priority species-country combinations for review under the RST at AC29, July 2017 (AC29 Com. 5 (Rev. by Sec.), AC29 Summary Record). *A. chloropterus* was identified as a species that met a high volume trade threshold, on the basis of trade data for the period 2011-2015 (AC29 Doc. 13.3 Annex 2 (Rev. 1)).

Previously, *A. chloropterus* was selected for RST at AC5 (August, 1991), post CoP7. At AC9 (September, 1993) the species was categorised as of 'possible concern' in 12 range States, with recommendations issued for Guyana and Suriname. In 1994, Suriname informed the Secretariat that it had prepared a proposal to study the distribution, status and management of psittacines in Suriname, and the Secretariat was satisfied that action had been taken to implement the recommendations (SC35 Doc. 6.2). Guyana provided a draft management plan to the Secretariat.

At AC14 (May, 1998), *A. chloropterus* was selected a second time for RST post CoP10 (AC14 Summary Record). At AC15 (July, 1999) eleven range States were categorised as 'least concern', whilst Guyana was categorised as of 'possible concern'. It was recommended that Guyana should i) adopt an annual export quota of no greater than 990 individuals (as suggested in a report of the CITES field project on 'the Status, management and trade of parrots in the Co-operative Republic of Guyana'), ii) establish and implement a field reporting system to record origin of harvested birds, iii) establish a population monitoring system, iv) consult with the SA to base future harvests and export quotas on the methods used in the field project and systems developed in ii) and iii), and v) maintain traditionally practised trapping and export seasons (Doc. AC.16.7.1 Annex 1). Guyana subsequently notified the Parties of its 2001 export quota of 990 live (Notif. No. 2001/019, Annex), and has published export quotas annually for the same amount. It was reported at SC45 in 2001 that, as recommended, a field reporting system was being established, a field survey was currently under way and that Guyana would continue to liaise with the Secretariat on the establishment of quotas and controls over harvesting (SC45 Doc. 12, AC17 Doc. 7.1). It was concluded that no further action was required, provided that the Secretariat was kept informed of the implementation of recommendations ii) - v) (SC45 Doc. 12, AC17 Doc. 7.1). No further updates were provided by the Secretariat.

B. Species characteristics

Taxonomic note: Ridgely (1981) noted that this species may be misidentified as *Ara macao* and may be traded under this name.

Biology: *Ara chloropterus* [*A. chloroptera*] is a large macaw measuring 68 to 93.5 cm (Abramson and Speer, 1996) and weighing between 1100 and 1400 g (Low, 1990) or up to 1500 g (Sick, 1993). It [*A. chloroptera*] was described as mostly dark red in colour, with light and dark blue and green on parts of its wings, and grey feet (Low, 1990).

It [*A. chloroptera*] was noted to occur at altitudes ranging from 0 to 500 m (Ridgely and Greenfield, 2001b; Clements and Shany, 2001), but other authors suggested higher altitudinal limits of 1000m (Low, 1990; Crease, 2009), 1400 m (Stotz *et al.*, 1996) or 1600 m above sea level (Rodner *et al.*, 2000). It [*A. chloroptera*] was reported to inhabit humid lowland forest, gallery forest, savannah with scattered trees, partially cleared terrain (Hilty and Brown, 1986), and seasonally flooded forest (Braun *et al.*,

2007); mainly occurring in *terra firme* rainforest in the northern part of its range, while in the southern and eastern part of its range it was reported from drier areas, such as floodplain forest, upland forest and dry woodland (Juniper and Parr, 1998). It was noted that the species [*A. chloroptera*] appeared to favour hilly areas (Ridgely and Greenfield, 2001a), and Haugaasen and Peres (2008) commented that the highest densities were found in várzea¹⁰ forests. It was reported generally to be seen in pairs or small flocks (Abramson and Speer, 1996) of up to 30 or more individuals in the lowlands (Hilty, 2003), and was often found associated with other large macaw species, such as *A. macao* and *A. ararauna* (Forshaw and Cooper, 1989). Flocks of 2.5 ± 0.7 individuals were observed in Yasuní National Park in Ecuador (Rasmussen, 1999), and flocks of 2.2 ± 1.0 were recorded in Manu in Peru in 1992 (Gilardi and Munn, 1998).

The species was reported to feed on large fruits and nuts (Low, 1990).

Breeding was noted to take place in the wet season between November and March in Tambopata in southeast Peru (Brightsmith, 2005), producing clutches of 1-4 (Abramson and Speer, 1996) or 2-3 eggs (Juniper and Parr, 1998) in nests in tree hollows or cliff sites (Abramson and Speer, 1996). Nest success was reported to be 40 to 50 per cent, producing 0.53-0.8 per cent fledglings per breeding pair (Renton and Brightsmith, 2009). Renton and Brightsmith (2009) further found that *A. chloropterus* showed a preference for nest sites in *Dipteryx* trees; slow growing hardwoods which may live for over 1000 years (Chambers *et al.*, 1998).

It was commented that the species was sometimes confused with the scarlet macaw *Ara macao*, but that *A. chloropterus* [*A. chloroptera*] was much larger with red facial feathers traversing the white facial patch, more red plumage (Meyer de Schauensee, 1982), a green patch on its wing (Abramson and Speer, 1996) and without yellow in the wing (Sick, 1993).

Distribution: The species [*A. chloroptera*] was described as having an extensive but declining range (Low, 1990) from eastern Panama through northern and central South America east of the Andes to Paraguay and northern Argentina in the south and the Guianas in the east (Juniper and Parr, 1998; Dickinson, 2003; Forshaw, 2010), including lowland Colombia (Hilty and Brown, 1986; del Hoyo *et al.*, 2014), Venezuela (Hilty, 2003; del Hoyo *et al.*, 2014), north-central (Dickinson and Remsen Jr, 2013) and south Brazil, Paraguay (Dickinson, 2003; del Hoyo *et al.*, 2014), east Ecuador (Ridgely and Greenfield, 2001b; del Hoyo *et al.*, 2014), east Peru, and north-east Bolivia (del Hoyo *et al.*, 2014). The estimated extent of occurrence of was 10 500 000 km² (BirdLife International, 2016), an increase of 2 400 000 km² from previous estimates of 8 100 000 km² (Parker *et al.*, 1996; Montemaggiori *et al.*, 2005; BirdLife International, 2012).

Some authors (Abramson and Speer, 1996; Montemaggiori *et al.*, 2005; BirdLife International, 2012, 2016) stated that the species [*A. chloroptera*] also occurred in northern Argentina, however others (Low, 1990; Volpe *et al.*, 2017) reported it to be extinct in Argentina. Low (1990) also reported the species to be extinct in southeast Brazil, although noted that it [*A. chloroptera*] survived in “substantial numbers in undisturbed areas of Amazonia and the Guianas”.

Population status and trends: *A. chloropterus* was categorised as Least Concern in the IUCN Red List, as despite the fact that the population size has not been quantified and the population trend appears to be decreasing, the species has an extremely large range and was not thought to meet the

¹⁰ Várzea forest is an Amazonian forest which is seasonally flooded with whitewater. This differs from igapó forest, which is seasonally flooded with blackwater, and *terra firme* forest which is unflooded.

thresholds for Vulnerable (BirdLife International, 2012, 2016). The population was suspected to be in decline by BirdLife International (2016).

O'Shea (pers. comm. to UNEP-WCMC, 2018) commented that he had not observed a “notable decline” in the species in the Guianas over the last 18 years, but that “they clearly undergo local declines around mining settlements, which are becoming more widespread”.

The species was reported to occur at naturally lower densities than other large macaws (Abramson and Speer, 1996; Forshaw, 2010), and was estimated to occur at a density of 1.78 individuals per km² in Tambopata, in southeast Peru (Lee and Marsden, 2012).

Juniper and Parr (1998) reported the species to be “mostly absent near population centres and declining or already disappeared at peripheries of range owing to habitat loss, trade and hunting”, and Lambert *et al.* (1993) estimated the global population at less than 100 000 birds and declining. The species [*A. chloroptera*] was described as “widespread” but “not numerous” (Low, 1990). Sick (1993) described the species [*A. chloroptera*] as “formerly common on coastal rivers with forested edges in eastern Brazil”.

It was reported that populations had declined due to a combination of capture for trade and habitat loss, with declining populations at the periphery of its range (Montemaggiori *et al.*, 2005). Abramson and Speer (1996) stated that numbers in French Guiana were “greatly reduced by hunting”.

Threats: BirdLife International (2016) considered ongoing habitat destruction and unsustainable levels of exploitation to be the primary threats to the species. O'Shea (pers. comm. to UNEP-WCMC, 2018) considered that trapping for household pets and international trade was the species' primary threat, and noted that the species was only occasionally hunted for food, except in the far southern regions in the territories of the Trio and Wayana communities.

The species has been reported in illegal trade, with two individuals seized in Argentina in 1996 (TRAFFIC, 2009) and Taiwan noted as an “important destination for live birds” such as *A. chloropterus* (TRAFFIC, 2016). In 2003, an individual was arrested for smuggling the species into the United States (USFWS, 2004), and Shepherd *et al.* (2004) observed *A. chloropterus* [*A. chloroptera*] for sale in Medan, reportedly having been smuggled in from Singapore. Herrera and Hennessey (2007) added that the species [*A. chloroptera*] commanded the second highest price of parrots traded, USD 500- 875. In the EU, individuals were reported to be on sale for EUR 1600 per pair (Theile *et al.*, 2004).

With regard to habitat loss and disturbance, the species was predicted to lose 17.9 % of suitable habitat within its distribution range (Bird *et al.*, 2012) over 38 years (three generations) from 2002, based on the model of Amazonian deforestation by Soares-Filho *et al.* (2006). Ridgely (1981) considered the species to be particularly susceptible to disturbance, being the first macaw to disappear from settled areas, and was reported to have become extinct in Sooretama Reserve in eastern Brazil (22 000 ha), indicating that large areas of undisturbed forest are needed to preserve it (Ridgely, 1981). However, O'Shea (pers. comm. to UNEP-WCMC, 2018) reported that plenty of habitat for the species remained. O'Neill (1981) blamed persecution for local population declines in Peru.

Overview of trade and management: *A. chloropterus* was listed in CITES Appendix II on 6th June 1981, as part of the family listing for Psittacidae. According to data in the CITES Trade Database, global direct trade in *A. chloropterus* predominantly comprised live birds with 26 873 birds reported by exporters and 14 454 reported by importers 2007–2016. According to data reported by exporters, trade in live *A. chloropterus* increased from 2007 to a peak in 2014 (5849 birds) before subsequently declining; importer reported trade peaked in 2011 (2440 birds).

González (2003) reported that despite being banned by national laws since 1973, the harvesting and domestic trade of psittacines was still common in the north-eastern Peruvian Amazon. The species [*A. chloroptera*] was described as “common” in captivity (Low, 1990).

To address threats, Berkunsky *et al.* (2017) suggested that priority should be given to reducing the capture of wild parrots for the pet trade, and protecting populations located at agricultural frontiers.

C. Country reviews

Guyana

Distribution: *Ara chloropterus* appears to occur throughout the entire country, according to a species range map by del Hoyo *et al.* (2014). The species was reported to be present in lowland forest areas in the country (Braun *et al.*, 2000, in: Hanks, 2005). The Management Authority (MA) of Guyana (*in litt.* to CITES Secretariat, 2017) reported that suitable habitat for the species was found throughout the country, including human settlements where the species was reported to feed.

Population status and trends: Ridgely *et al.* (2005) reported that the Iwokrama Forest in central Guyana had a “healthy population”, and was “by far the most numerous macaw”. O’Shea (pers. comm. to UNEP-WCMC, 2018) stated that the species was “reasonably common” in the interior of the country, but that “there is no good long-term dataset that could shed light on population size or recent trends”. Braun *et al.* (2000, in: Hanks, 2005) devised a scale to measure species’ abundance, with 5 indicating “most abundant” and 1 indicating “most rare”, on which *A. chloropterus* measured 4. In a country field checklist, the species was described as “fairly common” in Guyana with “5-20 individuals encountered daily in prime habitat and season”, although no method of establishing this estimation was mentioned (Braun *et al.*, 2007). Berkunsky *et al.* (2017) reported that they had been unable to find population trend data for any parrot populations in Guyana.

The MA of Guyana (*in litt.* to CITES Secretariat, 2017) considered that the species was unlikely to be declining due to a low level of threats, and noted that traders reported no difficulty in locating the species.

Threats: The MA of Guyana (*in litt.* to CITES Secretariat, 2017) stated that the only threat in Guyana was harvesting for trade, but added that the evidence suggested that the threat was not significant. Hanks (2005) reported that the species was harvested in several regions, including the east coast (Charity in Pomeroon-Supernaan region, Mabaruma in Barima Waini region), and in Lethem (in the Upper Takutu-Upper Essequibo Region) in the southwest of the country. In the northwest, trappers were reported to go on “lengthy” trips to collect the species on the Courantyne River (Hanks, 2005); in the southwest the species was noted to be collected from the Rupununi River.

The species was reported not to be utilised locally in any significant ways (MA of Guyana, *in litt.* to CITES Secretariat, 2017), but was reported to be threatened by habitat loss (BirdLife International, 2016). However, it was stated that Guyana’s forest ecosystems cover over 80 % of its land mass, with average deforestation rates below 0.1 % for several years (Martino *et al.*, 2016, in: MA of Guyana, *in litt.* to CITES Secretariat, 2017). FAO (2015) reported a national reduction of forest area in Guyana of 0 % from 1990 to 2015.

Trade: CITES annual reports were submitted for all years by Guyana for the period 2007-2016. Guyana’s annual reports for 2011 and 2012 covered the period April 2011 to April 2012 and April 2012 to April 2013, respectively. The annual report received for 2013 covered April-December 2013. Guyana published export quotas for trade in live *A. chloropterus* on an annual basis 2007-2017 (Table 1). Quotas

published in 2010-2013 covered trade across multiple years. Importer reported trade in *A. chloropterus* appeared to exceed the quotas published by Guyana in 2015 and 2016 (Table 1). Guyana's annual reports for 2015 and 2016 were based on actual trade and a permit analysis identified a number of cases of potential discrepancies in the reporting of imports of live *A. chloropterus* from Guyana by importing countries, such as the inclusion of the same permit in two different annual reports. As such it seems likely that the quotas published in 2015 and 2016 were in fact not exceeded.

According to the MA of Guyana (*in litt.* to CITES Secretariat, 2017), an annual quota of 990 individuals has been in place for decades and exports have been, on average, 88% of the quota over the past five years. The higher quota in 2014 was a result of cutting the 2013 export year short, to align the licensing year with the calendar year (MA of Guyana, *in litt.* to CITES Secretariat, 2017).

Table 1: CITES export quotas for live wild-sourced *Ara chloropterus* from Guyana, 2007-2017, and global direct exports as reported by countries of import and Guyana, 2007-2016. Guyana has submitted all annual reports 2007-2016.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Quota	990	990	990	990 ¹¹	990 ¹²	990 ¹³	990 ¹⁴	1126	990	990	990
Reported by Guyana	627	915	842	742	826	745	823	1036	954	921	-
Reported by importer	458	290	643	412	644	800	700	1051	1106	1052	-

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

According to data in the CITES Trade Database, direct trade in *A. chloropterus* from Guyana predominantly consisted of live, wild-sourced birds for commercial purposes, with 8335 reported by Guyana and 6147 reported by importing countries 2007-2016 (Table 2). According to data reported by Guyana, direct exports peaked in 2014 with 1036 live birds with trade in all other years remaining between 600 and 1000 individuals. Importer reported data has increased year on year since 2010 to a peak in 2015.

¹¹ The export quotas of Guyana cover the period from 9 March 2010 to 8 March 2011

¹² The export quotas of Guyana cover the period from 4 April 2011 to 3 April 2012

¹³ The export quotas of Guyana cover the period from 4 April 2012 to 3 April 2013

¹⁴ The export quotas of Guyana cover the period from 4 April 2013 to 3 April 2014

Table 2: Direct exports of *Ara chloropterus* from Guyana, 2007-2016. Guyana has submitted all annual reports 2007-2016. All direct trade was in wild-sourced birds. Quantities rounded to one decimal place, where appropriate.

Term	Unit	Purpose	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total		
feathers	-	P	Exporter	52										52		
			Importer													
live	-	B	Exporter													
			Importer			20	17	38	62	16	101	101	235	590		
		P	Exporter													
			Importer		6										6	
		T	Exporter	627	915	822	742	750	745	823	1036	954	921	8335		
			Importer	458	204	623	286	565	641	684	901	968	817	6147		
		Z	Exporter			20		76							96	
			Importer		80		109	41	97		49	37			413	
		specimens	I	M	Exporter				0							0
					Importer				<0.1							<0.1
S	Exporter			<0.1		0							0		<0.1	
	Importer			0		<0.1						<0.1	<0.1		<0.1	
T	Exporter			<0.1	<0.1	<0.1	0.1	<0.1	0.1	<0.1	0.2	0.2	<0.1	<0.1	0.2	
	Importer			0	<0.1	<0.1	0	<0.1	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	
-	M			Exporter												
				Importer				15				8	8		31	
S	Exporter															
	Importer			4		22			5	21	4	36	37	129		
T	Exporter				20		30	3	17	1					71	
	Importer					1	2	14		8	13	16	8	62		

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Moderate levels of indirect trade in *A. chloropterus* originating in Guyana were reported 2007-2016 primarily comprising live, wild-sourced birds for commercial purposes (Table 3).

Table 3: Indirect exports of *Ara chloropterus* originating in Guyana, 2007-2016. All indirect trade was in live birds.

Purpose	Source	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
B	W	Exporter				30		4					34
		Importer									146		146
P	W	Exporter			2	11	17	6	1	2	4	9	52
		Importer						3					3
Q	U	Exporter	1										1
		Importer											
	W	Exporter		4	3	5	4	4	5		12	3	40
		Importer					2	2	1		6	4	15
T	C	Exporter	25					30					55
		Importer											
	W	Exporter	6	22	44	161	110	128	73	102	1	39	686
		Importer	58	7	52	29	24	48	88	80			66
Z	C	Exporter											
		Importer			10								
	W	Exporter				16							16
		Importer			30	3							
-	-	Exporter									6		6
		Importer											

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

The MA of Guyana (*in litt.* to CITES Secretariat, 2017) reported that trade was “only minimally affected by the closure of the European market in 2005 and quickly rebounded”.

Management: Guyana became a Party to CITES on 27th May 1977, with entry into force on 25th August 1977 (CITES, 2018).

The MA of Guyana (*in litt.* to CITES Secretariat, 2017) stated that *A. chloropterus* occurs in several protected or managed areas (although none were specified), and there is currently no species-specific management plan in place for the species on the basis of the population status in Guyana. The MA of Guyana (*in litt.* to CITES Secretariat, 2017) noted that the Wildlife Conservation and Management Commission had commenced work on monitoring populations of traded species of psittacines including *A. chloropterus* to produce an estimation of the population of these species in Guyana, although *A. chloropterus* had not been highlighted as one requiring special attention because of reduced abundance. The MA of Guyana (*in litt.* to CITES Secretariat, 2017) added that the species is “otherwise monitored by its performance in trade”.

The MA of Guyana (*in litt.* to CITES Secretariat, 2017) reported that harvesting for the trade in wild-caught birds takes place from 01 June to 31 December each year, and harvesting is not permitted from January to May (coinciding with the breeding and nesting season).

Guyana’s Wildlife Conservation and Management Act 2016 addresses the protection, management, sustainable use and trade of Guyana’s wildlife, and states that all trappers and commercial exporters, apart from those who trap for “sustenance”, must be licensed annually by the Management Authority and accurate records must be kept (Government of Guyana, 2016). The Act applies to all of Guyana’s wildlife, and *A. chloropterus* is included in the Second Schedule (Government of Guyana, 2009, 2016), corresponding with a CITES Appendix II listing. However, the species is not included in the Schedules of Guyana’s Wild Birds Protection Act (Government of Guyana, 1997) or the Wildlife Import and Export Act (Government of Guyana, 2013).

O’Shea (pers. comm. to UNEP-WCMC, 2018) commented that “enforcement of existing laws is weak”.

Through its national legislation project, the CITES Secretariat categorised the national legislation in Guyana as legislation that is believed generally to meet all four requirements for effective implementation of CITES (CITES Secretariat, 2017).

Suriname

Distribution: *A. chloropterus* appears to occur throughout the entire country, according to a species range map by BirdLife International and Handbook of the Birds of World (del Hoyo *et al.*, 2014). *A. chloropterus* was confirmed to occur in Suriname (Mittermeier *et al.*, 1990; Rodner *et al.*, 2000; Milensky *et al.*, 2005) and was recorded in a 2005 survey on Lely plateau in the northeast of the country (Alonso and Mol, 2007). Previously, Haverschmidt (1968) described it as “more a bird of the forests of the interior where it is seen in small flocks.”

Population status and trends: Berkunsky *et al.* (2017) reported that they had been unable to find population trend data for any parrot populations in Suriname. O’Shea (pers. comm. to UNEP-WCMC, 2018) stated that the species was “reasonably common” in the interior of the country, but that “there is no good long-term dataset that could shed light on population size or recent trends”.

Based on the distribution of 278 observations, generally collected by experienced birders, *A. chloropterus* was considered “common” in the rainforest zone under 400 m, “uncommon” in the rainforest zone above 400 m, and “rare” in the coastal zone, northern savannah zone and the Sipaliwini savannah in the deep south (Ribot, 2017).

A. chloropterus was reported to be “rare” in Brownsberg Nature Park (Fitzgerald *et al.*, 2002).

Van Andel *et al.* (2003) stated that exporters in Suriname reported a decline in the availability of *A. chloropterus*. Ottema (pers. comm. to UNEP-WCMC, 2018) considered that the species was previously common in the interior, but estimated that population had declined by >90% in the eastern parts of the country, and > 20% in the west.

Threats: Ottema (pers. comm. to UNEP-WCMC, 2018) considered that hunting for local trade was a threat to the species in Suriname. FAO (2015) reported a national reduction of forest area in Suriname of 0 % from 1990 to 2015.

Trade: CITES annual reports were submitted for all years by Suriname for the period 2007-2015; no annual report had been submitted for 2016 at the time of writing. Suriname published export quotas for live *A. chloropterus* 2007-2014 and 2016 (Table 4). Trade reported by Suriname appeared to exceed published quotas in 2008 and 2014 (Table 4). A permit analysis revealed 30 live wild-sourced birds reported by Suriname as exported in 2008 were exported on permits which were issued in 2007, therefore bringing trade in 2008 under quota.

Table 4: CITES export quotas for live, wild-sourced *Ara chloropterus* from Suriname, 2007-2016, and global direct exports as reported by countries of import and Suriname, 2007-2016. Suriname has submitted all annual reports 2007-2015, no report had been received for 2016 at the time of writing.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Quota	250	250	250	250	250	250	250	250	-	250	250
Reported by Suriname	149	254	151	235	225	239	194	286	262	-	-
Reported by importer	51	98	130	125	107	119	102	196	243	206	-

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

According to data in the CITES Trade Database, direct trade in *A. chloropterus* from Suriname predominantly consisted of live, wild-sourced birds for commercial purposes, with 1112 reported by Suriname 2007-2015 and 777 reported by importing countries 2007-2016 (Table 5). Direct exports of live, wild-sourced birds for commercial purposes fluctuated year on year, with trade reported by Suriname peaking in 2008. According to importer reported data, direct exports of live wild-sourced birds for commercial purposes remained relatively stable 2007-2012 after which trade increased year on year to a peak in 2015 of 155 birds.

Table 5: Direct exports of *Ara chloropterus* from Suriname, 2007-2016. Suriname has submitted all annual reports 2007-2015.

Term	Purpose	Source	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total		
feathers	S	W	Exporter				286						-	286		
			Importer													
live	B	C	Exporter											-		
			Importer				20								20	
			Exporter	39	16	63	139	135	122	46	72	95	-	727		
			Importer	40	74	57	65	90	10	35	78	66	515			
			Exporter							2					-	2
			Importer													
	T	F	Exporter											-		
			Importer							2		2		4		
			Exporter	104	228	88	86	80	95	114	150	167	-	1112		
			Importer	45	58	56	68	42	29	82	108	155	134	777		
	Z	W	Exporter	6	10		10	10	20	34	64			154		
			Importer	6						10	53	10	6	85		
specimens	S	W	Exporter	20	58	148	104	206	71		52	28		687		
			Importer													

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Low levels of indirect trade in *A. chloropterus* originating in Suriname were reported 2007–2016, primarily comprising live, wild-sourced birds for commercial purposes (Table 6). Over 48 per cent of exporter reported and 90 per cent of importer reported trade in live wild-sourced birds for commercial purposes was reported in 2016.

Table 6: Indirect exports of *Ara chloropterus* originating in Suriname, 2007-2016. All indirect trade was in live birds.

Purpose	Source	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
B	W	Exporter							4	2			6
		Importer							4				
P	W	Exporter		2	2		6						10
		Importer			2								
Q	W	Exporter			1	1	1	3	2		3	2	13
		Importer									1	4	5
T	C	Exporter	10										10
		Importer											
	W	Exporter	6	4	25		42	29	4	4		108	222
		Importer							6	4		95	105

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Management: Suriname became a Party to CITES on 17th November 1980, with entry into force on 15th February 1981 (CITES, 2018).

Suriname's Nature Conservation Act 1954 aims to protect and preserve the country's natural resources through a network of nature reserves, in which catching and hunting wildlife is forbidden (Government of Suriname, 1954a). The Hunting Act 1954 forbids the capture, killing and sale of species included in the national list of protected species (Government of Suriname, 1954b). However, no information was located on the protection status of *A. chloropterus*, and it is therefore likely that the species is not protected. The Ministry of Labour, Technological Development and Environment was reported to be responsible for Suriname's environmental policy, while the Ministry of Physical Planning, Land and Forest Management and the Ministry of Agriculture, Animal Husbandry and Fisheries are responsible for the management of wild and domesticated biodiversity (ATM, 2013). All birds may be hunted all year round in the southern half of the country with no limit on the number of individuals that may be taken, and from July to November in the northern part of the country, with a limit of five individuals per bag (Government of Suriname, 2012). However, O'Shea (pers. comm. to UNEP-WCMC, 2018) commented that "enforcement of existing laws is weak".

All birds appear to be protected under the Game Law (denoting that their capture, killing or commercial use is prohibited), apart from those designated as game species, "cage species" (to be trapped alive) or harmful species, for which seasons and bag sizes are established (Government of Suriname, 1954b). Protection also reportedly exists for species within the southern zone (Government of Suriname, 2012), as laid down in the Hunting Decree of 2002 (Ottema, 2009; Government of Suriname, 2012).

The CITES Secretariat categorised the national legislation in Suriname as legislation that is believed generally to meet one to three of the four requirements for effective implementation of CITES (CITES Secretariat, 2017). Suriname enacted and submitted CITES legislation to the Secretariat for analysis in November 2017 (CITES Secretariat, 2017).

The MA of Suriname (pers. comm. to Secretariat and UNEP-WCMC, 2018) noted that they had undertaken interviews with trappers, but that the results were not yet available. It was reported that the Ministry of Physical Planning, Land and Forest Management was aware that research studies were needed, and that this would be done by the University of Suriname, however the CITES Scientific

Authority that had been established in 2016 was no longer functioning in the country (MA of Suriname, pers. comm. to Secretariat and UNEP-WCMC, 2018).

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

Illegal trade in this species was highlighted (see 'Threats').

E. References

- Abramson, J. and Speer, B.L. 1996. *The large Macaws, their care, breeding and conservation*. Thomsen, J.B. (Ed.). Raintree Publications, Fort Bragg, California. 552 pp.
- Alonso, L.E. and Mol, J.H. 2007. A Rapid Biological Assessment of the Lely and Nassau Plateaus, Suriname (with additional information on the Brownsberg Plateau). In: *RAP Bulletin of Biological Assessment*. Conservation International, Arlington, VA, USA.
- van Andel, T.R., MacKinven, A. and Bánki, O. 2003. *Commercial Non-Timber Forest Products of the Guiana Shield. An inventory of commercial NTFP extraction and possibilities for sustainable harvesting*. Netherlands Committee for IUCN, Amsterdam, Netherlands.
- ATM 2013. *Republic of Suriname National Biodiversity Action Plan (NBAP) 2012-2016*. Ministry of Labour, Technological Development and Environment (ATM), Paramaribo, Suriname. 84 pp.
- Berkunsky, I., Quillfeldt, P., Brightsmith, D.J., Abbud, M.C., Aguilar, J.M.R.E., Alemán-Zelaya, U., Aramburú, R.M., Arce Arias, A., Balas McNab, R., Balsby, T.J.S. *et al.* 2017. Current threats faced by Neotropical parrot populations. *Biological Conservation*, 214: 278–287.
- Bird, J.P., Buchanan, G.M., Lees, A.C., Clay, R.P., Develey, P.F., Yépez, I. and Butchart, S.H.M. 2012. Integrating spatially explicit habitat projections into extinction risk assessments: A reassessment of Amazonian avifauna incorporating projected deforestation. *Diversity and Distributions*, 18(3): 273–281.
- BirdLife International 2012. *Ara chloropterus*. *The IUCN Red List of Threatened Species 2012*: e.T22685566A39037091. Available at: <http://dx.doi.org/10.2305/IUCN.UK.2012-%0A1.RLTS.T22685566A39037091.en>. [Accessed: 11/04/2018].
- BirdLife International 2016. *Ara chloropterus*. *The IUCN Red List of Threatened Species 2016*: e.T22685566A93080287. Available at: <http://www.iucnredlist.org/details/full/22685566/o>. [Accessed: 11/04/2018].
- Braun, M.J., Finch, D.W., Robbins, M.B. and Schmidt, B.K. 2007. *A field checklist of the birds of Guyana*. Smithsonian Institution, Washington D. C. 36 pp.
- Braun, M.J., Finch, D.W., Robbins, M.B. and Schmidt, B.K. 2000. *A field checklist of the birds of Guyana*. Smithsonian Institution, Washington, D. C. 27 pp.
- Brightsmith, D.J. 2005. Parrot nesting in southeastern Peru: seasonal patterns and keystone trees. *The Wilson Bulletin*, 117(3): 296–305.
- Chambers, J.Q., Higuchi, N. and Schimel, J.P. 1998. Ancient trees in Amazonia. *Nature*, 391(135): 136.
- CITES 2018. *List of contracting Parties*. Available at: https://cites.org/eng/disc/parties/chronolo.php?order=field_country_official_name&sort=asc. [Accessed: 15/03/2018].
- CITES Secretariat 2017. *Status of legislative progress for implementing CITES*. Available at: https://cites.org/sites/default/files/eng/prog/Legislation/CITES_national_legislative_status_table.pdf. [Accessed: 11/04/2018].
- Clements, J.F. and Shany, N. 2001. *A Field Guide to the Birds of Peru*. Ibis Publishing Company, Temecula, California. 281 pp.
- Crease, A. 2009. Avian range extensions from the southern headwaters of the río Caroní, Gran Sabana, Bolívar, Venezuela. *Cotinga*, 31: 5–19.
- Dickinson, E.C. 2003. *The Howard and Moore complete checklist of the birds of the world. 3rd Edition*. Christopher Helm Publishers Ltd., London, UK.
- Dickinson, E.C. and Remsen Jr, J.V. 2013. *The Howard and Moore Complete Checklist of the Birds of the World. 4th edition. Volume 1: Non-Passerines*. Aves Press, Eastbourne, United Kingdom. 461 pp.
- FAO 2015. *Global Forest Resources Assessment 2015. Desk reference*. Food and Agriculture Organization

- of the United Nations, Rome, Italy. 244 pp.
- Fitzgerald, K.A., De Dijn, B.P.E. and Mitro, S. 2002. *Ecological research & monitoring program 2001-2006*. STINASU - Foundation for Nature Conservation in Suriname, Paramaribo, Suriname. 96 pp.
- Forshaw, J. and Cooper, W. 1989. *Parrots of the World, 3rd (revised) edn*. Weldon Publishing, Willoughby, NSW. 616 pp.
- Forshaw, J.M. 2010. *Parrots of the World*. A & C Black, London. 328 pp.
- Gilardi, J.D. and Munn, C.A. 1998. Patterns of activity, flocking, and habitat use in parrots of the Peruvian Amazon. *The Condor*, 100(4): 641–653.
- González, J. a 2003. Harvesting, local trade, and conservation of parrots in the Northeastern Peruvian Amazon. *Biological Conservation*, 114(3): 437–446.
- Government of Guyana 2009. *Environmental Protection (Wildlife Management and Conservation) Regulations, 2009*. Government of Guyana National Printers Ltd, Georgetown. 45 pp.
- Government of Guyana 1997. *Wild Birds Protection Act*. 9 pp.
- Government of Guyana 2016. *Wildlife Conservation and Management Bill*. 153 pp.
- Government of Guyana 2013. *Wildlife Import and Export Act*. 135 pp.
- Government of Suriname 2012. *Hunting calendar. Ministerie van Ruimtelijke Ordening, Grond- en Bosbeheer. Jachtkalender*. Available at: <http://www.gov.sr/media/741247/jachtkalender.pdf>. [Accessed: 15/03/2018].
- Government of Suriname 1954a. *Law of 3 April 1954, containing provisions for the protection and preservation of Suriname's natural monuments (GB 1954 no. 26), as it reads after the in modifications made to GB 1954 no. 105, SB 1980 no. 116, SB 1992 no. 80*. 3 pp.
- Government of Suriname 1954b. *Law of 3 April 1954 on provisions for the protection of fauna and arrangement of hunting in Suriname (GB 1954 no. 25), as it reads after the therein modifications made to GB 1954 no. 106, GB 1971 no. 61, SB 1980 no. 99, SB 1980 No. 116, SB 1982 No. 159 an*. 8 pp.
- Hanks, C.K. 2005. *Spatial Patterns in Guyana's Wild Bird Trade*. University of Texas. 111 pp.
- Haugaasen, T. and Peres, C. a. 2008. Population abundance and biomass of large-bodied birds in Amazonian flooded and unflooded forests. *Bird Conservation International*, 18: 87–101.
- Haverschmidt, F. 1968. *Birds of Surinam*. Oliver and Boyd, Edinburgh. 474 pp.
- Herrera, M. and Hennessey, B. 2007. Quantifying the illegal parrot trade in Santa Cruz de la Sierra, Bolivia, with emphasis on threatened species. *Bird Conservation International*, 17: 295–300.
- Hilty, S.L. 2003. *Birds of Venezuela*. Christopher Helm A & C Black, London, UK. 876 pp.
- Hilty, S.L. and Brown, W.L. 1986. *A guide to the birds of Colombia*. Princeton University Press, Princeton, New Jersey.
- del Hoyo, J., Collar, N.J., Christie, D.A., Elliott, A. and Fishpool, L.D.C. 2014. *HBW and BirdLife International illustrated checklist of the birds of the world. Volume 1: Non-passerines*. Lynx Edicions, Barcelona. 903 pp.
- Juniper, T. and Parr, M. 1998. *Parrots: a guide to the parrots of the world*. Pica Press, Robertsbridge, UK.
- Lambert, F., Wirth, R., Seal, U.S., Thomsen, J.B. and Ellis-Joseph, S. 1993. *Parrots: An action plan for their conservation 1993-1998*. BirdLife International, Cambridge, United Kingdom. 143 pp.
- Lee, A.T.K. and Marsden, S.J. 2012. The influence of habitat, season, and detectability on abundance estimates across an Amazonian parrot assemblage. *Biotropica*, 44(4): 537–544.
- Low, R. 1990. *Macaws: a complete guide*. Merehurst Limited, London. 144 pp.
- Management Authority of Guyana 2017. CITES Management Authority of Guyana, Wildlife Conservation and Management Commission *in litt.* to CITES Secretariat, 30 November 2017.
- Management Authority of Suriname. 2018. pers. comm to Secretariat and UNEP-WCMC. 14th March 2018 and 11th April 2018.
- Martino, D., Bholanath, P., Dewnath, N., Persaud, J. and Rampersaud, P. 2016. Chapter 4: Land. *State of the Environment Report 2016*,
- Meyer de Schauensee, R. 1982. *A guide to the birds of South America*. The Academy of Natural Sciences of Philadelphia, Philadelphia, USA. 498 pp.
- Milensky, C., Hinds, W., Aleixo, A. and Lima, M.C. 2005. Birds. In: Hollowell, T. and Reynolds, R.P. (Eds.). *Checklist of the terrestrial vertebrates of the Guiana shield*. Bulletin of the Biological Society of Washington, 13. 43–76.
- Mittermeier, R.A., Malone, S.A.J., Plotkin, M.J., Baal, F.L.J., Mohadin, K., MacKnight, J., Werkhoven, M. and Werner, T.B. 1990. *Conservation Action Plan for Suriname*. Conservation International, Ministry of Natural Resources, Suriname Forest Service, World Wildlife Fund, Foundation for

- Nature Preservation in Suriname (STINASU) and University of Suriname, Washington, D. C. 45 pp.
- Montemaggiore, A., Capula, M., Gippoliti, S., Marsden, S.J., Mertens, A., Rondinini, C., Salerno, G. and Sorace, A. 2005. *A study of species which are subject to import restrictions according to the article 4.6 of Regulation 338/97*. Rome, Italy. 981 pp.
- O'Neill, J.P. 1981. Comments on the status of the parrots occurring in Peru. In: Pasquier, R.F. (Ed.). *Conservation of New World Parrots. ICBP Technical Publication No. 1*. Smithsonian Institution Press, Washington D. C. 419–424.
- O'Shea, B. 2018. Dr Brian O'Shea (Collections Manager for Ornithology, North Carolina Museum of Natural Science) pers. comm. to UNEP-WCMC, 06 March 2018.
- Ottema, O.H. 2009. Suriname. In: Devenish, C., Díaz Fernández, D.F., Clay, R.P., Davidson, I. and Yépez Zabala I., A. (Eds.). *Important Bird Areas Americas - Priority sites for biodiversity conservation*. BirdLife International (Conservation Series No. 16), Quito, Ecuador. 345–350.
- Ottema, O. H. 2012. O. H. Ottema, STINASU (Stichting voor Natuurbehoud in Suriname), pers. comm. to UNEP-WCMC, 15/09/2012.
- Parker, T.A., Stotz, D.F. and Fitzpatrick, J.W. 1996. Ecological and distributional databases. In: Stotz, D.F., Fitzpatrick, J.W., Parker, T.A. and Moskovits, D.K. (Eds.). *Neotropical birds: ecology and conservation*. University of Chicago, Chicago. 131–436.
- Rasmussen, C. 1999. Flock sizes of Parrots recorded in a terra firme lowland rainforest in Parque Nacional Yasuni, Ecuador. *Papageienkunde*, 3: 141–145.
- Renton, K. and Brightsmith, D.J. 2009. Cavity use and reproductive success of nesting macaws in lowland forest of southeast Peru. *Journal of Field Ornithology*, 80(1): 1–8.
- Ribot, J. 2017. *Birds in Suriname, South America: Red and green macaw (Ara chloropterus)*. Available at: <http://www.surinamebirds.nl/php/bird.php?arch>. [Accessed: 11/04/2018].
- Ridgely, R.S. 1981. The current distribution and status of mainland and neotropical parrots. In: Parquier, R.F. (Ed.). *Conservation of New World Parrots. ICBP Technical Publication No.1*. Smithsonian Press, Washington D. C. 233–384.
- Ridgely, R.S., Agro, D. and Joseph, L. 2005. Birds of Iwokrama Forest. In: *Proceedings of the Academy of Natural Sciences of Philadelphia*. Vol. 154. 109–121.
- Ridgely, R.S. and Greenfield, P.J. 2001a. *The Birds of Ecuador: Volume 1. Status, Distribution and Taxonomy*. Christopher Helm, London. 848 pp.
- Ridgely, R.S. and Greenfield, P.J. 2001b. *The birds of Ecuador: Volume 2*. Christopher Helm, London. 740 pp.
- Rodner, C., Lentino, M. and Restall, R. 2000. *Checklist of the birds of northern South America: an annotated checklist of the species and subspecies of Ecuador, Colombia, Venezuela, Aruba, Curacao, Bonaire, Trinidad & Tobago, Guyana, Suriname and French Guiana*. Pica Press, Sussex. 136 pp.
- Shepherd, C.R., Sukumaran, J. and Wich, S.A. 2004. *Open season: An analysis of the pet trade in Medan, Sumatra 1997–2001*. TRAFFIC Southeast Asia, Petaling Jaya, Selangor, Malaysia. 67 pp.
- Sick, H. 1993. *Birds in Brazil: A Natural History*. Princeton University Press, Princeton, New Jersey.
- Soares-Filho, B.S., Nepstad, D.C., Curran, L.M., Cerqueira, G.C., Garcia, R.A., Ramos, C.A., Voll, E., McDonald, A., Lefebvre, P. and Schlesinger, P. 2006. Modelling conservation in the Amazon basin. *Nature*, 440(7083): 520–523.
- Stotz, D.F., Fitzpatrick, J.W., Parker, T.A. and Moskovits, D.K. 1996. *Neotropical birds: ecology and conservation*. University of Chicago Press, Chicago, Illinois. 502 pp.
- Theile, S., Steiner, A. and Kecse-Nagy, K. 2004. *Expanding borders: new challenges for wildlife trade controls in the European Union*. TRAFFIC Europe, Brussels, Belgium. 40 pp.
- TRAFFIC 2016. *Overview of important seizures in the European Union. January to December 2015*. Briefing prepared by TRAFFIC for the European Commission. 12 pp.
- TRAFFIC 2009. Vol. 16 No. 3 (March 1997) to Vol. 29 No. 2 (October 2017). *A compilation of seizures and prosecutions reported in the TRAFFIC Bulletin, 1997–2009*, 1–344.
- USFWS 2004. Éxito del USFWS. In: *The TRAFFIC Report*. United States Fish and Wildlife Service (USFWS). 7.
- Volpe, N.L., Di Giacomo, A.S. and Berkunsky, I. 2017. First experimental release of the red-and-green macaw *Ara chloropterus* in Corrientes, Argentina? *Conservation Evidence*, 14(20): 20.

Poicephalus gulielmi: Mali, Democratic Republic of the Congo

A. Summary

<p>RST Selection Selected in the RST based on high volume trade 2011-2015, and showing a sharp increase in trade from Mali in 2015.</p>	
<p>Global status: Assessed as Least Concern globally. Population size unknown, but suspected to be declining.</p>	
<p>DEMOCRATIC REPUBLIC OF THE CONGO: Occurs across the north of the country, in the extreme southwest and as an isolated population in central DRC. Population size and status in the country is unknown; one preliminary opinion considered the species to be “common but local” in DRC, but stressed that further assessment was needed. Overexploitation was considered a threat to wildlife in DRC, and in 2001 levels of hunting of the species were noted to be high. Annual export quotas of 3000 live birds published 2007-2017, but reduced to 2500 in 2018. Trade was within quota 2007-2016. Annual reports were submitted by DRC for all years 2007-2016. Trade 2007-2018 comprised live, wild-sourced birds for commercial purposes (6455 as reported by DRC). Trade in live wild-sourced birds increased by more than eight times between 2015 and 2016, with 2850 reported exported in 2016. The species is listed as ‘partially protected’ in national legislation and hunting requires a permit. DRC responded to the consultation relating to the RST. It was noted that there was a lack of information available on this species, and the impact of trade could not be determined. Whilst the need for field studies to inform a species management plan was recognised, DRC noted a lack of resources and capacity within the country for national biodiversity management. The basis for non-detriment findings for export of increasing numbers of wild-sourced specimens of this species, which has unknown status in DRC, has not been provided, and the impact of trade is unclear; therefore categorised as Action is needed.</p>	<p>RECOMMENDATION: Action is needed</p>
<p>MALI: Not a range State for <i>P. gulielmi</i>, Discrepancies in annual reports have led to the species-country being selected in the RST. Exports of 2190 live wild-sourced birds were reported by Mali 2007-2016, with importers reporting 4810. Annual reports were submitted by Mali in all years 2007-2014, but not yet for 2015 and 2016. Mali did not respond to the consultation relating to the RST. However, on the basis that the species does not appear to occur in the country, categorised as Less concern.</p>	<p>RECOMMENDATION: Less concern</p>

RST Background

Poicephalus gulielmi (Red-fronted parrot) from Democratic Republic of Congo¹⁵ and Mali were selected as a priority species-country combinations for review under the RST at AC29, July 2017 (AC29 Com. 5 (Rev. by Sec.), AC29 Summary Record). *P. gulielmi* was identified as a species that met a high volume trade threshold, on the basis of trade data for the period 2011-2015, as well as showing a sharp increase in trade from Mali in 2015 (AC29 Doc. 13.3 Annex 2 (Rev. 1)).

P. gulielmi was previously selected for RST at AC10 (May, 1994) post CoP8. Whilst no category was given, recommendations (noted to be outside of the formal process) were issued in 1995 for Côte d'Ivoire, DRC and Guinea; these related to the basis for non-detriment findings. At AC14 (May, 1998) it was reported that there was a ban on export of the species from Guinea, hence no further action was required, that a response had not yet been received from Côte d'Ivoire, and that the species had been confirmed to occur in DRC, where a ten-fold increase in exports 1992-1996 was noted and this would be taken up in a closed session (AC14 Summary Record). At CoP 11 (April, 2000), the Secretariat reported that Côte d'Ivoire had not provided any responses on the scientific basis for exports (Doc. 11.41.1).

B. Species characteristics

Taxonomic note: Three subspecies are currently recognised, *P. g. fantiensis*, *P. g. gulielmi* and *P. g. massaicus* (Dickinson, 2003; Collar and Boesman, 2018).

Biology: *P. gulielmi* is a large parrot (Juniper and Parr, 1998) measuring 26-30 cm in length (Collar and Boesman, 2018), which may occasionally form parapatric¹⁶ species-pairs with *P. robustus* (Collar and Boesman, 2018). A mainly sedentary species with local daily movements, *P. gulielmi* was reported to inhabit montane *Juniperus* and *Podocarpus* forests (1600-3250 m above sea level) in the east of its range, and lowland forest in the remainder of its range (Juniper and Parr, 1998; Collar and Boesman, 2018). The species appears to have a preference for, but is not restricted to, primary forest (Yaokokoré-Béibro, 2010; Yaokokoré-Béibro *et al.*, 2015), with records from secondary forests (in Ghana) and shade trees in coffee plantations (in Angola) (Juniper and Parr, 1998). According to Martin *et al.* (2014) the species is more common in disturbed habitats where it feeds on the seeds of pioneer species. It is usually found in pairs or small groups (up to 10 birds), but larger groups gather where food is abundant (Juniper and Parr, 1998; Borrow and Demey, 2014). Pairs nest in tree holes (Fry *et al.*, 1988) and clutch sizes of two to four eggs were reported (Juniper and Parr, 1998; Collar and Boesman, 2018), which hatch after an incubation period of 26-28 days (Collar and Boesman, 2018). Egg-laying in September was reported from DRC (Juniper and Parr, 1998). The CITES Scientific Authority (SA) of DRC (*in litt.* to UNEP-WCMC, 2018) reported that the species had a low reproductive rate, and life expectancy was approximately 20 years in the wild. The species diet was reported to comprise seeds, fruits, flowers and insects (Juniper and Parr, 1998; Collar and Boesman, 2018).

Distribution: The species occurs in several disjunct populations: in West Africa, from Liberia east to south Ghana (*P. g. fantiensis*) (Juniper and Parr, 1998; Dickinson, 2003; del Hoyo *et al.*, 2014; Collar and Boesman, 2018); and in western-central Africa, from southeast Nigeria and south Cameroon, south to northern Angola and east to east DRC and southwest Uganda (*P. g. gulielmi*) (Dickinson, 2003; del Hoyo *et al.*, 2014; Collar and Boesman, 2018). It is also found in the highlands of west and central Kenya

¹⁵ Hereafter referred to as DRC.

¹⁶ Relationship between species where their ranges are adjacent and only overlap in a narrow zone.

and in the north of the United Republic of Tanzania (*P. g. massaicus*) (Juniper and Parr, 1998; Dickinson, 2003; del Hoyo *et al.*, 2014). A range map for the species is provided in Figure 1.

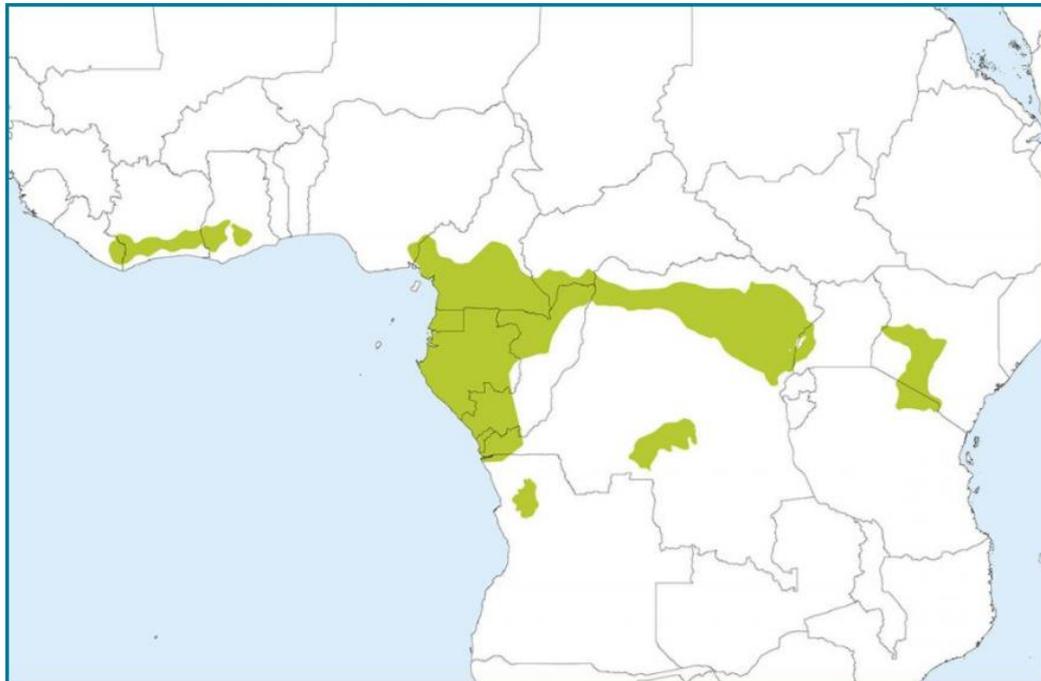


Figure 1. Distribution of *Poicephalus gulielmi* (Collar and Boesman, 2018).

Population status and trends: *P. gulielmi* was categorised as Least Concern by the IUCN in 2016 (BirdLife International, 2016). The species was reported to have a “very large range” (with an estimated extent of occurrence of 5 380 000 km²), and whilst its population size had not been quantified and the population trend appeared to be decreasing, the species did not meet the thresholds for Vulnerable under the population size or trend criteria (BirdLife International, 2016). According to BirdLife International (2016), the declining population trend was suspected to be as a result of ongoing habitat loss and unsustainable levels of exploitation. The species was reported as locally common to abundant in many localities in the east of its range, but apparently declining in others (del Hoyo *et al.*, 1997; Forshaw and Cooper, 1989; Juniper and Parr, 1998). In the west of its range, the species has been described as scarce (Forshaw and Cooper, 1989; Juniper and Parr, 1998) and rare to locally fairly common (del Hoyo *et al.*, 1997; Borrow and Demey, 2014). ‘Major declines’ in west Africa since the 1970s were suspected by Holbech (pers. obs., in: Martin *et al.*, 2014) although it was noted that quantitative assessments were lacking (Martin *et al.*, 2014). It was reported that details of distribution existed for only five of the 13 range States of *P. gulielmi*, and there had been no detailed density estimates, aggregation counts or population monitoring in any of the range States (Martin *et al.*, 2014). Data on life-history and ecology were also considered lacking (Martin *et al.*, 2014).

Threats: *P. gulielmi* was considered to be threatened by habitat destruction and unsustainable levels of exploitation (Juniper and Parr, 1998; Martin *et al.*, 2014; BirdLife International, 2016), and it was noted that trapping for the bird trade may pose a significant threat to the species (Snyder *et al.*, 2000).

The species was included in the West and Central African Bushmeat database as a species that is either hunted, consumed or sold as bushmeat (Taylor *et al.*, 2015). Martin *et al.* (2014) recommended further research into the size, impact and socio-economic context of domestic trade in this species in west and central Africa.

Overview of trade and management: *P. gulielmi* was listed in CITES Appendix III by Ghana on 26th February 1976 and listed in Appendix II on 6th June 1981, as part of the order listing for Psittaciformes. According to data in the CITES Trade Database, global direct trade 2007–2016 was predominantly in live birds for commercial purposes: 15 115 reported by exporters and 13 726 reported by importers. Exporters reported approximately half of trade to be in captive-produced individuals (Source C and F) with the other half wild-sourced, while importers reported 82 per cent of trade to be wild-sourced. Direct exports of live birds was variable over time, but exporter-reported trade peaked in 2016.

P. gulielmi occurs in several protected areas across its range, including Maraoué National Park (Côte d’Ivoire) (Collar and Boesman, 2018), Kakum (Collar and Boesman, 2018) and Bia National Parks (Ghana), Korup National Park (Cameroon) (Juniper and Parr, 1998; Forshaw, 2010; Collar and Boesman, 2018), Arusha National Park (Tanzania) (Forshaw, 2010), and Dzanga reserves and Manovo-Gounda-St Floris National Park (Central African Republic) (Collar and Boesman, 2018).

C. Country reviews

Democratic Republic of Congo

Distribution: The subspecies *P. g. gulielmi* was reported to occur in DRC (Dickinson, 2003; del Hoyo *et al.*, 2014; Collar and Boesman, 2018). A distribution map by Collar and Boesman (2018) indicated that the species occurs across northern DRC (from west to east), in the extreme southwest of the country, and as an isolated population in central DRC. In 2018, the SA of DRC (*in litt.* to UNEP-WCMC, 2018) noted the occurrence of the species in the country.

A checklist of the birds of DRC compiled by Pedersen (2010), 1990–2009, details the distribution of *P. g. gulielmi* in DRC: in the southwest along the coast and in west Kasai Province, and in the north, from Equateur Province (in the northwest) to Uele and the Semliki Valley (in the northeast). The species has been observed in Kisangani [north central DRC], where five sites¹⁷ were surveyed from 1976–2014 (Bapeamoni and Upoki, 2016), and in Kinshasa city, 2006–2014 [west DRC] (Punga and Ifuta, 2015). A single individual was recorded in the Luki Man and Biosphere Reserve (Bas-Congo Province, extreme southwest DRC) 2012–2013 (Liyandja *et al.*, 2015).

The species was considered poorly known throughout much of the Congo basin, particularly in DRC and the Republic of Congo, which were considered likely to represent a large portion of the species range (Martin *et al.*, 2014). Noting the lack of recent data on the distribution of *P. g. gulielmi* in all areas of the Congo Basin, Martin *et al.* (2014) recommended surveys to confirm the species distribution in the region.

Population status and trends: Little information on the current population status of *P. gulielmi* within DRC could be located. Mapunzu (2000) noted that as result of socio-political situation in the country, insufficient information existed for threatened species such as *P. gulielmi*. Scientific data on wild populations of bird species traded in DRC at the local, regional and international levels, including *P. gulielmi*, were reported to be “almost non-existent” (SA of DRC *in litt.* to UNEP-WCMC, 2018).

Pedersen (2010) [unpublished data] described the status of the subspecies *P. g. gulielmi* as “common, but local” in DRC, but cautioned that this opinion was “subjective and in need of further research”. Of the 131 bird species (including *P. gulielmi*) that were recorded in Kinshasa city during a study conducted

¹⁷ Including Masako Forest Reserve, Yoko Forest Reserve, Kungulu (Kongolo) island, Mbiye Island (Bapeamoni and Upoki, 2016).

from 2006-2014, the majority were considered to be of ‘precarious conservation status’ (Punga and Ifuta, 2015).

The species was previously reported to be widely dispersed throughout the forests of the central Congo basin, although nowhere as abundant or conspicuous as *Psittacus erithacus* (Chapin, 1939, in: Forshaw and Cooper, 1989).

Threats: Levels of hunting of *P. guielmi* in DRC were reported to be high (Sébastien and N’yanga-Nzo Kiyulu, 2001). Debroux *et al.* (2007) considered excessive hunting to be a threat to wildlife in DRC, and hunting and the bushmeat trade were reported to be widespread. The growth of the timber industry and increasing access to remote areas as a result of logging, were considered likely to contribute to an intensification of hunting (Debroux *et al.*, 2007). Furthermore, Debroux *et al.* (2007) noted that the majority of DRC’s protected areas were endangered, with a large number described as ‘paper parks’. Poaching and deforestation were reported to pose a threat to wildlife in protected areas, resulting in a loss of biodiversity in these areas (Sébastien and N’yanga-Nzo Kiyulu, 2001).

Overexploitation as a result of uncontrolled hunting and poaching was reported to pose a threat to wildlife in Nord Ubangi [north-east DRC], where *P. guielmi* was reportedly sold at various markets as bushmeat (Ngbolua *et al.*, 2015). Habitats in Kinshasa city and in Kisangani, where the species has been observed, were reported to be under threat from urban expansion (Punga and Ifuta, 2015; Bapeamoni and Upoki, 2016), logging and shifting cultivation (Bapeamoni and Upoki, 2016). During surveys conducted in February 2017, two specimens of *P. guielmi* were observed in an aviary of wildlife traders based in Kinshasa (SA of DRC *in litt.* to UNEP-WCMC, 2018).

According to the SA of DRC (*in litt.* to UNEP-WCMC, 2018), there are no targeted captures, suitable sites for capture, or specific local markets for this species in DRC. However, *P. guielmi* was reported to share the same habitat type as *Psittacus erithacus* for parts of the year and individuals of *P. guielmi* were reported to be caught as by-catch by collectors hunting *P. erithacus* (SA of DRC *in litt.* to UNEP-WCMC, 2018). According to the SA of DRC (*in litt.* to UNEP-WCMC, 2018), trade in *P. guielmi* was reportedly driven by external demand and it was noted that the “few specimens” occasionally observed in aviaries due for export, were attempts at commercial activity.

It was noted that large areas of the species range in DRC were threatened by activities such as mining and logging (SA of DRC *in litt.* to UNEP-WCMC, 2018). Wild birds of *P. guielmi* were also reportedly being negatively impacted by the practice of keeping them in households in urban and rural areas to contribute to “well-being” (Bapeamoni *et al.*, in-press in: SA of DRC *in litt.* UNEP-WCMC, 2018).

DRC’s forests were reported to cover over 65% of its land mass, with average deforestation rates of 0.2% 2010-2015 and a national reduction of forest area of 0.2% from 1990 to 2015 (FAO, 2015).

Trade: The DRC has submitted CITES annual reports for all years 2007-2016. The DRC published an export quota of 3000 live birds every year 2007-2017, but reduced the quota to 2500 in 2018. Direct export of *P. guielmi* 2007-2016 does not appear to have exceeded export quotas, as reported by DRC and countries of import (Table 1).

Table 1: CITES export quotas for live, wild-sourced *Poicephalus guielmi* from the DRC, 2007-2018, and global direct exports of live, wild-sourced *P. guielmi* as reported by the DRC and countries of import, 2007-2016. The DRC has submitted all annual reports 2007-2016.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Quota (live)	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	2500*
Reported by DRC	395		130	550	200	855	825	300	350	2850	-	-
Reported by importer	410	110	150	250	700	1510	100	380	200	400	-	-

*2018 quota did not specify live trade

Direct trade in *P. gulielmi* from DRC 2007-2016 comprised 6455 live wild-sourced birds as reported by DRC and 4210 live wild-sourced birds as reported by countries of import (Table 2). All trade was for commercial purposes. Direct trade reported by the DRC increased by more than eight times between 2015 and 2016 to the highest levels reported during the ten-year period (2850). This coincided with reduced exports of *Psittacus erithacus* from DRC following a suspension for all commercial trade in *P. erithacus* from DRC on 16 March 2016¹⁸ (additionally *P. erithacus* was listed in Appendix I at CoP17, DRC has submitted a reservation against this listing). The increase in 2016 is sufficient to meet the ‘sharp increase’ criterion of the RST selection process. Trade reported by DRC in all other years (2007-2015) remained below 900 live birds. According to importer reported data, trade peaked in 2012 (1510) and remained at or below 700 live birds in all other years 2007-2016.

Table 2: Direct exports of *Poicephalus gulielmi* from DRC 2007-2016. All trade was in live, wild-sourced birds for commercial purposes.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Reported by DRC	395	0	130	550	200	855	825	300	350	2850	6455
Reported by importers	410	110	150	250	700	1510	100	380	200	400	4210

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Indirect trade in *P. gulielmi* originating in DRC 2007-2016 comprised live, wild-sourced birds re-exported by Singapore for commercial purposes in 2012, reported by both Singapore (60 live birds) and countries of import (10 live birds).

Management: DRC became a Party to CITES on 20th July 1976, with entry into force on 18th October 1976 (CITES, 2018).

The SA of DRC (*in litt.* to UNEP-WCMC, 2018) did not confirm whether the species is protected in the country, however, *P. gulielmi* is listed in Appendix II (partially protected species) in the Annexes of Decree 020 of 2006 (Government of the Democratic Republic of the Congo, 2006b). Article 31 of the Law on Hunting of 1982 (no. 82-002) specifies that hunting of partially protected animals in DRC requires a permit (a sport permit, a grand permit for tourism, or special permits issued under conditions established by the hunting authorities) (Government of the Democratic Republic of the Congo, 1982). According to Interministerial bylaw no. 003 of 2006 and no. 099 of 2006 (Government of the Democratic Republic of the Congo, 2006a), taxes for the collection of *P. gulielmi* include: FC 650 00 (Congolese Franc) for capture, FC 4 130 00 for killing and FC 650 00 for detention.

The SA of DRC (*in litt.* to UNEP-WCMC, 2018) stated that the impact of trade in *P. gulielmi* in DRC on the survival of the species in the wild could not be concluded due to the lack of information available for the species. It was also considered “imperative” that field studies be undertaken to obtain information to inform any production of a national management plan for *P. gulielmi* (SA of DRC *in litt.* to UNEP-WCMC, 2018).

The management of biological resources and the environment in DRC was reported to be largely governed by four pieces of legislation: Law no. 82-002 on Fishing and Hunting of 28 May 1982; the Forest Code of 29 August 2002; the Mining Code of 11 July 2002; and Law no. 11/009 of 09 July 2011 on the fundamental principles of environmental protection. According to the SA of DRC (*in litt.* to UNEP-WCMC, 2018), some of these laws had proved ineffective. For example, the law regulating hunting (no. 82-002) was considered out-of-date given the ongoing process of decentralisation in the country (SA of DRC *in litt.* to UNEP-WCMC, 2018). While the Forestry Code was considered insufficient at governing

¹⁸ CITES Notification No. 2016/021

the exploitation of biological resources other than non-timber forest products (NTFPs), such as game birds or bushmeat (SA of DRC *in litt.* to UNEP-WCMC, 2018). It was further noted by the SA of DRC (*in litt.* to UNEP-WCMC, 2018) that specific policies and strategies for wildlife governance were lacking, particularly with respect to wildlife management outside protected areas. The institutions responsible were reported to lack sufficient resources and capacity to successfully manage biodiversity in DRC (SA of DRC *in litt.* to UNEP-WCMC, 2018). It was also noted that compliance with legislation concerning the exploitation of biological resources was significantly constrained by levels of poverty (SA of DRC *in litt.* to UNEP-WCMC, 2018). It was reported that while efforts to enforce existing laws were being made, scientific field research was needed to inform the revision of certain laws to ensure the sustainable use of wildlife in DRC (SA of DRC *in litt.* to UNEP-WCMC, 2018).

According to the SA of DRC (*in litt.* to UNEP-WCMC, 2018), in order to ensure compliance with the Convention and the sustainability of the species in trade, training programmes to develop specialist wildlife managers in DRC were needed.

In 2016, permit irregularities for parrot species from the DRC were identified by the CITES Secretariat in (SC67 Doc. 12.2.1); a permit issued by the MA of DRC for the export of 200 wild *Psittacus erithacus* to Thailand appeared to have been falsified, with the permit originally being granted for 100 *P. gulielmi* (SC67 Doc. 12.2.1).

Through its national legislation project, the CITES Secretariat categorised the national legislation in DRC as Category 1, meaning “legislation that is believed generally to meet all four requirements for effective implementation of CITES” (CITES Secretariat, 2017).

Mali

Distribution: Mali is not considered to be a range State of *P. gulielmi* (Juniper and Parr, 1998; Dickinson, 2003; del Hoyo *et al.*, 2014; Martin *et al.*, 2014; Collar and Boesman, 2018; Martin, 2018).

Trade: Mali has submitted CITES annual reports for all years 2007-2014, although reports for 2015 and 2016 have not yet been received. Mali is not a range State of *P. gulielmi*, however between 2008 and 2014, 2190 live, wild-sourced birds were reported as direct exports from Mali for commercial purposes, with trade increasing more than four-fold between 2013 and 2014 (Table 1). According to importer reported data, a total of 4810 live, wild-sourced birds were imported from Mali 2008-2016. Trade reported by importers increased year-on-year between 2011 and 2015 to a peak of 1570 live birds in 2015 (Table 1). No indirect trade in *P. gulielmi* originating in Mali was reported.

Table 2: Direct exports of *Poicephalus gulielmi* from Mali, 2008-2016. No trade was reported in 2007. All trade was in live, wild-sourced birds for commercial purposes. Mali has submitted annual reports 2008-2014, Mali had not submitted annual reports for 2015 and 2016 at the time of writing.

Reported by	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Reported by Mali	150	90	300	220	320	220	890	-	-	2190
Reported by importers	150		350	80	320	330	610	1570	1400	4810

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Research into the origin of species exported from countries where it does not occur in the wild, including Mali, was recommended by Martin *et al.* (2014).

Management: Not applicable.

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

High levels of wild-sourced direct exports of *P. guielmi* from Mali were reported by both Mali and importers, although Mali is not a range State.

E. References

- Bapeamoni, A. and Upoki, A. 2016. Knowledge state of Kisangani avifauna (DRC). *Journal of Life Sciences*, 10: 386–390.
- BirdLife International 2016. *Poicephalus guielmi*. The IUCN Red List of Threatened Species 2016. Available at: <http://www.iucnredlist.org/>. [Accessed: 29/03/2018].
- Borrow, N. and Demey, R. 2014. *Field guide to the birds of western Africa*. Christopher Helm, London. 592 pp.
- Chapin, J.P. 1939. The birds of the Belgian Congo, part II. *Bulletin of the American Museum of Natural History*, 75: 1–632.
- CITES 2018. *List of contracting Parties*. Available at: https://www.cites.org/eng/disc/parties/chronolo.php?order=field_country_official_name&sort=asc. [Accessed: 11/04/2018].
- CITES Secretariat 2017. *Status of legislative progress for implementing CITES*. Available at: https://cites.org/sites/default/files/eng/prog/Legislation/CITES_national_legislative_status_table.pdf. [Accessed: 02/04/2018].
- Collar, N. and Boesman, P. 2018. Red-fronted Parrot (*Poicephalus guielmi*). In: del Hoyo, J., Elliott, A., Sargatal, J., Christie, D.A. and de Juana, E. (Eds.). *Handbook of the Birds of the World Alive*. Barcelona. (retrieved from <https://www.hbw.com/node/54605> on 14 May 2018).
- Debroux, L., Hart, T., Kaimowitz, D., Karsenty, A. and Topa, G. (Eds.) 2007. *Forests in post-conflict Democratic Republic of Congo: analysis of a priority agenda*. CIFOR, The World Bank and CIRAD, Jakarta. 82 pp.
- Dickinson, E.C. 2003. *The Howard and Moore complete checklist of the birds of the world. 3rd Edition*. Christopher Helm Publishers Ltd., London, UK. 1039 pp.
- FAO 2015. *Global Forest Resources Assessment 2015*. Desk reference. Food and Agriculture Organization of the United Nations, Rome, Italy. 244 pp.
- Forshaw, J. and Cooper, W. 1989. *Parrots of the World, 3rd (revised) edn*. Weldon Publishing, Willoughby, NSW. 616 pp.
- Forshaw, J.M. 2010. *Parrots of the World*. A & C Black, London. 328 pp.
- Fry, C.H., Keith, S. and Urban, E.K. (Eds.) 1988. *The birds of Africa, Volume 3*. Academic Press, London.
- Government of the Democratic Republic of the Congo 2006a. Arrete interministeriel no.003/CAB/MIN/ECN-EF/2006 et no. 009/CAB/MIN/FINANCES/2006 du 13 juin 2006 portant fixation des taux des droits, taxes et redevances a percevoir, en matiere de faune et de flore, a l'initiative du Ministere de l'Environnement, Con. *Journal officiel de la République Démocratique du Congo*, 22.
- Government of the Democratic Republic of the Congo 2006b. Arrete interministeriel no. 020/CABI/MIN/ECN-EF/2006 du 20 mai 2006 portant agrement de la liste des especes animales protegees en Republique Democratique du Congo. *Conservation de la nature*, 110–121.
- Government of the Democratic Republic of the Congo 1982. Loi n° 82-002 du 28 mai 1982 portant réglementation de la chasse. *Journal officiel de la République Démocratique du Congo*,
- del Hoyo, J., Collar, N.J., Christie, D.A., Elliott, A. and Fishpool, L.D.C. 2014. *HBW and BirdLife International illustrated checklist of the birds of the world. Volume 1: Non-passerines*. Lynx Edicions, Barcelona. 903 pp.
- del Hoyo, J., Elliott, A. and Sargatal, J. 1997. *Handbook of the birds of the world - Volume 4: Sandgrouse to Cuckoos*. Lynx Editions, Barcelona, Spain. 679 pp.
- Juniper, T. and Parr, M. 1998. *Parrots: a guide to the parrots of the world*. Pica Press, Robertsbridge, UK. 583 pp.
- Liyandja, T.L.D., Andersen, M.J., Oliveros, C.H., Kalemba, L.N., Bakambana, T.L., Marks, B.D., Kahindo, C. and Malekani, J.M. 2015. Birds of the Man and Biosphere Reserve of Luki, Bas-Congo province,

- Democratic Republic of Congo. *Check List*, 11(5): 1755.
- Mapunzu, P.M. 2000. Synthèse du rapport préparé par le groupe de contact de la CEFDHAC portant sur le plan d'action stratégique de la biodiversité du Congo. *Bulletin de l'ANSD*, 1: 71-96.
- Martin, R.O. 2018. The wild bird trade and African parrots: past, present and future challenges. *Ostrich*, 1-5.
- Martin, R.O., Perrin, M.R., Boyes, R.S., Abebe, Y.D., Annorbah, N.D., Asamoah, A., Bizimana, D., Bobo, K.S., Bunbury, N., Brouwer, J. *et al.* 2014. Research and conservation of the larger parrots of Africa and Madagascar: a review of knowledge gaps and opportunities. *Ostrich*, 85(3): 205-233.
- Ngbolua, K.N., Mafoto, A., Molongo, M., Ngemale, G.M., Ashande, M.C., Gbolo, Z.B., Mpiana, P.T. and Bongo, G.N. 2015. Contribution to the inventory of 'Protected Animals' sold as bush meats in some markets of Nord Ubangi Province, Democratic Republic of the Congo. *Journal of Advanced Botany and Zoology*, 3(2): 1-9.
- Pedersen, T. 2010. *Democratic Republic of Congo - A bird checklist*. 52 pp.
- Punga, J.K. and Ifuta, S.N.B. 2015. Recent data on birds of Kinshasa in Democratic Republic of Congo. *Journal of Agricultural Science and Technology A*, 5(3): 218-233.
- Scientific Authority of DRC 2018. CITES Scientific Authority of the Democratic Republic of the Congo (DRC), Université de Kisangani (UNIKIS) *in litt.* to the CITES Secretariat, 16 April 2018.
- Sébastien, L.K. and N'yanga-Nzo Kiyulu, J. 2001. *Integration of biodiversity into the forestry sector in the Democratic Republic of Congo (DRC)*. 33 pp.
- Snyder, N., McGowan, P., Gilardi, J. and Grajal, A. 2000. *Parrots. Status survey and conservation action plan 2000-2004*. IUCN, Gland, Switzerland and Cambridge, UK. 180 pp.
- Taylor, G., Scharlemann, J.P.W., Rowcliffe, M., Kumpel, N., Harfoot, M.B.J., Fa, J.E., Melisch, R., Milner-Gulland, E.J., Bhagwat, S., Abernethy, K. a. *et al.* 2015. Synthesising bushmeat research effort in West and Central Africa: A new regional database. *Biological Conservation*, 181: 199-205.
- Yaokokoré-Béibro, H. 2010. Diversité avifaunique de la forêt classée de la Besso, Sud-Est de la Côte d'Ivoire. *Sciences & Nature*, 7(2): 207-219.
- Yaokokoré-Béibro, H., Michaël, K.E. and Pierre, K.K. 2015. Diversité et abondance des oiseaux de la forêt classée de la Téné, Centre-Ouest Côte d'Ivoire. *Journal of Animal & Plant Sciences*, 24(1): 3733-3743.

Uromastyx geyri: Mali, Ghana, Benin, Togo

A. Summary

RST Selection	Selected in the RST based on high volume trade 2011-2015, and showing a sharp increase in trade from Togo in 2015.
Global status	Not assessed by the IUCN, but considered Near Threatened in a draft assessment. Population sizes unknown, but likely to be declining, possibly severely. Considered rare by one study.
BENIN:	<p>Not a range State, as confirmed by Benin in response to the consultation (see distribution map on page 61). Discrepancies in annual reports have led to the species-country being selected in the RST. Exports of live, wild (80) and ranched (100) specimens were reported by Benin 2007-2016, with importers reporting higher levels of direct trade from Benin (908 wild-sourced and 215 ranched). Benin submitted all annual reports for 2007-2016. However, on the basis that the species does not occur in the country, categorised as Less concern.</p> <p style="text-align: right;">RECOMMENDATION: Less concern</p>
GHANA:	<p>Not a range State, as confirmed by Ghana in response to the consultation (see distribution map on page 61). Discrepancies in annual reports have led to the species-country being selected in the RST. Exports of 350 live, wild-sourced specimens were reported by Ghana 2007-2016, with importers reporting higher levels of direct trade from Ghana (2956 wild-sourced and 500 ranched). Ghana submitted all annual reports for 2007-2016, except for 2016. However, on the basis that the species does not occur in the country, categorised as Less concern.</p> <p style="text-align: right;">RECOMMENDATION: Less concern</p>
MALI:	<p>Restricted range in north-western Mali, and considered rare in the country. Threatened by over-collection for the national and international pet trade, domestic food and traditional medicinal products. Annual reports were submitted by Mali for all years 2007-2014, but not yet for 2015-2016. Trade 2007-2016 mainly comprised live, wild-sourced individuals (>38 000 specimens as reported by Mali and importers). Indirect trade from Mali was a third higher than direct exports (mainly live, wild-sourced individuals). No information on management available; Mali did not respond to the consultation relating to the RST. The basis for non-detriment findings for export of wild-sourced specimens for this apparently uncommon and declining species has not been provided, and international trade may be impacting the species; therefore categorised as Action is needed.</p> <p style="text-align: right;">RECOMMENDATION: Action is needed</p>

TOGO: Not a range State, as confirmed by Togo in response to the consultation (see distribution map on page 61). Discrepancies in annual reports have led to the species-country being selected in the RST. Exports of 200 live, wild-sourced specimens were reported by Togo 2007-2016, with importers reporting higher levels of direct trade from Togo (1113 wild-sourced and 200 ranched). Togo submitted all annual reports for 2007-2016, except for 2016. However, on the basis that the species does not occur in the country, categorised as Less concern.

RECOMMENDATION:
Less concern

RST Background

Uromastix geyri (Saharan spiny-tailed lizard) from Mali, Ghana, Benin and Togo were selected as a priority species-country combinations for review under the RST at AC29, July 2017 (AC29 Com. 5 (Rev. by Sec.), AC29 Summary Record). Ghana, Benin and Togo are not range States for the species (see Distribution section). *U. geyri* was identified as a species that met a high volume trade threshold, on the basis of trade data for the period 2011-2015, as well as showing a sharp increase in trade for Togo in 2015 (AC29 Doc. 13.3 Annex 2 (Rev. 1)).

Previously, *U. geyri* was selected for RST at AC20 (March, 2004) post CoP12. The Secretariat did not receive any responses from the three range States - Algeria, Mali and Niger (AC21 Doc. 10.1.1 (Rev.1)). Following review of the species (AC22 Doc. 10.2 Annex 6d), Algeria was categorised as 'least concern', whereas Mali and Niger were categorised as 'possible concern', with recommendations to: clarify with the Secretariat, within six months, the basis for the annual export quota and clarify if captive-breeding takes place in Mali (and if so, provide details of nature and extent), and conduct a status assessment within 18 months and establish an annual quota based on the results (AC22 Summary Record). In February 2007, Niger advised the Secretariat that they had suspended trade in *U. geyri* until further notice and in December 2007, Mali advised the Secretariat that it was re-establishing a voluntary annual export quota of 2000 specimens, although it did not clarify the scientific basis for this (SC57 Doc. 29.1 (Rev. 2)). It was recommended that the Secretariat should not accept any increase in the annual export quotas from Mali or Niger until all the recommendations of the Animals Committee had been complied with (SC57 Doc. 29.1 (Rev. 2) Annex), AC24 Doc. 7.2). At AC25 the review for *U. geyri* was reported to be completed (AC25 Doc. 9.2).

B. Species characteristics

Taxonomic note: *Uromastix geyri* has undergone several taxonomic changes since its description (Müller, 1922). It was synonymised with *Uromastix acanthinura* by Mertens (1962) but resurrected by several authors (Wilms and Böhme, 2001; Wilms *et al.*, 2009 (the current CITES standard reference); Tamar *et al.*, 2017).

Biology: *U. geyri* is a relatively small, slender, spiny-tailed lizard (Schleich *et al.*, 1996). Adults reach a maximum total length of 340 mm (Schleich *et al.*, 1996) and snout-vent length of 197 mm (Meiri, 2008). This species typically shows little variability in colour, being either bright yellow or red, with a pattern of light brown to blackish brown dots predominantly on its flanks (Schleich *et al.*, 1996; Wilms, 2005). *U. geyri* is morphologically similar to *U. acanthinura*, (Tamar *et al.*, 2017), and was previously considered a subspecies of *U. acanthinura*. *U. geyri* can be distinguished by its comparatively longer, more slender tail and by its duller colours, contrasting with the striking green, yellow, red and black markings often seen on *U. acanthinura* (Schleich *et al.*, 1996).

This species inhabits rocky outcrops in semi-desert areas throughout the Central-Sahara (Schleich *et al.*, 1996), and was noted from elevations between 500- 2000 metres above sea level (Wilms *et al.*, in press, *in litt.* to UNEP-WCMC, 2018). This species is diurnal with highest activity recorded in the morning and afternoon, reducing activity in winter (Schleich *et al.*, 1996). In general adult *Uromastyx* are exclusively herbivorous, while juveniles in captivity are noted to also consume invertebrates (Schleich *et al.*, 1996). *Uromastyx* are oviparous, typically lay one clutch per year (Wilms, 2005). Mating occurs directly following a winter brumation, and following a four to six week gestation females will dig a nest and lay between seven and 22 eggs (Wilms, 2005). The species reaches sexual maturity in two to three years (Gray, 1995) and has a relatively long generation time, estimated at 11 years (Wilms *et al.*, in press, *in litt.* to UNEP-WCMC, 2018).

Distribution: This species is found in Northern Africa, from southern Algeria, to eastern Mali and northern-central Niger (Schleich *et al.*, 1996; Wilms, 2005) (see Figure 1). It has been recorded in the Ahaggar (or Hoggar) Mountains and Tassili N'Ajjer in southern Algeria, the Adrar des Ifoghas Mountains in north-eastern Mali and southern Algeria, and the Air Mountains in northern-central Niger (Schleich *et al.*, 1996; Wilms, 2005). The species has a comparatively large range estimated at 100 to 120 million hectares (Wilms and Böhme, 2001).



Figure 1. The distribution of *U. geyri* according to Tamar *et al.*, 2017, reproduced by UNEP-WCMC.

Population status and trends: The species was considered to be rare (Wilms and Böhme, 2001). It has not been assessed by the IUCN Red List, and no information on the population density was located. However, a draft IUCN assessment indicated that the species is categorised as Near Threatened, on the basis of known exploitation rates (domestic utilisation and international trade), noting that actual harvesting rates may be considerably higher, and the possibility that severe declines may be ongoing that could approach 30% over three generations (either in the past or in the future), but are undetected due to a lack of population monitoring (Wilms *et al.*, in press, *in litt.* to UNEP-WCMC, 2018). The species was considered in decline, “possibly severely” (Wilms *et al.*, in press, *in litt.* to UNEP-WCMC, 2018).

It was noted that "population data are urgently needed to estimate the impacts of harvesting on this species and the sustainability of current harvesting levels, as well as to quantify any decline" (Wilms *et al.*, in press, *in litt.* to UNEP-WCMC, 2018).

Threats: The main threat to *U. geyri* is overexploitation, including collection for food and use in traditional medicine (Ching and Chng, 2016), and in the pet trade (Wilms, 2005; Ching and Chng, 2016). *Uromastyx* body parts such as flesh are purported to give curative effects such as preventing rheumatism, malignant tumours and childhood measles (Wilms, 2005). It has been reported that the belief in the medicinal properties of *Uromastyx* is so deeply rooted that they can be readily acquired from large cities in northern Africa (Wilms, 2005) and Malaysia (Ching and Chng, 2016). Throughout much the range, *Uromastyx* spp. were reported to be also offered as live or stuffed souvenirs for tourists (Wilms, 2005).

Uromastyx spp. have been traded internationally for several decades and collecting was considered to be the major threat to wild populations (AC20 Inf. 13; Wilms, 2005). Whilst it was noted that little evidence existed to indicate that any *Uromastyx* species were threatened as a whole, the scale of exploitation, including domestic utilisation was considered likely to lead to local depletions (AC20 Inf. 13).

In general, the habitats of *Uromastyx* spp. are not considered directly threatened by anthropogenic pressures, as they mainly comprise desert environments of little or no commercial value, away from human habitation (Nemtzov, 2008). Wilms *et al.* (in press, *in litt.* to UNEP-WCMC, 2018) noted the possibility that the species may be at risk from future climate impacts, and that this required further investigation.

Overview of trade and management: *U. geyri* was listed in Appendix II on 4th February 1977 as part of the genus listing for *Uromastyx*. According to data in the CITES Trade Database, global direct trade 2007-2016 was predominantly in live, wild-sourced animals for commercial purposes; 42 861 reported by exporters and 44 411 reported by importers. Direct export of live animals showed an overall increase 2007-2012, following which both exporters and importers reported a decline 2012-2016. Higher levels of indirect trade in live wild-sourced *U. geyri* were reported 2007-2016, accounting for approximately 23 000 more individuals (53% more) than were directly exported, as reported by re-exporters.

Auliya *et al.* (2015) noted that *U. geyri* were consistently observed in markets in Togo, despite not occurring in the country. There also appear to be no well-established captive-breeding facilities for *U. geyri* in Benin, Ghana and Togo (Auliya *et al.*, 2015). Auliya *et al.* (2015) considered that all specimens in international trade from West Africa were in fact wild animals.

The EU is known to import reptiles, including *U. geyri*, from western Africa (Auliya *et al.*, 2015), however there are EU restrictions in place for wild specimens of *U. geyri* from Mali and Niger.

In AC20 Inf. 13, it was reported that levels of illegal trade in *Uromastyx* between 1977 and 2001 appeared to be low compared to the legal trade and fluctuated over time, but that such trends may reflect the lack of accurate and complete data, rather than actual changes in illegal trade (AC20 Inf. 13).

The species has been recorded from the Tassili N'Ajjer National Park in Algeria (Wilms *et al.*, 2009; Tamar *et al.*, 2017). Its range also overlaps the Air and Tenere National Nature Reserve in Niger (IUCN and UNEP-WCMC, 2018), although no information on occurrence was located.

C. Country reviews

Benin

Distribution: The Management Authority (MA) of Benin confirmed that the country is not a range State for *U. geyri* (*in litt.* to CITES Secretariat, 2018).

Trade: Benin has submitted all annual reports to CITES for the period 2007-2016.

Benin is not a range State of *U. geyri*, however according to the CITES Trade Database, direct trade in *U. geyri* from Benin comprised live animals exported for commercial purposes, 2010-2016 (Table 5). Benin reported 100 live, ranched *U. geyri* in 2011, while the United States, the sole importer, reported 1123 live animals 2010-2016, of which 74% were wild-sourced and 18% ranched (Table 5). As Benin is not a range State of *U. geyri*, direct trade in wild-sourced and ranched animals reported by Benin and the United States is likely to represent indirect trade. According to the CITES Trade Database, Benin re-exported higher levels of live wild-sourced animals which predominantly originated in Mali, with 2391 reported by Benin and 1483 reported by importers. According to the MA of Benin, the country re-exports *U. geyri* originating in Mali.

Table 5: Direct exports of live *Uromastix geyri* 2007-2016. All trade was reported by number for commercial purposes. Benin has submitted all annual reports 2007-2016.

Source	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
F	Exporter											
	Importer						100					100
R	Exporter					100						100
	Importer				65		150					215
W	Exporter											
	Importer						458			300	150	908

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Indirect trade in *U. geyri* originating from Benin solely comprised live, wild-sourced individuals for commercial purposes. Re-exporters (96% Ghana; 4% Togo) reported trade in 485 animals 2010-2014 and importers (United States) reported trade in 150 animals in 2012 and 2016. Given that Benin is not a range State for *U. geyri*, indirect trade in wild-sourced or ranched animals originating in Benin is erroneous.

According to the MA of Benin (*in litt.* to CITES Secretariat, 2018), the only known case of illegal trade involved the fraudulent re-export of 42 individuals of *U. geyri* to Canada in 2017.

Management: Benin became a Party to CITES on 28th February 1984, with entry into force on 28th May 1984 (CITES, 2018).

The MA of Benin (*in litt.* to CITES Secretariat, 2018) reported that the country ensures that any specimens traded do not originate from countries subject to recommendations to suspend trade. Through its national legislation project, the CITES Secretariat categorised the national legislation in Benin as Category 2, meaning “legislation that is believed generally to meet one to three of the four requirements for effective implementation of CITES” (CITES Secretariat, 2017).

Ghana

Distribution: The Management Authority (MA) of Ghana (*in litt.* to CITES Secretariat, 2017) confirmed that the country is not a range State for *U. geyri*.

Trade: Ghana has submitted all annual reports to CITES for the period 2007-2015, but not yet for 2016.

Ghana is not a range State for *U. geyri*, however according to data in the CITES Trade Database, direct trade in *U. geyri* from Ghana consisted of live animals; 350 reported by Ghana and 3554 reported by importers. Ghana reported all exports to be wild-sourced and importers reported over 80% as wild-sourced and the majority of the remainder as ranched (Table 4). The United States was the largest direct importer of *U. geyri* from Ghana. Ghana has not reported direct exports of *U. geyri* since 2010, whilst importers continued to report direct trade throughout the ten-year period. As Ghana is not a range State for this species, records of direct wild-sourced and ranched trade from Ghana are erroneous and are likely to represent re-exports. According to the CITES Trade Database, Ghana also re-exported high levels of live, wild-sourced *U. geyri*, 2007-2016, predominantly originating in Mali with 42 426 reported by Ghana and 33 921 reported by importers.

Table 4: Direct exports of live *Uromastix geyri* from Ghana, 2007-2016. All trade was reported in number. Ghana has submitted annual reports 2007-2015, but not yet for 2016.

Purpose	Source	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
T	R	Exporter											-
		Importer		200		300							
	W	Exporter		50		300							-
		Importer		150	271	773	200	502	40		760	260	2956
-	I	Exporter											-
		Importer		98									

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Indirect trade in *U. geyri* originating in Ghana consisted solely of live, wild-sourced individuals for commercial purposes, re-exported in 2008, 2010 and 2011. The United States, the sole re-exporter, reported trade in 72 live animals whilst importers reported lower levels of trade in 45 live individuals. As Ghana is not a range State for this species, these records are erroneous.

Management: Ghana became a Party to CITES on 14th November 1975, with entry into force on 12th February 1976 (CITES, 2018).

The MA of Ghana (*in litt.* to CITES Secretariat, 2017) reported that there are currently no captive-breeding facilities in Ghana, and the country serves only as a re-exporter, with specimens re-exported predominantly originating from Mali, but also Benin and Togo. Through its national legislation project, the CITES Secretariat categorised the national legislation in Ghana as Category 3, meaning “legislation that is believed generally not to meet any of the four requirements for effective implementation of CITES” (CITES Secretariat, 2017).

Mali

Distribution: *U. geyri* is restricted to north-western Mali, occurring in the Adrar des Ifoghas Mountains (Wilms, 2005; Tamar *et al.*, 2017).

Population status and trends: This species is considered to be rare throughout its range in Mali (Wilms and Böhme, 2001). The estimated total population size in the country was no more than 7500 individuals (Joger, pers. comm. to TRAFFIC Europe, 2003, in: AC20 Inf. 13), however, these figures were noted to require verification.

Threats: The main threat to *U. geyri* in Mali was reported to be over-collection for the national and international pet trade, domestic food, and traditional medicinal products (AC20 Inf. 13; Wilms, 2005).

Trade: Mali has submitted all annual reports to CITES for the period 2007-2014, but not yet for 2015-2016. An annual quota of 2000 live animals was published by Mali for 2007 and 2009-2011. Mali published its 2008 quota for *U. geyri* as “in preparation”. It appears that quotas published for live *U. geyri* may have been exceeded 2009-2011, according to data reported by both Mali and importers (Table 1).

Table 1: CITES export quotas for live wild-sourced *Uromastix geyri* from Mali, 2007-2018, and global direct exports as reported by Mali and countries of import, 2007-2016. Mali has submitted annual reports 2007-2014, but not yet for 2015-2016.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Quota	2000	in prep.	2000	2000	2000	-	-	-	-	-	-	-
Reported by Mali	970	3754	5470	6530	5050	7370	5550	4965	-	-	-	-
Reported by importer	333	3343	5700	4257	3202	7850	6985	2445	4202	400	-	-

According to data in the CITES Trade Database, direct trade in *U. geyri* from Mali primarily consisted of live, wild-caught individuals exported for commercial purposes. Mali reported 39 659 live individuals exported 2007-2014, with importing countries reporting 38 717, 2007-2016 (Table 2). Ghana was the main importer of live wild-sourced *U. geyri*, accounting for 65% of all exports reported by Mali. Both Mali and importing countries reported an increase in live wild-sourced trade 2007-2012, following which both observed a decline (Table 2).

Table 2: Direct exports of *Uromastix geyri* from Mali, 2007-2016. Mali has submitted annual reports 2007-2014, but not yet for 2015-2016. All trade was reported by number.

Term	Purpose	Source	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total			
bones	S	W	Exporter									-	-				
			Importer											1	1		
live	T	C	Exporter				400	870				-	-	1270			
			Importer				200		120		260				580		
		F	Exporter							500				-	-	500	
			Importer							507	567			300	32	1406	
		I	Exporter											-	-		
			Importer										400			400	
		R	Exporter											-	-		
			Importer								600					600	
		W	Exporter			970	3754	5470	6530	5050	7370	5550	4965		-	-	39659
			Importer			333	3343	5700	4257	3202	7850	6985	2445	4202	400		38717

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Indirect trade in *U. geyri* originating from Mali 2007-2016 almost entirely consisted of live, wild-sourced animals re-exported for commercial purposes, as reported by both re-exporters and importers (Table 3). Indirect trade in live, wild-sourced *U. geyri* originating from Mali (as reported by re-exporters) was 33% higher than direct trade reported by Mali during the ten-year period; over three-quarters of indirect trade was re-exported via Ghana.

Table 3: Indirect exports of *Uromastyx geyri* originating in Mali, 2007-2016.

Term	Purpose	Source	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total	
live	B	W	Exporter												
			Importer										100	100	
	T	C	Exporter				12							12	
			Importer												
	F		Exporter						100					100	
			Importer												
	O		Exporter												
			Importer					40							40
	R		Exporter						120	450					570
			Importer						120	100		200	70		490
W		Exporter	1466	3609	6035	9860	4334	5959	5722	6400	7574	1678	52637		
		Importer	263	3057	4227	5985	4167	4286	6014	4693	5713	5594	43999		
skulls	S	W	Exporter							1				1	
			Importer												

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Management: Mali became a Party to CITES on 18th July 1994, with entry into force on 16th October 1994 (CITES, 2018).

The CITES Authorities of Mali were consulted, however no response has yet been received. No information on management of the species in the country could be located. No systematic monitoring of the species was thought to occur in Mali to ensure sustainability of exports, and doubts were expressed about the sustainability of the trade from the country (Wilms *et al.*, in press, *in litt.* to UNEP-WCMC, 2018).

Through its national legislation project, the CITES Secretariat categorised the national legislation in Togo as Category 2, meaning “legislation that is believed generally to meet one to three of the four requirements for effective implementation of CITES” (CITES, 2017).

Togo

Distribution: The Management Authority (MA) of Togo (*in litt.* to CITES Secretariat, 2017) confirmed that the country is not a range State for *U. geyri*.

Trade: Togo has submitted all annual report to CITES for the period 2007-2015, but not yet for 2016.

Togo is not a range State of *U. geyri*, however according to data in the CITES Trade Database, direct trade in *U. geyri* from Togo primarily consisted of live wild-sourced individuals exported for commercial purposes; 200 reported by Togo and 1113 reported by the United States, the sole importer (Table 6). As Togo is not a range State of *U. geyri*, direct trade is likely to have been mis-reported and in fact represent indirect trade. According to the CITES Trade Database, Togo re-exported higher levels of live wild-sourced animals, predominantly originating in Mali; 6125 reported by Benin and 6147 reported by importers.

Table 6: Direct exports of live *Uromastyx geyri*, from Togo 2007-2016. Togo has submitted annual reports 2007-2015, but not yet for 2016. All trade was for commercial purposes and reported by number.

Source	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
R	Exporter										-	
	Importer										200	200
W	Exporter					200					-	200
	Importer									532	581	1113

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Indirect trade in *U. geyri* originating in Togo solely comprised live, wild-sourced animals for commercial purposes, reported 2008, 2012, 2013 and 2016; 66 reported by re-exporters and 567 by importers. Reported re-exports originating from Togo were predominantly exported via Ghana. Given that Togo is not a range State of *U. geyri* any indirect trade in wild-sourced or ranched animals originating in Togo is erroneous.

On the basis that *U. geyri* was reported to be frequently observed in markets within Togo, despite it not occurring in the country, Auliya *et al.* (2015) suggested that the species is smuggled illegally across the country border.

Management: Togo became a Party to CITES on 23rd October 1978, with entry into force on 21st January 1979 (CITES, 2018).

The MA of Togo (*in litt.* to CITES Secretariat, 2018) noted that they had engaged the scientific faculty of the University of Lome to collect data on ten species, including *U. geyri*, including information on specimens held within captivity in the country.

Through its national legislation project, the CITES Secretariat categorised the national legislation in Togo as Category 2, meaning “legislation that is believed generally to meet one to three of the four requirements for effective implementation of CITES” (CITES Secretariat, 2017).

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

None identified

E. References

- Auliya, M., Altherr, S., Ariano-Sanchez, D., Baard, E.H., Brown, C., Brown, R.M., Cantu, J.C., Gentile, G., Goldenhuys, P., Henningheim, E. *et al.* 2015. Trade in live reptiles, its impact on wild populations, and the role of the European market. *Biological Conservation*, 204(June): 103–119.
- Ching, O.O. and Chng, S.C.L. 2016. The use of spiny-tailed lizards *Uromastyx* spp. for medicinal purposes in Peninsular Malaysia. *TRAFFIC Bulletin*, 28(1): 35–40.
- CITES 2018. *List of contracting Parties*. Available at: https://www.cites.org/eng/disc/parties/chronolo.php?order=field_country_official_name&sort=asc. [Accessed: 11/04/2018].
- CITES Secretariat 2017. *Status of legislative progress for implementing CITES*. Available at: https://cites.org/sites/default/files/eng/prog/Legislation/CITES_national_legislative_status_table.pdf. [Accessed: 16/04/2018].
- Gray, R.L. 1995. *Captive husbandry of ornate spiny-tailed lizards*. *Reptiles*. 64–76
- IUCN and UNEP-WCMC 2017. Air and Ténéré in Niger. In: *The World Database on Protected Areas (WDPA) [On-line]*. Available at: <https://www.protectedplanet.net/1766>. [Accessed: 13/05/2018].
- MA of Benin 2018. *in litt.* to CITES Secretariat, 19th March 2018.
- MA of Ghana 2017. *in litt.* to CITES Secretariat, 13th November 2017.
- MA of Togo 2018. *in litt.* to CITES Secretariat, 14th March 2018.

- Meiri, S. 2008. Evolution and ecology of lizard body sizes. *Global Ecology and Biogeography*, 17(6): 724–734.
- Mertens, R. 1962. Bemerkungen über *Uromastix acanthinurus* als Rassenkreis (Rept. Saur.). *Senckenbergiana biologica*, 43: 425–432.
- Müller, L. 1922. Über eine neue Uromastix-Art aus der Zentral-Sahara. *Naturwissenschaftlicher Beobachter*, 63: 193–201.
- Nemtsov, S.C. 2008. *Uromastix lizards in Israel*. NDF Workshop Case Studies, WG7 - Reptiles and Amphibians. Case study 5. International Expert Workshop on CITES Non-Detriment Findings, Cancun, Mexico. 22 pp.
- Schleich, H.H., Kästle, W. and Kabisch, K. 1996. *Amphibians and Reptiles of North Africa*. Koeltz Scientific Books, Koenigstein, Germany.
- Tamar, K., Metallinou, M., Wilms, T., Schmitz, A., Crochet, P.A., Geniez, P. and Carranza, S. 2017. Evolutionary history of spiny-tailed lizards (Agamidae: *Uromastix*) from the Saharo-Arabian region. *Zoologica Scripta*, 47(2): 159–173.
- Wilms, T. and Böhme, W. 2001. Revision der *Uromastix-acanthinura*. Artengruppe, mit Beschreibung einer neuen Art aus der Zentralsahara (Reptilia: Sauria: Agamidae). *Zoologische Abhandlungen Staatliches Museum für Tierkunde, Dresden*, 51: 73–104.
- Wilms, T.M. 2005. *Uromastix: natural history, captive care, breeding*. Herpeton, Offenbach, Germany. 143 pp.
- Wilms, T.M., Bohme, W., Wagner, P., Lutzmann, N. and Schmitz, A. 2009. On the phylogeny and taxonomy of the genus *Uromastix* Merrem, 1820 (Reptilia: Squamata: Agamidae: Uromastycinae) – Resurrection of the genus *Saara* Gray, 1845. *Bonner Zoologische Beiträge*, 56(1/2): 55–99.
- Wilms, T.M., Wagner, P. and Niagate, B. (in press). *IUCN Species Information Service Toolkit Assessment Report*. (IUCN draft assessment). *in litt.* to UNEP-WCMC, 5th April, 2018.

Brookesia minima: Madagascar

A. Summary

RST Selection Selected under the “Endangered species” criterion, as well as showing a sharp increase in trade from Madagascar in 2015.

<p>MADAGASCAR: Classified as Endangered in the IUCN Red List, with a decreasing population trend. Endemic to north-west Madagascar, with a relatively small range, and occurring in fragmented habitat. Described as “not common” by one study. The primary threat is habitat loss driven by slash-and-burn agriculture and logging. Madagascar published an annual export quota of 150 live individuals 2014- 2016. Trade 2007-2016 mainly in live, wild-sourced individuals (151 as reported by Madagascar and 56 by importers) and was well within quota. Madagascar submitted all annual reports for 2007-2016. A zero quota was published in 2017 due to a change in the species’ IUCN Red List status. Madagascar responded to the consultation in 2017, indicating that a zero quota would be proposed for 2018. A quota of 150 live individuals was subsequently published erroneously for 2018, then corrected to zero following consultation with the country. On the basis of no anticipated legal trade in wild-sourced specimens due to the zero quota, categorised as Less concern. However it is recommended that the scientific basis for any future (non-zero) quota is referred to the Animals Committee prior to being published on the CITES website, as current information indicates that any international trade would impact the species.</p>	<p>RECOMMENDATION: Less concern</p>
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RST Background

Brookesia minima (Minute leaf chameleon) from Madagascar was selected as a priority species-country combination for review under the RST at AC29, July 2017 (AC29 Com. 5 (Rev. by Sec.), AC29 Summary Record). *B. minima* was identified as a species that met the selection criteria for an endangered species, as well as showing a sharp increase in trade for Madagascar in 2015 (AC29 Doc. 13.3 Annex 2 (Rev. 1)).

B. Species characteristics

Taxonomic note: Within the *Brookesia* genus there are a number of highly miniaturised species, known as the *Brookesia minima* group (Brygoo and Domergue, 1975). The group was originally composed of five species (*Brookesia dentata*, *B. minima*, *B. peyrierasi*, *B. ramanantsoai* and *B. tuberculata*) (Brygoo, 1978 in: Glaw *et al.*, 2012) that proved difficult to distinguish from each other, due to morphological similarities and retainment of paedomorphic [juvenile] features, with many of the characters used to identify larger *Brookesia* species being greatly reduced (Glaw *et al.*, 1999).

The original CITES standard nomenclatural reference for *Brookesia* spp. (Klaver and Böhme, 1997) considered *Brookesia peyrierasi* and *B. tuberculata* to be synonyms of *B. minima*. However, *B. peyrierasi* and *B. tuberculata* were elevated to distinct species at CoP16 based on Glaw *et al.* (1999). Four new

Brookesia species (*Brookesia confidens*, *B. desperata*, *B. micra* and *B. tristis*) have recently been described from within the *B. minima* species-complex (Glaw *et al.*, 2012).

B. minima, *sensu stricto*, is morphologically very similar to the ten currently described members of the *Brookesia minima* species-group (*B. confidens*, *B. denata*, *B. desperata*, *B. exarmata*, *B. karchei*, *B. micra*, *B. peyeriasi*, *B. ramanantsoai*, *B. tristis*, *B. tuberculata*)(Glaw *et al.*, 2012). However, it was reported to be differentiated by an extremely small body size, head proportion (i.e., having the lowest relative head height and width ratio) and absent or indistinct pelvic spines (Glaw *et al.*, 2012).

Biology: *B. minima* is currently the second smallest chameleon species to be described (Glaw *et al.*, 2012). Females reach a maximum total length of 26 – 36 mm (16 - 22 SVL), with males reaching 26 – 34 mm (15 -21 SVL) (Glaw and Vences, 2007; Glaw *et al.*, 2012). In general, *B. minima* is uniform brown, but colour can vary to include shades of green, brown and grey, with a lichen-like or striped pattern (Nečas and Schmidt, 2004; Glaw and Vences, 2007).

B. minima inhabits lowland primary and secondary rainforest from sea level to 350 m elevation (Glaw and Jenkins, 2014). This species is primarily found in the leaf litter of primary evergreen rainforest, preferring sites with sparse undergrowth (Glaw and Vences, 2007). While less frequently observed in the herbaceous stratum during the day, the species will retreat to small branches to roost at night (Nečas and Schmidt, 2004). This species exhibits a degree of tolerance to habitat disturbance, being found in disturbed canopy forest, but is absent from burnt forest (Jenkins *et al.*, 2003) and non-forested areas such as plantations (Blumgart *et al.*, 2017). *B. minima* is oviparous and females invariably lay a clutch of two eggs (Glaw and Vences, 2007).

C. Country reviews

Madagascar

Distribution: *B. minima* is endemic to north-western Madagascar (Glaw and Jenkins, 2014). Confirmed localities include the islands of Nosy Be (Andreone *et al.*, 2003; Glaw and Vences, 2007) and Nosy Komba (Blumgart *et al.*, 2017), and the mainland regions of Sambirano (Glaw and Vences, 2007) southward to the Ankarafa forest on the Sahamalaza Peninsula (Penny *et al.*, 2017). This species has a relatively small range, with an extent of occurrence of approximately 3 966 km² (Glaw and Jenkins, 2014). However, its lowland-forest habitat within this area is highly fragmented; actual area of occurrence was therefore considered to be much smaller (Glaw and Jenkins, 2014). On Nosy Be, where the species is restricted to primary forest relics, it is confined to areas of less than 100 m² which are not suitable for agriculture (Henkel and Schmidt, 2000). The estimated extent of occurrence did not however, take into account the recent confirmation of the expansion of the species range (by over 100 km south along the west coast of Madagascar) recorded by Penny *et al.* (2017).

B. minima is noted to occur in a number of protected areas, including Lokobe Strict Nature Reserve, Manongarivo Special Reserve and Sahamalaza National Park (Glaw and Jenkins, 2014).

Population status and trends: The IUCN Red List classifies the species as Endangered on the basis of its restricted range size, severely fragmented population and an ongoing decline in the quality and area of its habitat (Glaw and Jenkins, 2014). The species, described as “not common”, was reported to have a decreasing population trend (Glaw and Jenkins, 2014).

Threats: The main threats to this species were reported to be habitat loss driven by slash-and-burn agriculture and logging for charcoal production and construction materials (Glaw and Jenkins, 2014). It

was noted that further research was needed to clarify the species' exposure to and sensitivity to threats (Glaw and Jenkins, 2014).

Trade: *B. minima* was listed in CITES Appendix II on 13th February 2003 as part of the genus listing for *Brookesia*. Madagascar has submitted all annual reports to CITES for the period 2007-2016.

Madagascar published an export quota of 150 live individuals each year 2014-2016. A zero quota was published in 2017. A quota of 150 live animals was published erroneously in 2018 (see 'Management'). Trade in *B. minima* did not exceed quotas published by Madagascar for the period 2014-2016 (Table 1).

Table 1: CITES export quotas for live wild-sourced *Brookesia minima* from Madagascar, 2007-2018, and global direct exports as reported by Madagascar and countries of import, 2007-2016. Madagascar has submitted all annual reports 2007-2016.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Quota	-	-	-	-	-	-	-	150	150	150	0	150*
Reported by Madagascar								40	111		-	-
Reported by importers									8	48	-	-

*Corrected to a zero quota on 30th March 2018 (*in litt.* to CITES Secretariat and UNEP-WCMC, 2018).

Direct trade in *B. minima* from Madagascar 2007-2016 predominantly comprised live, wild-sourced animals for commercial purposes, with 151 individuals reported by Madagascar and 56 reported by the United States, the only Party which reported live imports (Table 2). Madagascar reported direct exports in 2014 and 2015, with exports in 2015 representing over 2.5 times the trade reported in 2014. Trade reported by the United States peaked in 2016 (Table 2). Lower quantities of wild-sourced bodies and specimens for scientific purposes were reported by importers only (Table 2). No indirect trade in *B. minima* originating in Madagascar was reported 2007-2016.

Table 2: Direct exports of *Brookesia minima* from Madagascar, 2007-2016. Madagascar has submitted all annual reports 2007-2016. All direct trade was wild-sourced and reported by number.

Term	Purpose	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
bodies	S	Exporter											
		Importer				1			4				5
live	T	Exporter								40	111		151
		Importer									8	48	56
specimens	S	Exporter											
		Importer								11			11

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Harvesting of *Brookesia* species for the pet trade has been recorded in Madagascar (Carpenter and Robson, 2005). A TRAFFIC report on EU seizures in 2016, stated that 211 live chameleons, including *Brookesia* spp., were seized in the Czech Republic (TRAFFIC, 2017). Anderson (pers. comm. to UNEP-WCMC, 2018) confirmed that *B. ramanantsoai*, another Endangered species with a zero export quota, has been exported to the US in at least one case labelled as *B. minima*. The Management Authority of Madagascar stated that they had no information on illegal trade in this species (*in litt.* to the CITES Secretariat, 2017).

Management: Madagascar became a Party to CITES on 20th August 1975, with entry into force on 18th November 1975 (CITES, 2018).

The MA of Madagascar (*in litt.* to CITES Secretariat, 2017) noted that during 2012-2014, export quotas for reptiles were derived from a formula adopted by the Scientific Authority which used a number of parameters including: the area of occurrence of the species, the fragmentation of habitat, the type of habitat occupied (primary, secondary or anthropogenic), species abundance, and a "collection

coefficient”. Where quotas were then considered too high, they were reduced taking account of the IUCN Red List category, with for example, a Vulnerable species being allocated a quota of 50-250 individuals (MA of Madagascar (*in litt.* to the CITES Secretariat, 2017)).

According to the Madagascar MA (*in litt.* to CITES Secretariat, 2017), the export quota of 150 individuals for *B. minima* was set in 2014 when the species was classified as Vulnerable by the IUCN Red List. Following a taxonomic revision of the *Brookesia minima* species-group (Glaw *et al.*, 2012), which subsequently reduced the known range of true *B. minima*, this species was reassessed as Endangered (Glaw and Jenkins, 2014), and accordingly Madagascar adopted a precautionary quota setting methodology (Madagascar MA, *in litt.* to CITES Secretariat, 2017). Madagascar submitted a zero quota “from 2017, until new information on the population is obtained”, and a zero quota for 2018 was proposed (Madagascar MA, *in litt.* to CITES Secretariat, 2017). However a quota of 150 individuals was published on 19th March 2018. Madagascar was consulted to query the quota, and it was confirmed this had been published erroneously, and should be corrected to zero (MA of Madagascar, *in litt.* to CITES Secretariat and UNEP-WCMC, 2018).

The species does occur in several protected areas (see Distribution section). Several categories of protected areas are recognised in Madagascar and Law No. 2001-005 prohibits the sale of wild animals from any protected areas (UNEP and UNCTAD, 2008).

Through its national legislation project, the CITES Secretariat categorised the national legislation in Madagascar as legislation that is believed generally to meet the requirements for implementation of CITES (CITES, 2017). The MA of Madagascar reported there is a capture period for reptiles, as defined in the procedure manual for the management of wild fauna and flora of Madagascar (February 1 to April 30) (*in litt.* to CITES Secretariat, 2017). It is also forbidden to collect pregnant females and newborns to ensure the regeneration of the wild populations MA of Madagascar (*in litt.* to the CITES Secretariat, 2017).

The MA of Madagascar (*in litt.* to the CITES Secretariat, 2017) reported that an identification guide has been available for the genus *Brookesia* since 2016, and that training on the guide is provided to border control officials by the Scientific Authority (*in litt.* to CITES UNEP-WCMC, 2018). However, there has been some misidentification of *Brookesia* species reported in trade, with *B. ramanantsoai* being imported to the United States described as *B. minima* (Anderson, pers. comm. to UNEP-WCMC, 2018). Doubts remain about the capacity of those involved in the trade to correctly identify species of the very small *B. minima* group, and concern was expressed that trade in protected species occurring at low densities could negatively impact populations (Jenkins, pers. comm. to UNEP-WCMC, 2018).

No current population monitoring schemes for *B. minima* were reported to be in place (Glaw and Jenkins, 2014). The MA of Madagascar (*in litt.* to UNEP-WCMC, 2018) noted that the country was looking for a partnership to conduct further study of the species. The MA of Madagascar (*in litt.* to the CITES Secretariat, 2017) reported that this species is not bred in captivity within the country.

The European Union implemented a “negative opinion” for imports of *B. minima* from Madagascar on 7th March 2016, effectively suspending wild-sourced imports pending consultation with Madagascar.

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

None identified.

E. References

- Anderson, C. 2018. Christopher Anderson (IUCN SSC Chameleon Specialist Group) pers. comm. to UNEP-WCMC, 9th March 2018.
- Andreone, F., Glaw, F., Nussbaum, R. a., Raxworthy, C. J., Vences, M. and Randrianirina, J. E. 2003. The amphibians and reptiles of Nosy Be (NW Madagascar) and nearby islands: a case study of diversity and conservation of an insular fauna. *Journal of Natural History*, 37 (17), 2119–2149.
- Blumgart, D., Dolhem, J. and Raxworthy, C.J. 2017. Herpetological diversity across intact and modified habitats of Nosy Komba Island, Madagascar. *Journal of Natural History*, 51(11–12), 625–642.
- Carpenter, A.I. and Robson, O. 2005. A review of the endemic chameleon genus *Brookesia* from Madagascar, and the rationale for its listing on CITES Appendix II. *Oryx*, 39(4) 375–380.
- CITES 2017. *Status of legislative progress for implementing CITES*. Available at: https://cites.org/sites/default/files/eng/prog/Legislation/CITES_national_legislative_status_table.pdf. [Accessed: 29/03/2018].
- CITES 2018. *List of contracting Parties*. Available at: https://www.cites.org/eng/disc/parties/chronolo.php?order=field_country_official_name&sort=asc. [Accessed: 11/04/2018].
- Glaw, F. 2018. Frank Glaw (IUCN SSC Chameleon Specialist Group) pers. comm. to UNEP-WCMC, 9th March 2018.
- Glaw, F. and Jenkins, R.K.B. 2014. *Brookesia minima*. Available at: <http://www.iucnredlist.org/details/67009871/0>. [Accessed: 28/02/2018].
- Glaw, F., Köhler, J., Townsend, T.M. and Vences, M. 2012. Rivaling the world's smallest reptiles: discovery of miniaturized and microendemic new species of leaf chameleons (*Brookesia*) from northern Madagascar. *PloS one*, 7(2).
- Glaw, F. and Vences, M. 2007. *A field guide to the amphibians and reptiles of Madagascar*. 3rd Ed. Vences & Glaw Verlag, Cologne, Germany. 495.
- Henkel, F.-W. and Schmidt, W. 2000. *Amphibians and reptiles of Madagascar and the Mascarene, Seychelles and Comoro Islands*. Krieger Publishing Company, Malabar, Florida.
- Jenkins, R. 2018. Richard Jenkins (IUCN SSC Chameleon Specialist Group) pers. comm. to UNEP-WCMC, 9th March 2018.
- Jenkins, R.K.B., Brady, L.D., Bisoa, M., Rabearivony, J. and Griffiths, R.A. 2003. Forest disturbance and river proximity influence chameleon abundance in Madagascar. *Biological Conservation*, 109(3), 407–415.
- Klaver, C.J.J. and Böhme, W. 1997. Chamaeleonidae. In: Wermuth, H. (Ed.). *Das Tierreich, Part 112*. Verlag Walter de Gruyter & Co., Berlin and New York.
- Management Authority of Madagascar 2017. *in litt.* to the CITES Secretariat, 16 November 2017.
- Management Authority of Madagascar 2018. *in litt.* to CITES Secretariat and UNEP-WCMC, 30 March 2018.
- Nečas, P. and Schmidt, W. 2004. *Stump-tailed Chameleons: Miniature Dragons of the Rainforest, the Genera Brookesia and Rhampholeon*. Chimaira, Frankfurt am Main, Germany. 255.
- Penny, S.G., Crottini, A., Andreone, F., Bellati, A., Rakotozafy, L.M.A., Holderied, M.W., Schwitzer, C. and Rosa, G.M. 2017. Combining old and new evidence to increase the known biodiversity value of the Sahamalaza Peninsula, Northwest Madagascar. *Contributions to Zoology*, 86(4), 273–296.
- TRAFFIC 2017. *Overview of important seizures in the European Union: January to December 2016*. Geneva, Switzerland.

Brookesia peyrierasi: Madagascar

A. Summary

RST Selection Selected under the “Endangered species” criterion, as well as showing a sharp increase in trade from Madagascar in 2015.

MADAGASCAR: Classified as Endangered in the IUCN Red List, with a decreasing population trend and a fragmented population. Endemic to north-east Madagascar, with a relatively small range (3,774 km²). Recorded in high densities in one location (Nosy Mangabe). Primary threats are habitat loss and fragmentation, driven by logging and mining. Madagascar submitted all annual reports for 2007-2016. Trade since 2013 (when it split from *B. minima*) was mainly in live, wild-sourced individuals (118 as reported by Madagascar, but with none reported by importers). Madagascar published an annual export quota of 150 live individuals for 2014-2016, which increased to 250 in 2017. Madagascar responded to the consultation in 2017, indicating that a zero quota would be proposed for 2018. A quota of 150 live individuals was subsequently published erroneously for 2018, then corrected to zero following consultation with the country. On the basis of no anticipated legal trade in wild-sourced specimens due to the zero quota, categorised as Less concern. However it is recommended that the scientific basis for any future (non-zero) quota is referred to the Animals Committee prior to being published on the CITES website, as current information indicates that any international trade would impact the species.

RECOMMENDATION:

Less concern

RST Background

Brookesia peyrierasi (Antongil leaf chameleon) from Madagascar was selected as a priority species-country combination for review under the RST at AC29, July 2017 (AC29 Com. 5 (Rev. by Sec.), AC29 Summary Record). *B. peyrierasi* was identified as a species that met the selection criteria for an endangered species, as well as showing a sharp increase in trade for Madagascar in 2015 (AC29 Doc. 13.3 Annex 2 (Rev. 1)).

B. Species characteristics

Taxonomic note: Within the *Brookesia* genus there are a number of highly miniaturised species, known as the *Brookesia minima* group (Brygoo and Domergue, 1975), which was originally composed of five very small species (*Brookesia dentata*, *B. minima*, *B. peyrierasi*, *B. ramanantsoai* and *B. tuberculata*) (Brygoo, 1978 in: Glaw *et al.*, 2012). Species within this group have proved difficult to distinguish, due to morphological similarities and retainment of paedomorphic [juvenile] features, with many of the characters used to identify larger *Brookesia* species being greatly reduced within the *B. minima* group (Glaw *et al.*, 1999).

The original CITES standard nomenclatural reference for *Brookesia* spp. (Klaver and Böhme, 1997) considered *B. peyrierasi* and *B. tuberculata* to be synonyms of *B. minima*. However, *B. peyrierasi* and *B. tuberculata* have since been elevated to distinct species and have a separate CITES standard nomenclatural reference (Glaw *et al.*, 1999, adopted at CoP16).

B. peyrierasi is morphologically very similar to the ten currently described members of the *Brookesia minima* species-group (*B. confidens*, *B. denata*, *B. desperata*, *B. exarmata*, *B. karchei*, *B. micra*, *B. peyrierasi*, *B. ramanantsoai*, *B. tristis*, *B. tuberculata*; Glaw *et al.*, 2012). However, it lacks a dorsal ridge, has distinct latero-vertebral tubercles on its body, no pelvic shield, but a pelvic spine is often present (Glaw and Vences, 2007).

Biology: *B. peyrierasi* belongs to a species-group characterized by a minute body size with females reaching a maximum total length of 32 – 43 mm (19 - 27 SVL), and males 34 – 40 mm (20 - 22 SVL) (Glaw *et al.*, 2012). This species typically exhibits various shades of brown, beige and green colouration and rarely display a striped or lichen-like pattern typified in other members of the *Brookesia minima* species-group (Nečas and Schmidt, 2004; Glaw and Vences, 2007).

B. peyrierasi inhabits lowland primary rainforest from sea level to 300 m elevation (Nečas and Schmidt, 2004). This species is primarily found in the rainforest leaf litter (Glaw and Vences, 2007). It is unclear if the species is sensitive to habitat degradation, however other members of the *B. minima* group are known to be intolerant of habitat modification (Jenkins *et al.*, 2014; Blumgart *et al.*, 2017). The species was not found to be present in urban areas (Lutzman, 2006). Mating couples and gravid females have been observed in different climatic seasons, in June and also from October to December (Glaw and Vences, 2007). This species is oviparous with egg disposition occurring 30 – 40 days after copulation (Nečas and Schmidt, 2004).

Country reviews

C. Madagascar

Distribution: *B. peyrierasi* is endemic to north-eastern Madagascar (Glaw *et al.*, 1999). Confirmed localities include the type locality, Nosy Mangabe (Glaw *et al.*, 1999), and Masoala (Glaw and Vences, 2007). The species was reported for the first time from the west coast of Masoala in 2016 (Glaw, pers. comm. to UNEP-WCMC, 2018). A recent record includes a locality west of Maroantsetra close to Makira Reserve (Glaw pers. comm. to UNEP-WCMC, 2018). It was noted to possibly occur in lowland moist forests around Marojejy (Glaw *et al.*, 1999), although other records from Daraina, Analamerana, the Mantadia-Zahamena corridor and north of Toamasina, however, these records were noted to require verification (Jenkins *et al.*, 2014). This species has a relatively small range, with an approximate extent of occurrence of 3,774 km² (Jenkins *et al.*, 2014).

Brookesia peyrierasi is noted to occur in two protected areas, Masoala National Park and the Nosy Mangabe Special Reserve, and the species may occur in Makira, which was noted to be in the process of coming under national protection, (Jenkins *et al.*, 2014; MA of Madagascar, *in litt.* to CITES Secretariat, 2017).

Population status and trends: The IUCN Red List classifies the species as Endangered on the basis of its restricted range size, severely fragmented population and an ongoing decline in the quality and area of its habitat (Jenkins *et al.*, 2014). In 2003, this species was recorded in high densities on Nosy Managbe (138 individuals found along a 0.5 ha transect over a five day period) with a population density estimated at 70 (\pm 29.28) individuals per 0.5 ha (Lutzman, 2006). Lutzman (2006) reported that similar surveys carried out in the National Park at Andranobe revealed significantly fewer individuals (four and

five individuals on two separate surveys). Glaw and Vences (2007) also noted that this species was common in the rainforest leaf litter of Nosy Mangabe. However, conversion and degradation of lowland rainforest on Masoala Peninsula was considered likely to have severely fragmented and reduced the population in this area (Jenkins *et al.*, 2014).

Threats: The main threats to this species is habitat destruction and degradation, driven by practices such as Rosewood extraction and mining for precious mineral and metals (Jenkins *et al.*, 2014). It was noted that further research was needed to clarify the species' exposure to and sensitivity to threats (Jenkins *et al.*, 2014).

Trade: *B. peyrierasi* was listed in CITES Appendix II on 13th February 2003, as part of the genus listing for *Brookesia*, however, it was only recognised as a species separate from *B. minima* in 2013. Madagascar has submitted all annual reports to CITES for the period 2007-2016. Madagascar published an export quota of 150 live individuals 2014-2016, with a higher quota of 250 live individuals in 2017 (Table 1). A quota of 150 live animals was published erroneously in 2018 (see 'Management'). Direct trade in *B. peyrierasi* did not exceed quotas published by Madagascar (Table 1).

Table 1: CITES export quotas for live wild-sourced *Brookesia peyrierasi* from Madagascar, 2007-2018, and global direct exports as reported by Madagascar and countries of import, 2007-2016. Madagascar has submitted all annual reports 2007-2016.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Quota	-	-	-	-	-	-	-	150	150	150	250	150*
Reported by Madagascar								47	71		-	-
Reported by importers											-	-

*Corrected to a zero quota on 30th March 2018 (*in litt.* to CITES Secretariat and UNEP-WCMC, 2018).

Direct trade in *B. peyrierasi* almost entirely consisted of live, wild-sourced animals for commercial purposes, with 118 individuals reported by Madagascar in 2014 and 2015 (Table 2). Madagascar reported the export of 90 individuals (76%) to the United States and 28 (24%) to Hong Kong, Special Administrative Region (SAR) of China 2014-2015; importer reported trade comprised one wild-sourced body imported by Germany for scientific purposes in 2016. No indirect trade in *B. peyrierasi* originating in Madagascar was reported 2007-2016.

Table 2: Direct exports of *Brookesia minima* from Madagascar, 2007-2016. Madagascar has submitted all annual reports 2007-2016. All direct trade was wild-sourced and reported by number.

Term	Purpose	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
bodies	S	Exporter											
		Importer										1	1
live	T	Exporter								47	71		118
		Importer											

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Harvesting of *Brookesia* species for the pet trade has been recorded in Madagascar (Carpenter and Robson, 2005). A TRAFFIC report on European seizures in 2016, stated 211 live chameleons, including *Brookesia* spp, were seized at Czech Republic airport destined for France (TRAFFIC, 2017). The Management Authority of Madagascar stated that they have no information on the illegal trade in this species (*in litt.* to the CITES Secretariat, 2017).

Management: Madagascar became a Party to CITES on 20th August 1975, with entry into force on 18th November 1975 (CITES, 2018).

The MA of Madagascar (*in litt.* to CITES Secretariat, 2017) noted that during 2012-2014, export quotas for reptiles were derived from a formula adopted by the Scientific Authority which used a number of

parameters including: the area of occurrence of the species, the fragmentation of habitat, the type of habitat occupied (primary, secondary or anthropogenic), species abundance, and a “collection coefficient”. Where quotas were then considered too high, they were reduced taking account of the IUCN Red List category, with for example, a Vulnerable species being allocated a quota of 50-250 individuals (MA of Madagascar (*in litt.* to the CITES Secretariat, 2017)).

The MA of Madagascar (*in litt.* to CITES Secretariat, 2017) noted that whilst *B. peyrierasi* had been categorised as Endangered in 2011, its status was displaying incorrectly as Vulnerable on the IUCN Red List website, and accordingly a quota of 150 live specimens was published. Based on the global population status and trend, and fragmented habitat, a zero quota for 2018 was proposed (Madagascar MA, *in litt.* to CITES Secretariat, 2017), however a quota of 150 individuals was published on 19th March 2018. Madagascar was consulted to query the quota, and it was confirmed this had been published erroneously, and should be corrected to zero (MA of Madagascar, *in litt.* to CITES Secretariat and UNEP-WCMC, 2018).

The species does occur in several protected areas (see Distribution section). Several categories of protected areas are recognised in Madagascar and Law No. 2001-005 prohibits the sale of wild animals from any protected areas (UNEP and UNCTAD, 2008).

Through its national legislation project, the CITES Secretariat categorised the national legislation in Madagascar as legislation that is believed generally to meet the requirements for implementation of CITES (CITES, 2017). *B. peyrierasi* is not listed among the *Brookesia* species protected under Madagascar’s national legislation (Decree No. 2006-400) (Ministère de l’Environnement des Eaux et Forêts, 2006), presumably because it was formerly considered a synonym of *B. minima*.

The SA of Madagascar previously noted that the species was “under consideration” in terms of the national legislation (pers. comm. to UNEP-WCMC, 17 July 2014). The MA of Madagascar reported that there is a capture period for reptiles, as defined in the procedure manual for the management of wild fauna and flora of Madagascar (February 1 to April 30)(*in litt.* to CITES Secretariat, 2017). It is also forbidden to collect pregnant females and newborns to ensure the regeneration of the wild populations MA of Madagascar (*in litt.* to the CITES Secretariat, 2017).

The MA of Madagascar (*in litt.* to the CITES Secretariat, 2017) reported that an identification guide has been available for the genus *Brookesia* since 2016, and that training on the guide is provided to border control officials by the Scientific Authority. However, there has been some misidentification of *Brookesia* species reported in trade, with *B. ramanantsoai* being imported to the United States described as *B. minima* (Anderson, pers. comm. to UNEP-WCMC, 2018). Doubts remain about the capacity of those involved in the trade to correctly identify species of the very small *B. minima* group, and concern was expressed that trade in protected species occurring at low densities could negatively impact populations (Jenkins, pers. comm. to UNEP-WCMC, 2018).

No current population monitoring schemes for *B. peyrierasi* are in place and its population is presumed to be declining based on the continuing loss of its natural habitat (Jenkins *et al.*, 2014).

The MA of Madagascar (*in litt.* to the CITES Secretariat, 2017) reported that this species is not bred in captivity within the country.

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

None identified.

E. References

- Anderson, C. 2018. Christopher Anderson (IUCN SSC Chameleon Specialist Group) pers. comm. to UNEP-WCMC, 9th March 2018.
- Blumgart, D., Dolhem, J. and Raxworthy, C.J. 2017. Herpetological diversity across intact and modified habitats of Nosy Komba Island, Madagascar. *Journal of Natural History*, 51(11–12): 625–642.
- Brygoo, E. 1978. Reptiles Sauriens Chamaeleonidae - Genre *Brookesia* et complément pour le genre *Chamaeleo*. *Faune de Madagascar*, 47: 1–173.
- Brygoo, E. and Domergue, C.A. 1975. Notes sur les *Brookesia* de Madagascar. IX. Observations sur *B. tuberculata* Mocquard, 1894, *B. ramanantsoai* sp. nov. et *B. peyrierasi* nom. nov. (Reptilia, Squamata, Chamaeleontidae). *Bulletin du Muséum national d'histoire naturelle*, 189(267): 1769–1782.
- Carpenter, A.I. and Robson, O. 2005. A review of the endemic chameleon genus *Brookesia* from Madagascar, and the rationale for its listing on CITES Appendix II. 375–380 pp. Available at: [isi:000234153500008](https://doi.org/10.1017/S0002341535000008).
- CITES 2017. *Status of legislative progress for implementing CITES*. Available at: https://cites.org/sites/default/files/eng/prog/Legislation/CITES_national_legislative_status_table.pdf. [Accessed: 29/03/2018].
- CITES 2018. *List of contracting Parties*. Available at: https://www.cites.org/eng/disc/parties/chronolo.php?order=field_country_official_name&sort=asc. [Accessed: 11/04/2018].
- Glaw, F. 2018. Frank Glaw (IUCN SSC Chameleon Specialist Group) pers. comm. to UNEP-WCMC, 9th March 2018.
- Glaw, F. and Jenkins, R.K.B. 2014. *Brookesia minima*. Available at: <http://www.iucnredlist.org/details/67009871/0>. [Accessed: 28/02/2018].
- Glaw, F., Köhler, J., Townsend, T.M. and Vences, M. 2012. Rivaling the world's smallest reptiles: discovery of miniaturized and microendemic new species of leaf chameleons (*Brookesia*) from northern Madagascar. *PloS one*, 7(2).
- Glaw, F. and Vences, M. 2007. *A field guide to the amphibians and reptiles of Madagascar*. 3rd Ed. Vences & Glaw Verlag, Cologne, Germany. 495 pp.
- Glaw, F., Vences, M., Ziegler, T., Bohme, W. and Kohler, J. 1999. Specific distinctness and biogeography of the dwarf chameleons *Brookesia minima*, *B. peyrierasi* and *B. tuberculata* (Reptilia: Chamaeleonidae): evidence from hemipenial and external morphology. *Journal of Zoology (London)*, 247: 225–238.
- Jenkins, R. 2018. Richard Jenkins (IUCN SSC Chameleon Specialist Group) pers. comm. to UNEP-WCMC, 9th March 2018.
- Jenkins, R.K.B., Andreone, F., Andriamazava, A., Anjeriniaina, M., Glaw, F., Rabibisoa, N., Rakotomalala, D., Randrianantoandro, J.C. and Randrianiriana, J. 2014. *Brookesia peyrierasi*. In: *IUCN 2014. IUCN Red List of Threatened Species. Version 2014.1*. Available at: <http://www.iucnredlist.org/details/full/172795/0>.
- Klaver, C.J.J. and Böhme, W. 1997. Chamaeleonidae. In: Wermuth, H. (Ed.). *Das Tierreich, Part 112*. Verlag Walter de Gruyter & Co., Berlin and New York.
- Lutzmann, N. 2006. Untersuchungen zur Ökologie der Chamäleonfauna der Masoala-Halbinsel, Nord-Ost Madagaskar. Dissertationsschrift zur Erlangung des Doktorgrades der Mathematisch-Naturwissenschaftlichen Fakultät der Rheinischen FriedrichWilhelms-Universität Bonn.
- Management Authority of Madagascar 2017. *in litt.* to CITES Secretariat, 16/11/2017.
- Management Authority of Madagascar 2018. *in litt.* to CITES Secretariat and UNEP-WCMC, 30/3/2018.
- Ministère de l'Environnement des Eaux et Forêts 2006. *Manuel de procédures pour la gestion de la faune et de la flore sauvages à Madagascar (PC20 Inf. 11)*. Antananarivo, Madagascar. 1–111 pp.
- Nečas, P. and Schmidt, W. 2004. *Stump-tailed Chameleons: Miniature Dragons of the Rainforest, the Genera Brookesia and Rhampholeon*. Chimaira, Frankfurt am Main, Germany. 255 pp.
- Scientific Authority of Madagascar, 2014. Dr Falitiana Rabemananjara (CITES Scientific Authority of Madagascar) *in litt.* to UNEP-WCMC, 17 July 2014.
- TRAFFIC 2017. *Overview of important seizures in the European Union: January to December 2016*. Geneva, Switzerland.

Cuora amboinensis: Indonesia

A. Summary

RST Selection Selected in the RST based on high volume trade 2011-2015 for a globally threatened species.

INDONESIA: Widespread species. Assessed as globally Vulnerable, but preliminary results from a workshop in March 2018 indicated that the species qualifies for Endangered, based on a suspected overall population decline between 50 and 80 per cent across its wide range. Global population size unknown. Widespread in Indonesia, occurring in Sumatra, Kalimantan, Java, the Lesser Sundas, Sulawesi and the Moluccas. Population size in Indonesia unknown but considered vulnerable. Surveys conducted in 2006 indicated population declines and possible local extinctions around trade centres. Collection for international trade for consumption and traditional Chinese medicine was considered the main threat to the species and high levels of illegal trade were reported to represent a major threat to the species survival. Annual reports were submitted by Indonesia for all years 2007-2016. Trade 2007-2016 consisted of high levels of live, wild-sourced individuals (174 290 as reported by Indonesia). Annual export quotas in place for 18 000 live individuals 2007-2017 (except for a quota of 5490 live and 12 510 skins and skin products in 2016). Quota appears to have been exceeded in 2016, according to Indonesia. Indonesia responded to the consultation relating to the RST. The species is not protected by national legislation, but was reported to be managed by harvest and export quotas. The basis for non-detriment findings for export of wild-sourced specimens does not appear robust, and international trade appears to be impacting the species, therefore categorised as Action is needed.

RECOMMENDATION:

Action is needed

RST Background

Cuora amboinensis (South Asian box turtle) from Indonesia was selected as a priority species-country combination for review under the RST at AC29, July 2017 (AC29 Com. 5 (Rev. by Sec.), AC29 Summary Record). *C. amboinensis* was identified as a species that met a high volume trade threshold for a globally threatened species, on the basis of trade data for the period 2011-2015 (AC29 Doc. 13.3 Annex 2 (Rev. 1)).

Under CoP Decision 11.93, the AC was recommended to consider trade in specimens of CITES-listed freshwater turtles and tortoises under the RST. At AC18, (April, 2002), *C. amboinensis* was categorised as of urgent concern, due to apparent high levels of unreported trade from a number of range States, coupled with an apparent decline in the availability of individuals (AC18 Doc. 7.1, AC18 Summary record). The scientific basis for quotas established by Indonesia and Malaysia was also unclear (AC18 Summary record). At AC19 (August, 2003) the RST working group recommended that Indonesia and Malaysia should be brought forward to the SC, as Article IV was not being complied with, as well as Viet Nam, as no response to the consultation was received (AC19 Summary Record). Recommendations

were finalised at AC21 (May 2005) which included for Indonesia; reviewing the annual export quota and undertaking a status assessment and field study of the species, upon which an adaptive management programme should be based (AC21 WG2 Doc. 1 (Rev. 1), AC21 Summary Record). Indonesia's response was summarised in SC54 Doc. 42: the country noted the species was widespread in the west and abundant in natural and man-made wetlands, exports for food consumption had been temporarily halted, and declines were not observed as harvested animal sizes had remained stable, and field studies were planned (SC54 Doc. 42). It was determined that both Indonesia and Malaysia had implemented the recommendations, and they were subsequently removed from the RST process (SC54 Doc. 42). It was decided at SC58 to recommend that Parties suspend trade in *C. amboinensis* from Viet Nam, until the AC recommendations had been implemented (SC58 summary record, Notification No. 2009/032). This trade suspension was subsequently withdrawn following SC62 (Notification No. 2012/057).

B. Species characteristics

Taxonomic note: It was reported that significant phylogeographic differentiation has been documented within *C. amboinensis* and the species may warrant recognition as multiple taxa at the species level (Koch, 2012; Turtle Taxonomy Working Group, 2017). Four subspecies are currently recognised *C. a. amboinensis*, *C. a. couro*, *C. a. kamaroma*, and *C. a. lineata* (Schoppe and Das, 2011; Turtle Taxonomy Working Group, 2017).

Biology: *C. amboinensis* is a small, semi-aquatic turtle (Schoppe and Das, 2011; Chan-ard *et al.*, 2015) measuring up to 25 cm straight carapace length (Lim and Das, 1999), which feeds on both plant and animal matter (Das, 2007; Schoppe and Das, 2011; Management Authority (MA) and Scientific Authority (SA) of Indonesia *in litt.* to the CITES Secretariat, 2017). The species occurs in lowland freshwater habitats from sea level up to an altitude of about 500 m (Schoppe and Das, 2011). The species was reported to occur in a range of habitats including swamps, marshes and permanent or temporary wetlands that experience little or no current (Ernst *et al.*, 2000), as well as man-made habitats such as oil palm plantations and ponds (Schoppe, 2009). In Indonesia, the species has been found in various natural and artificial habitats (Schoppe, 2009; MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017) and was considered “well adapted” by the MA and SA of Indonesia (*in litt.* to the CITES Secretariat, 2017). Young were reported to be more aquatic than adults (Asian Turtle Trade Working Group, 2000; Schoppe and Das, 2011).

Females can reportedly lay up to six eggs per year (Schoppe, 2008a), which hatch after an incubation period of 67-77 days in the wild (Whitaker and Andrews, 1997 *in*: Schoppe and Das, 2011). Referring to earlier studies by Wilbur (1975) and Mitchell (1988), Schoppe (2009) estimated an average hatching success of around 50 per cent. A lack of scientific literature on the growth rate and size at maturity of *C. amboinensis* was noted, and most studies were reportedly from hobby breeders (Schoppe, 2009). Based on observations of individuals in captivity, it was estimated that it takes approximately 5.5-6 years for *C. amboinensis* to reach sexual maturity in the wild (Schoppe, unpubl. data in Schoppe, 2009). A life expectancy of 25-30 years has been reported, with a maximum age of 38 years recorded in captivity (Bowler, 1977 *in*: Schoppe and Das, 2011) and generation time was reported to be approximately 18 years (Schoppe, 2009). The low reproductive rate of the species was thought to make it more vulnerable to over-exploitation (CoP11 Prop. 36; Schoppe, 2008a, 2008b, 2009), although the MA and SA of Indonesia reported that the species has a ‘high reproductive capability’.

C. Country reviews Indonesia

Distribution: *C. amboinensis* is a widespread species occurring in South and Southeast Asia (Schoppe and Das, 2011; Turtle Taxonomy Working Group, 2017; MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017), ranging from India and Bangladesh through Southeast Asia to Malaysia, the Nicobar Islands, Indonesia, and the Philippines (Fritz and Havaš, 2007).

C. amboinensis was reported to be widespread in Indonesia (Schoppe, 2008b; MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017), occurring in Sumatra, Kalimantan, Java, the Lesser Sundas, Sulawesi and the Moluccas (Fritz and Havaš, 2007; Turtle Taxonomy Working Group, 2017; MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017). Three of the four currently recognised subspecies of *C. amboinensis* have been reported to occur in Indonesia: *C. a. amboinensis* from Moluccas and Sulawesi (Fritz and Rummeler, 1991; Fritz and Havaš, 2007; Turtle Taxonomy Working Group, 2017), *C. a. couro* from Java, Sumatra and the Lesser Sundas (Fritz and Havaš, 2007; Turtle Taxonomy Working Group, 2017), and *C. a. kamaroma* from Kalimantan (Gaulke and Fritz, 1998; Turtle Taxonomy Working Group, 2017). A range map for the species is provided in Figure 1.

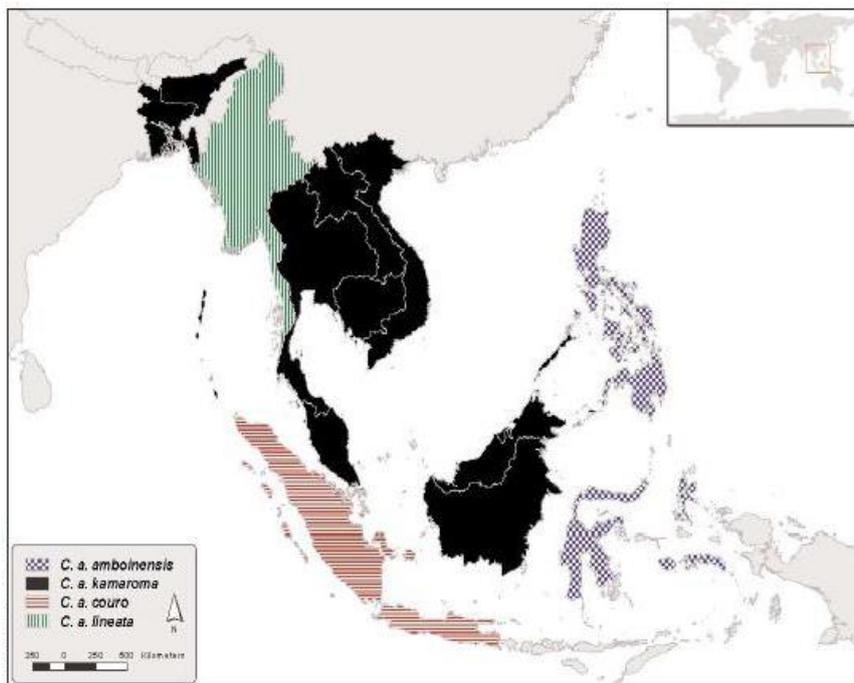


Figure 1. Distribution of the subspecies of *C. amboinensis* in Indonesia (Schoppe, 2009).

In **Sumatra**, Iverson (1992) mapped twelve locations, including the offshore islands Enggano (North Bengkulu Regency), Nias (North Sumatra), Pulau (Simeulue Regency, Aceh), Bangka, and Riau. The species occurrence has been reported from Aceh Province, Bengkulu, Jambi Province, Lampung Province, Mentawai Archipelago and other islands of the west coast of Sumatra, Riau Province, Sumatera Barat (West) Province, Sumatera Selatan (South) Province and Sumatera Utara (North) Province (Teynié *et al.*, 2010). The species occurrence in Loagan Bunut National Park was reported by Jensen and Das (2008).

In **Sulawesi**, Iverson (1992) mapped approximately eight locations. In the southeast, the species was recorded on Kabaena and Buton offshore Islands (within and adjacent to the Lambusango and Kakenauwe Forest Reserves on Buton) 2000-2010 (Gillespie *et al.*, 2005, 2015). The species occurrence has also been reported from Lore Lindu National Park (LLNP) area, central Sulawesi (Manthey and Grossmann, 1997 in: Wanger *et al.*, 2011).

In **Kalimantan**, Iverson (1992) mapped only one location, in the east, and the species was recorded from Mahakam River in East Kalimantan in 2007 (Budiono *et al.*, 2007). According to Muslim (2016), it could reportedly be found in 'large numbers' at a collection site for the province's reptile trade along Mahakam River. In West Kalimantan, the species has been reportedly collected from Pontianak City and Kabupaten Kubu Raya (Setiadi, 2015). The species has also been reported from Kapuas River (Moll and Moll, 2004). It was also reported to occur in mixed peat swamp forest in the Sabangau River catchment, Central Kalimantan (Borneo Nature Foundation, *in litt.* to UNEP-WCMC, 2017).

In the **Lesser Sunda Islands**, Iverson (1992) mapped one location from West Nusa Tenggara. In Bali, *C. amboinensis* was recorded from Tegal Bunder area in West Bali National Park, Kab. Buleleng and Jembrana Districts, Bali Province, in 2012 (Riyanto and Mumpuni, 2013). It was noted by Ibarrondo (pers. obs., 2004 in: Shepherd and Ibarrondo, 2005) that captive individual of *C. amboinensis* had been observed on Roti Island, Indonesia, but according to reptile traders, these were purchased on Timor. The species was reported to occur in Timor by the Turtle Taxonomy Working Group (2017) and Iverson (1992) mapped one location from Timor.

Iverson (1992) also mapped four locations from Banten and West **Java**, and four locations from **Maluku**, including North Maluku, Buru Regency, Ambon and Seram. *C. amboinensis* was recorded on Halmahera Island, North Maluku by Setiadi and Hamidy (2006).

The species was reported occur a number of protected areas in Indonesia, including Berbak National Park (Jambi, Sumatra), Rawa Aopa Watumohai National Park (Sulawesi), Lore Lindu National Park (Sulawesi), and Sebangau National Park (Kalimantan) (MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017). The species was reported to occur in Berbak National Park on Sumatra, in Lake Sentarum Wildlife Reserve, West Kalimantan, Lake Tempe and Lake Buaya, and Bunaken National Park on Sulawesi, and Lake Lebu, East Nusa Tenggara according to the Wetland Database of Wetlands International's Indonesia Program (Samedi and Iskandar, 2000). However, Samedi and Iskandar (2000) cautioned that some of these records may be questionable.

Based on species point localities and coverage of suitable habitat (taking into account elevation and hydrology), Buhlmann *et al.* (2009) estimated the global range of *C. amboinensis* to be 3,136,203 km².

Population status and trends: *C. amboinensis* was categorised as Vulnerable in the IUCN Red List in 2000, although it was noted that this assessment needs updating (Asian Turtle Trade Working Group, 2000). The species was considered Endangered in Bangladesh, Cambodia, Lao PDR and Viet Nam, Vulnerable in India, Indonesia, Malaysia and Thailand, and presumed stable in Singapore with a small population; there was no information available for Myanmar (Asian Turtle Trade Working Group, 2000). According to Schoppe and Das (2011), the species was assessed as Vulnerable due to its "heavy exploitation for the international food, pet and medicinal trade". Van Dijk and Rhodin (unpublished data in Schoppe and Das, 2011) were reported to have carried out a preliminary assessment in 2011, which indicated that the species still warranted a Vulnerable status at that time; an updated Red List assessment for *C. amboinensis* was discussed at a workshop in March 2018, and preliminary results indicated that the species qualifies for Endangered at its next Red List update, based on a suspected overall population decline between 50 and 80 per cent across its wide range (van Dijk *in litt.* to UNEP-WCMC, 2018).

It was reported that *C. amboinensis* was considered "relatively common" in most of its range (Schoppe and Das, 2011) although it was reported that many regional populations appeared to be decreasing rapidly and required close monitoring (Schoppe and Das, 2011). The species was reported to have experienced a rapid decline, demonstrated by its IUCN Red List assessments over time: unlisted in 1994, Lower risk/Near Threatened in 1996 to Vulnerable in 2000 (Schoppe and Das, 2011). It was thought that

extinction of the species could occur “within a relatively short timeframe” as a result of over-exploitation, as predicted by Altherr and Freyer (2000) (Schoppe and Das, 2011). Historically, Pritchard (1979) described the species as “well-known and abundant” and Das (1991) as “not uncommon”. Schoppe (2008b, 2009) reported that no estimates of the global population size of the species were available.

In Indonesia, the species was considered Vulnerable in 2000 (Asian Turtle Trade Working Group, 2000), although all three subspecies of *C. amboinensis* were considered common in Indonesia by Samedi and Iskandar (2000). In 2005, the MA of Indonesia, reported that the species was common and widespread in the west of the country and abundant in most areas with natural and artificial wetlands (SC54 Doc. 42). However, according to Anon (2002 in: Schoppe, 2008b) and Schoppe (2009), populations in Indonesia were reduced and declining.

In 2006, a harvest survey from an accessible area of wetlands in Kota Bangun, East Kalimantan was conducted (Schoppe, 2009; MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017); the site was chosen based on known exploitation in the area (Schoppe, 2009). Over 43 days, the collection of 1547 individuals of *C. amboinensis* by four middlemen was recorded (Schoppe, 2009), which if extrapolated for the year, would account for half the national annual quota (Schoppe, 2009; MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017). The composition of harvested individuals at the study site was 96 per cent adults and 4 per cent juveniles (Schoppe, 2009; MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017). According to reptile traders (pers. comm. in Schoppe, 2009), collection activities for *C. amboinensis* in the area typically peaked around January to May.

The population size of the species in a two hectare site in a peat swamp forest in the Rawa Aopa Watomohai National Park, Tinanggea, southeast Sulawesi, was estimated to be 120 individuals (60 individuals per hectare) in 2006 (Schoppe, 2009; MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017). The population composition was reported to be almost 1:1 juvenile to mature ratio of individuals (Schoppe, 2009; MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017), which was thought to indicate a healthy population (Schoppe, 2008b). Male to female ratio of the population was 1:1.2 and a normal distribution of sizes in the protected area was reported (Schoppe, 2009).

Surveys of markets (in West Java, South Sulawesi, Sumatra and Kalimantan) and qualitative surveys on the impact of harvesting on populations at sites in South Sulawesi, Sumatra and Kalimantan were also carried out in 2006 (Schoppe, 2008b, 2009). A decrease in the mean size of *C. amboinensis* in trade in Indonesia was observed, probably as a result of “ongoing long-term exploitation at modest intensity”, although it was noted that there have been few previous studies and comparative data are lacking (Schoppe, 2009). The results indicated population declines in the study areas and possible local extinctions around trade centres as a result of over-exploitation for the food and the Traditional Chinese Medicine (TCM) trade (Schoppe, 2009). In Tembilahan, Riau (Sumatra) the species was considered no longer common by local people (Schoppe, 2009). While local people still considered the species common near Rawa Aopa Watomohai National Park, population declines were noted, and traders in South Kalimantan described the species as “not as easy to obtain compared to some years ago”; the traders had therefore extended their collection activities to Central Kalimantan (Schoppe, 2009). The situation was considered similar in West Kalimantan (Schoppe, 2009).

In northern Sulawesi, the species was reported to be common (Ives *et al.*, 2008) and ‘commonly encountered’ in the lowlands of the Lore Lindu National Park (LLNP) area, central Sulawesi by Manthey and Grossmann (1997 in: Wanger *et al.*, 2011). Whilst there was little evidence of commercial exploitation of turtles in North Sulawesi and Gorontalo, it was noted that an increasing number of individuals were being harvested in central Sulawesi to supply local Chinese and international pet, food and medicinal markets (Ives *et al.*, 2008).

In 2017, a survey conducted by the Indonesian SA (LIPI) in a 0.45 km² area of oil palm plantation in Jambi Province, Sumatra, recorded 40 individuals¹⁹. According to Mumpuni (2017 pers. comm. to the MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017), a relative abundance of up to 0.9 individuals per hectare could be assumed from this result, which was considered high. It was noted that the survey is still ongoing in other areas (MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017), however no further information was available at the time of writing.

Threats: *C. amboinensis* was reported to be threatened by collection for local consumption, and international trade as meat for consumption, for Traditional Chinese Medicine (TCM) and as pets (van Dijk *et al.*, 2000; Holloway, 2003 in: Schoppe and Das, 2011; Cheung and Dudgeon, 2006). Habitat loss and degradation were reported as additional threats (Jenkins, 1995; Schoppe and Das, 2011).

In Indonesia, the main threat to the species was reported to be collection for international trade for consumption and TCM (Schoppe, 2009). Indonesia was reported to be the main supplier of the species for the international meat, TCM and pet markets (Schoppe, 2009; Schoppe and Das, 2011) and levels of exploitation were considered by Schoppe (2008b) to be unsustainable. Collection for the consumption trade was reported to be focused on large adults (Schoppe, 2009; Schoppe and Das, 2011) and females of all three subspecies of *C. amboinensis* occurring in Indonesia were reportedly typically larger and heavier than males, making them more attractive to traders (Schoppe, 2009). Adaptation to man-made habitats was considered by Schoppe (2009) to enable easier access to individuals, increasing the risk of collection.

Aside from international trade for consumption, the species was still considered popular in the pet trade in the United States, Europe and Japan (Schoppe, 2009). Online surveys in 2006 found the species for sale at mean prices of USD 67.25 in Europe, between USD 20-79.99 in the US and for USD 56.72 by a single retailer in Japan (Schoppe, 2009).

Individuals of *C. amboinensis* were recorded for sale in Jakarta in 2004 and 2010 (395 and 125, respectively) (Shepherd and Nijman, 2007; Stengel *et al.*, 2011), and in Jakarta, Kalimantan, Medan, Sulawesi and Sumatra in 2006 (Schoppe, 2009), with the largest quantity observed in Jakarta, mainly for local consumption, at prices ranging between USD 3.26-10.85 (Schoppe, 2009). Whilst Schoppe (2009) considered levels of local use were low, *C. amboinensis* was found to be amongst the five most commonly observed species of tortoises and freshwater turtles on sale during a survey of Jakarta's markets and pet shops, with an estimated 837 individuals for sale in 2015 (Morgan, 2018).

Levels of exploitation and export of the species from Indonesia prior to its listing in Appendix II were considered to be high (Jenkins, 1995; van Dijk *et al.*, 2000; MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017). Van Dijk *et al.* (2000) noted that the species in Indonesia has experienced "boom-and-bust" cycles, where collection and export volumes increase rapidly, peak and then decline as populations become depleted and collectors move to new areas.

Illegal trade in *C. amboinensis* was reported to be extensive, involving a range of actors, and representing a major threat to the species survival (Schoppe, 2008b, 2009). The destination of illegal exports of live *C. amboinensis* from Indonesia were reported to include Hong Kong, Special Administrative Region (SAR) of China, China, Singapore and Malaysia (Schoppe, 2008b). Levels of illegal trade were estimated to be at least ten times the volume of legal trade (Schoppe, 2009), and included live individuals and shells (Schoppe and Das, 2011). A review of global illegal trade in tortoises and freshwater turtles recorded *C. amboinensis* as the third most seized turtle species by volume (live

¹⁹ Using 50 "traditional traps" over a five day period (MA and SA *in litt.* to the CITES Secretariat, 2017).

specimens) 2000-2016, with at least 20 772 individuals seized in a total of 37 separate seizures (CoP17 Doc. 73).

Seizures of *C. amboinensis* in international trade originating from Indonesia and destined for China and Hong Kong were reported 2002-2017, totalling at least 5233 individuals and 602 kg of plastrons (TRAFFIC, 2014, 2016). In July 2002, 1423 individuals of *C. amboinensis*, arriving from Banjarmasin, South Kalimantan and destined for export to China for food and medicinal purposes, were seized by customs officials at Jakarta airport, Indonesia (TRAFFIC, 2014). In January 2006, customs officers at Kwai Chung Customhouse, Hong Kong seized 602 kg of plastrons from *C. amboinensis*; the consignment had been shipped from Indonesia to Hong Kong earlier that month for re-export to the mainland (TRAFFIC, 2014). In June 2006, AVA enforcement officers in Singapore seized 2520 individuals from an illegal cargo of freshwater turtles shipped from Tembilahan in Sumatra, Indonesia (TRAFFIC, 2014) and according to Indonesia's biennial report for 2005-2006, the captain of a vessel was imprisoned for five months and fined SGD 20 000 by the Singapore Government; 57 of the surviving *C. amboinensis* were repatriated to Batam. In February 2010, marine police in Hong Kong prevented an attempt to smuggle 1000 freshwater turtles, including *C. amboinensis* to mainland China; the consignment was believed to have originated in Indonesia (TRAFFIC, 2014). In November 2015, customs officials at Shanghai Pudong International Airport, China, seized 1290 individuals of *C. amboinensis* arriving from Indonesia (TRAFFIC, 2016). The MA and SA of Indonesia (*in litt.* to the CITES Secretariat, 2017) reported that in January and September 2017, smuggled carapaces of *C. amboinensis* were seized at Tanjung Priok Port and in Tangerang, West Java, respectively.

Schoppe (2009) noted that many of the illegal shipments of *C. amboinensis* are accompanied by forged CITES permits. Schoppe (2009) found evidence of illegal harvest within Indonesia (individuals obtained from provinces without a quota).

Trade: *C. amboinensis* was listed in CITES Appendix II on 19th July 2000 as part of the genus listing for *Cuora*. All CITES annual reports have been submitted by Indonesia for the period 2007-2016. Indonesia published an export quota of 18 000 live individuals each year 2007-2015²⁰ and 2017 (Table 1). In 2016, export quotas of 5490 live individuals and 12 510 skins and skin products were published. No trade in skins or skin pieces was reported during the ten-year period. Reported trade in live, wild-sourced individuals appears to have exceeded the export quotas in 2016, according to Indonesia, and 2009-2010 and 2016, according to importers (Table 1), however a permit analysis identified a number of cases of trade reported in one year on permits which appeared to have been issued in the previous year, thus potentially bringing trade under quota for 2009 and 2010. The MA of Indonesia (*in litt.* to UNEP-WCMC, 2018) noted that exports in 2009, 2010 and 2016 did not exceed the export quotas, but referred to a quota of "18 000 heads", while the export quota published in 2016 was for 5490 live individuals and 12 510 skins and skin products.

Table 1: CITES export quotas for live, wild-sourced *C. amboinensis* from Indonesia 2007-2018 and global direct exports of live, wild-sourced *C. amboinensis* as reported by Indonesia and countries of import, 2007-2016.

	2007	2008	2009	2010	2011 ²	2012	2013	2014	2015	2016	2017	2018
Quota (live)	18000	18000	18000	18000	18000	18000	18000	18000	18000	5490	18000	18000
Reported by Indonesia	17766	17994	18000	17965	14568	15997	18000	18000	18000	18000	-	-
Reported by importer	13950	14559	18960	18239	11074	7793	11174	14441	16704	22184	-	-

²⁰ Quotas published in 2011 totalled 18 000 for live individuals, but specified 10 350 for consumption and 7650 for pets.

Direct trade in *C. amboinensis* from Indonesia 2007-2016 predominantly comprised 174 290 live, wild-sourced individuals exported for commercial purposes, as reported by Indonesia, and 149 078 as reported by countries of import (Table 2). Trade reported by Indonesia remained relatively consistent during the ten-year period whereas importers reported a three-fold increase 2012-2016. Hong Kong, SAR, China and the United States represented the top three importing countries, collectively accounting for 91 per cent and 98 per cent of the trade 2007-2016, according to Indonesia and the countries of import, respectively. Hong Kong, SAR represented the main importing country from 2007-2012, while China represented the main importing country from 2013-2016, according to both the countries of import and Indonesia. Trade in live captive-produced (sources C and F) *C. amboinensis* increased 2011-2016. The MA and SA of Indonesia (*in litt.* to the CITES Secretariat, 2017) provided more recent records of trade, reporting the export of 490 live, captive born (source F) individuals in 2017.

In 2014, Indonesia also reported the export of 20 000 kg of wild-sourced carapaces to Taiwan, Province of China for commercial purposes (Table 2). According to the MA and SA of Indonesia (*in litt.* to the CITES Secretariat, 2017), the high number of carapaces reported in trade in 2014 may be due to several reasons: 1) the carapaces could represent residual waste from domestic consumption collected over a number of years; 2) some of the carapaces may have come from species other than *C. amboinensis* and were misidentified; and 3) were collected from dead specimens.

Table 2: Direct exports of *C. amboinensis* from Indonesia, 2007-2016.

Term	Purpose	Source	Reported by	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total	
carapaces	T	W	Exporter								20000			20000	
			Importer												
live	B	W	Exporter												
			Importer										40	40	
	P	W	Exporter		6									6	
			Importer												
	Q	W	Exporter												
			Importer	52											52
	T	C	Exporter												
			Importer					40	43						83
		F	Exporter									324	950	1298	2572
			Importer										650	678	1328
I	W	Exporter													
		Importer					50	3						53	
W	W	Exporter	17766	17994	18000	17965	14568	15997	18000	18000	18000	18000	18000	192290	
		Importer	13950	14559	18960	18239	11074	7793	11174	14441	16704	22184	149078		
specimens	S	W	Exporter												
			Importer									1			1

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Indirect trade in *C. amboinensis* originating in Indonesia 2007-2016, comprised live, wild-sourced individuals; 747 reported by re-exporters and 707 reported by importers. The vast majority of live animals were re-exported by Singapore to China and Hong Kong, SAR for commercial purposes.

A comparison of export records for 2000-2006 provided by the Indonesian Reptile and Amphibian Trade Association (IRATA) with CITES trade data by Schoppe (2009) found that for all years, except 2005, levels of trade recorded by IRATA exceeded those reported by the Indonesian MA.

Management: Indonesia became a Party to CITES on 28th December 1978, with entry into force on 28th March 1979 (CITES, 2018).

C. amboinensis is not included in the list of protected species under Indonesian Government Regulation No. 7 concerning the preservation of wild plants and animals (Government of Indonesia, 1999). However, it was noted by Morgan (2018) that the law relating to wildlife protection (Conservation Act No. 5, 1990) and the protected species list (Regulation No. 7, 1999) were currently under review by the Indonesian Government. The species was reported to be managed in Indonesia through a quota system (Jenkins, 1995; Schoppe, 2009; MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017) and through protection of its habitat and restrictions on harvest in protected areas (MA of Indonesia *in litt.* to UNEP-WCMC, 2018).

According to the MA and SA of Indonesia (*in litt.* to the CITES Secretariat, 2017), prior to its inclusion in CITES Appendix II in 2000, the species was managed as a fishery resource in Indonesia under the Indonesian Department of Marine Affairs and Fisheries (DKP).

Quota setting: According to the MA and SA of Indonesia (*in litt.* to the CITES Secretariat, 2017), provincial Management Authority officers propose harvest levels, which are then assessed by the SA (Indonesian Institute of Sciences, LIPI). It was reported that 90 per cent of the national quota is typically allocated for export and the remainder for domestic trade (Schoppe, 2008b; Siswomartono, 1998 in: MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017). National quotas are set, with sub-quotas for specific provinces or regions, and these are reviewed annually (Stengel *et al.*, 2011). The MA of Indonesia (*in litt.* to UNEP-WCMC, 2018), clarified that exports quotas are set at the national level only, with the harvesting quota set at provincial level. According to the MA of Indonesia (*in litt.* to UNEP-WCMC, 2018), harvest areas for *C. amboinensis* are located in Sumatera (in the north, west, south), including Jambi, Riau, Kalimantan (east, west, south and central), Sulawesi (central and south), and Molucca. No information on the harvest quotas by province was available.

The MA and SA of Indonesia (*in litt.* to the CITES Secretariat, 2017) reported that harvest quotas for individual species are based on a range of available data, including information on the biology and distribution of the species, general land-use and potential threats in specific areas, and include various parameters, including environmental conditions. In setting the quotas, expertise is sought by the Scientific Authority from other research organisations, universities and NGOs (MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017). The finalised quotas are issued in an annual decree by the Directorate General of Ecosystem and Nature Conservation (DG KSDAE) as the CITES MA (MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017), which identifies the allowable harvest for each species at the national level down to the Provincial level (MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017). According to the MA and SA of Indonesia (*in litt.* to the CITES Secretariat, 2017), monitoring of the 'chain of custody' between the source region and the point of collection is theoretically possible to "a certain degree of accuracy", and each province was reported to be divided into a number of BKSDA jurisdictions, which are able to track the legality of specimens.

Concerns regarding the process used to establish quotas were noted by several authors. It was reported that due to a lack of species information, harvest and export quotas were typically set based on actual export levels from the previous year (LIPI and PHKA-KKH (Directorate General of Forest Protection and Nature Conservation) pers. comm. 2006 in: Schoppe, 2009). Shepherd and Nijman (2007) noted that the process where harvest quotas may be allocated to one province, but not to the adjacent province, created a loophole for harvest in adjacent areas. Samedi and Iskandar (2000) and Schoppe (2009) noted that the allocation of quotas to the provinces did not match the distribution of *C. amboinensis*. Concerns were also raised that harvest and trade were not efficiently monitored and enforcement of wildlife laws was rare (Shepherd and Nijman, 2007).

Protected areas: *C. amboinensis* occurs in a number of protected areas in Indonesia (see 'Distribution') and these areas in Sumatra, Kalimantan, Sulawesi, Java, Bali and Moluccas, within the range of

C. amboinensis in Indonesia, were considered important for the protection of the species (MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017). The MA and SA of Indonesia (*in litt.* to the CITES Secretariat, 2017) reported that harvest of any species within gazetted Protected Areas, is prohibited under Act No. 5 of 1990.

The United Nations (1997 in: Schoppe, 2009) cautioned that protected areas in Indonesia did not assure biodiversity conservation due to inadequate resources for management and enforcement, and Schoppe (2009) considered it likely that the situation remained similar.

Captive-breeding: In an NDF case study, Schoppe (2008b) noted that *C. amboinensis* had been recommended for large-scale captive-breeding to supply the consumption trade by the Indonesian MA. The MA and SA of Indonesia (*in litt.* to the CITES Secretariat, 2017) reported that a captive-breeding programme (PT. Agrisatwa Alam Nusa in Bekasi, West Java) had been initiated, with support from the Indonesian Government. In October 2017, the number of individuals kept at the captive-breeding facility was reported to total 2180 adults (726 males and 1454 females) and 1564 juveniles, and it was reported that juveniles were usually sold at 2-3 months of age (MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017). A tool to control and monitor captive-breeding operations, referred to as 'Maximum Estimated Production' (MEP) has been developed by the MA; this is an estimate of breeding success for a particular species, by a particular breeder, for the forthcoming year (MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017). In 2018, the MA of Indonesia published MEP figures for breeding facilities for *C. amboinensis* including: five individuals for CV. Pasundar, 2790 for PT. Agrisatwa Alam Nusa, and 15 for PT. Indoreptile, with a note specifying that these may be utilised after completion of an audit and approval from LIPI (Ministry of Environment and Forestry, 2018).

Janssen and Chng (2018) raised concerns regarding the biological parameters used for species in Indonesia's captive-breeding production plan (CBPP) for 2016, and remarked that there was reportedly no breeding stock of *C. amboinensis* present at the breeding facility for which a quota (1995) had been allocated. Captive-breeding of the species for commercial purposes was considered expensive and time-consuming (Schoppe, 2008a), and not economically feasible due to air freight rates for captive-bred animals and the high costs associated with breeding a slow-reproducing species (Schoppe, 2009).

Legislation and enforcement: Through its national legislation project, the CITES Secretariat categorised the national legislation in Indonesia as "legislation that is believed generally to meet the requirements for implementation of CITES" (CITES Secretariat, 2017).

Shepherd (2000) and Schoppe (2009) expressed concerns regarding the ability of enforcement officers to correctly identify *C. amboinensis*. According to the MA and SA of Indonesia (*in litt.* to the CITES Secretariat, 2017), the MA has established a special unit to manage cases of wildlife smuggling, and efforts had been made to increase the capacity of officers to identify whole specimens to the species level (although not yet of carapaces or other parts). It was reported that in some instances, the MA and law enforcement agencies consult with the SA to identify confiscated specimens (MA and SA of Indonesia *in litt.* to the CITES Secretariat, 2017).

Non-Detriment Finding (NDF): On the basis of stable levels of actual exports, in combination with other factors, including the species wide distribution, high reproductive capability, ability to adapt to disturbed habitats, presence in protected areas and captive-breeding efforts, it was considered trade was "not a significant threat" to the wild population of the species according to the MA and SA of Indonesia (*in litt.* to the CITES Secretariat, 2017).

Resolution Conf. 11.9 (Rev. CoP13) on the 'Conservation of and trade in tortoises and freshwater turtles' urges Parties, especially range States, to undertake a number of activities including enhancing

enforcement and management efforts, implementing research programmes and management strategies, enacting legislation, and increasing public awareness. Range States that authorize trade in tortoises and freshwater turtles are required to provide information on their progress towards implementing this Resolution in their periodic reporting (Res. Conf. 11.9 [Rev. CoP13]). In their 2005-2006 implementation report to CITES, Indonesia noted the seizure of 2520 *C. amboinensis* (Doc. 11/02/08e). No further specific information could be located on progress towards these activities in relation to the species under review in the implementation reports of Indonesia. Pursuant to CITES Decision 16.109, the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group produced a guide for CITES Scientific and Management Authorities on non-detriment findings and trade management for tortoises and freshwater turtles (AC28 Doc. 15 Annex 2).

In 2002, a species management workshop funded by Environment Australia was held with members of the Indonesian MA and SA to explore the use of the IUCN risk-assessment checklist in assisting the Indonesian SA in making non-detriment findings (Schoppe, 2008b). Following fieldwork in 2006, TRAFFIC Southeast Asia applied the checklist to produce a risk assessment of *C. amboinensis* in Indonesia (Schoppe, 2007 in: Schoppe, 2008b).

An NDF study of *C. amboinensis* in Indonesia was prepared by Schoppe (2008b) and considered at an NDF International Expert Workshop in Mexico in 2008 (AC24 Doc. 9). Schoppe (2008b) recommended that surveys be conducted to determine the “exact distribution of the species and its abundance in Indonesia” and that in the absence of quantitative data on local populations, indicators of change, developed by TRAFFIC Southeast Asia in 2006, should be assessed on an annual basis at sites in trade centres.

Schoppe (2009) recommended that harvest for legal trade should be strictly regulated, and efforts made to “seriously” address illegal trade.

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

Levels of illegal trade in *C. amboinensis* from Indonesia were reported to be high and to represent a major threat to the species survival (Schoppe, 2008b, 2009).

E. References

- Altherr, S. and Freyer, D. 2000. *The decline of Asian turtles: Food markets, habitat destruction and pet trade drive Asia's freshwater turtles and tortoises to extinction*. Pro Wildlife, Munich, Germany. pp.
- Anon 2002. *Species management workshop funded by Environment Australia*. Cibinong, Indonesia, 15-17 April 2002.
- Asian Turtle Trade Working Group 2000. *Cuora amboinensis*. The IUCN Red List of Threatened Species 2000. Available at: <http://www.iucnredlist.org/details/5958/0>. [Accessed: 14/02/2018].
- Borneo Nature Foundation. 2017 Borneo Nature Foundation *in litt.* to UNEP-WCMC, 15.04.2017.
- Bowler, J. 1977. Longevity of reptiles and amphibians in North American collections as of 1 November, 1975. *Society for the Study of Amphibians and Reptiles. Miscellaneous Publications, Herpetological Circular No. 6.*, 32.
- Budiono., Kreb, D., Syachraini. and Agustina, S. 2007. *Biodiversity in lakes and wetlands in the Middle Mahakam Region (DMT) East Kalimantan, Indonesia, 2005-2007. Mahakam Bird Assessment Survey, YK-RASI 2007*. Samarinda, East Kalimantan, Indonesia. 31 pp.
- Buhlmann, K.A., Akre, T.S.B., Iverson, J.B., Karapatakis, D., Mittermeier, R.A., Georges, A., Rhodin, A.G.J., van Dijk, P.P. and Gibbons, J.W. 2009. A global analysis of tortoise and freshwater turtle distributions with identification of priority conservation areas. *Chelonian Conservation and Biology*, 8(2): 116-149.

- Chan-ard, T., Parr, J.W.K. and Nabhitabhata, J. 2015. *A field guide to the reptiles of Thailand*. Oxford University Press, New York, United States. 314 pp.
- Cheung, S.M. and Dudgeon, D. 2006. Quantifying the Asian turtle crisis: market surveys in southern China, 2000-2003. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 16: 751-770.
- CITES 2018. *List of contracting Parties*. Available at: https://www.cites.org/eng/disc/parties/chronolo.php?order=field_country_official_name&sort=asc. [Accessed: 11/04/2018].
- CITES Secretariat 2017. *Status of legislative progress for implementing CITES*. Available at: https://cites.org/sites/default/files/eng/prog/Legislation/CITES_national_legislative_status_table.pdf. [Accessed: 11/04/2018].
- Das, I. 2007. *Amphibians and reptiles of Brunei*. Natural History Publications, Kota Kinabalu, Borneo. 200 pp.
- Das, I. 1991. *Colour guide to the turtles and tortoises of the Indian subcontinent*. R&A Publishing Ltd, Portishead, England.
- Ernst, C.H., Altenburg, R.G.M. and Barbour, R.W. 2000. *Turtles of the World*. Available at: <http://wbd.etibioinformatics.nl/bis/turtles.php>? [Accessed: 2/12/2015].
- Fritz, U. and Havaš, P. 2007. Checklist of chelonians of the world. *Vertebrate Zoology*, 57(2): 148-368.
- Fritz, U. and Rummeler, H.-J. 1991. Geographische Variabilität der Amboina-Schmarnschildkröte *Cuora amboinensis* (Daudin, 1802), mit Beschreibung einer neuen Unterart, *C. a. kamaroma* subsp. nov. *Salamandra*, 27(1): 17-45.
- Gaulke, M. and Fritz, U. 1998. Distribution patterns of batagurid turtles in the Philippines (Testudines: Bataguridae: *Cuora*, *Cyclemys*, *Heosemys*). *Herpetozoa*, 11(1/2): 3-12.
- Gillespie, G., Howard, S., Lockie, D. and Scroggie, M. 2005. Herpetofaunal Richness and Community Structure of Offshore Islands of Sulawesi, Indonesia. *Biotropica*, 37(2): 279-290.
- Gillespie, G.R., Howard, S., Stroud, J.T., Ul-Hassanah, A., Campling, M., Lardner, B., Scroggie, M.P. and Kusrini, M. 2015. Responses of tropical forest herpetofauna to moderate anthropogenic disturbance and effects of natural habitat variation in Sulawesi, Indonesia. *Biological Conservation*, 192: 161-173.
- Government of Indonesia 1999. *Indonesian Government Regulation No. 7 concerning the preservation of wild plants and animals*. Peraturan Pemerintah Republik Indonesia, Indonesia.
- Holloway, R.H.P. 2003. Domestic trade of tortoises and freshwater turtles in Cambodia. Linnean Fund Research Report. *Chelonian Conservation and Biology*, 4: 733-734.
- Iverson, J.B. 1992. *A revised checklist with distribution maps of the turtles of the world*. Earlham College, Richmond, USA. 363 pp.
- Ives, I.E., Platt, S.G., Tasirin, J.S., Hunowu, I., Siwu, S. and Rainwater, T.R. 2008. Field Surveys, Natural History Observations, and Comments on the Exploitation and Conservation of *Indotestudo forstenii*, *Leucocephalon yuwonoi*, and *Cuora amboinensis* in Sulawesi, Indonesia. *Chelonian Conservation and Biology*, 7(2): 240-248.
- Janssen, J. and Chng, S.C.L. 2018. Biological parameters used in setting captive-breeding quotas for Indonesia's breeding facilities. *Conservation Biology*, 32(1): 18-25.
- Jenkins, M. 1995. *Tortoises and freshwater turtles: the trade in South East Asia*. TRAFFIC International, Cambridge (UK). 1-49 pp.
- Jensen, K.A. and Das, I. 2008. Observations on the Influence of Seasonality, Lunar Cycles, and Weather Condition on Freshwater Turtle Activity in Sarawak, East Malaysia (Borneo). *Asiatic Herpetological Research*, 11: 37-42.
- Koch, A. 2012. *Discovery, diversity, and distribution of the amphibians and reptiles of Sulawesi and its offshore islands*. Chimaira. Andreas S. Brahm, Frankfurt am Main. 374 pp.
- Lim, B.L. and Das, I. 1999. *Turtles of Borneo and peninsular Malaysia*. Available at: <http://www.chelonian.org/ttn/archives/ttn4/pp25.shtml>. [Accessed: 2/12/2015].
- Management Authority and Scientific Authority of Indonesia 2017. CITES Management Authority and Scientific Authority of Indonesia, Ministry of Environment and Forestry *in litt.* to the CITES Secretariat, 17 November 2017.
- Management Authority of Indonesia 2018. CITES Management Authority of Indonesia, Ministry of Environment and Forestry *in litt.* to UNEP-WCMC, 9 May 2018.
- Manthey, U. and Grossmann, W. 1997. *Amphibien und Reptilien Südasiens*. Natur und Tier Verlag,

Munich, Germany.

- Ministry of Environment and Forestry 2018. *Batas maksimal pemanfaatan satwa liar hasil penangjaran tahun 2018*. Directorate General Conservation of Natural Resources and Ecosystems, Ministry of Environment and Forestry, Indonesia.
- Mitchell, J.C. 1988. Population ecology and life histories of the freshwater turtles *Chrysemys picta* and *Sternotherus odoratus* in an Urban Lake. *Herpetological Monographs*, 2: 40–61.
- Moll, D. and Moll, E.O. 2004. *The ecology, exploitation, and conservation of river turtles*. Oxford University Press, New York, USA. 393 pp.
- Morgan, J. 2018. *Slow and steady: The global footprint of Jakarta's tortoise and freshwater turtle trade*. 44 pp.
- Muslim, T. 2016. *Reptile Exploitation at Mahakam River on East Kalimantan. Prosiding Seminar Nasional Lahan Basah Tahun 2016*. Indonesia. 135-140 pp.
- Pritchard, P.C.H. 1979. *Encyclopedia of turtles*. TFH Publishing Inc., Neptune, USA. 859 pp.
- Riyanto, A. and Mumpuni 2013. *Herpetofauna di taman nasional bali barat. Prosiding Seminar Nasional Biologi-IPA*. Jawa Barat, Indonesia. 978-979 pp.
- Samedi and Iskandar, D.T. 2000. Freshwater turtle and tortoise conservation and utilization in Indonesia. In: van Dijk, P.P., Stuart, B.L. and Rhodin, A.G.J. (Eds.). *Asian turtle trade: proceedings of a workshop on conservation and trade of freshwater turtles and tortoises in Asia*. Chelonian Research Monographs 2. Chelonian Research Foundation, Lunenburg, Massachusetts, USA. 106–111.
- Schoppe, S. 2007. *Non-Detrimental Finding Methodology for the trade of Southeast Asian freshwater turtles and tortoises (Fam. Geoemydidae)*. Kuala Lumpur, Malaysia. 19 pp.
- Schoppe, S. 2008a. Science in CITES: The biology and ecology of the Southeast Asian Box Turtle and its uses and trade in Malaysia. *TRAFFIC Southeast Asia, Petaling Jaya, Malaysia.*,
- Schoppe, S. 2009. *Status, trade dynamics and management of the Southeast Asian Box Turtle in Indonesia*. TRAFFIC Southeast Asia, Petaling Jaya, Malaysia. 105 pp.
- Schoppe, S. 2008b. *The Southeast Asian Box Turtle Cuora amboinensis (Daudin, 1802) in Indonesia. NDF workshop case studies WG 7 – Reptiles and Amphibians*. Mexico. 1-19 pp.
- Schoppe, S. and Das, I. 2011. *Cuora amboinensis (Riche in Daudin 1801) - Southeast Asian Box Turtle*. In: Rhodin, A.G.J., Pritchard, P.C.H., van Dijk, P.P., Saumure, R.A., Buhlmann, K.A., Iverson, J.B. 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. Chelonian Research Monographs, No. 5*. 53.1-53.13.
- Setiadi, A.E. 2015. Identifikasi dan deskripsi karakter morfologi kura-kura air tawar dari Kalimantan Barat (Identification and description morphological character of freshwater turtle from West Kalimantan) Sebagian besar wilayah Kalbar adalah dataran rendah , sungai , rawa . *Majalah Ilmiah Al Ribaath, Universitas Muhammadiyah Pontianak*, 12(1): 29–34.
- Setiadi, M.I. and Hamidy, A. 2006. *Jenis-jenis herpetofauna di pulau Halmahera*. 41 pp.
- Shepherd, C.R. 2000. Export of live freshwater turtles and tortoises from North Sumatra and Riau, Indonesia: A case study. In: *Asian turtle trade: Proceedings of a workshop on conservation and trade of freshwater turtles and tortoises in Asia*. Chelonian Research Foundation, Lunenburg. 112–119.
- Shepherd, C.R. and Ibarrondo, B. 2005. *The Trade of the Roti Island Snake-necked Turtle Chelodina mccordi, Indonesia*. Southeast Asia. 51 pp.
- Shepherd, C.R. and Nijman, V. 2007. *An overview of the regulation of the freshwater turtle and tortoise pet trade in Jakarta, Indonesia*. TRAFFIC Southeast Asia. 62 pp.
- Siswomartono, D. 1998. Review of the policy and activities of wildlife utilization in Indonesia Erdelen, W. (Ed.). *Conservation, trade and sustainable use of lizards and snakes in Indonesia - Mertensiella*, 9: 27–31.
- Stengel, C., Shepherd, C. and Caillabet, O. 2011. *The trade in tortoises and freshwater turtles in Jakarta revisited*. TRAFFIC Southeast Asia, Petaling Jaya, Malaysia. 24 pp.
- Teynié, A., David, P. and Ohler, A. 2010. Note on a collection of amphibians and reptiles from western Sumatra (Indonesia), with the description of a new species of the genus *Bufo*. *Zootaxa*, 2416: 1–43.
- TRAFFIC 2016. Seizures and prosecutions. *TRAFFIC Bulletin*, 28(1): 29–34.
- TRAFFIC 2014. *TRAFFIC Bulletin: Seizures and prosecutions March 1997-October 2014*. Cambridge, UK. 276 pp.

- Turtle Taxonomy Working Group 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. (Ed.). *Conservation biology of freshwater turtles and tortoises: a compilation project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group*. Chelonian Research Monographs 7:1–292. 296.
- United Nations 1997. *Indonesia, country profile. Implementation of Agenda 21: Review of progress made since the United Nations conference on environment and development, 1992*.
- van Dijk, P.P., Iskandar, D.T., Palasuwan, T., Rhodin, A.G.J., Samedi, Sharma, D.S.K., Shepherd, C.R., Tisen, O.B. and Genorupa, V.R. 2000. Turtle trade in southeast Asia: regional summary (Indonesia, Malaysia, Papua New Guinea, and Thailand). In: *Asian Turtle Trade: Proceedings of a Workshop on Conservation and Trade of Freshwater Turtles and Tortoises in Asia*. Chelonian Research Monographs 2: 145-147.
- van Dijk, P. 2018. Peter Paul van Dijk (Nomenclature Specialist - Fauna, CITES Animals Committee) in *litt.* to UNEP-WCMC, 5 and 13 March 2018.
- Wanger, T.C., Motzke, I., Saleh, S. and Iskandar, D.T. 2011. The amphibians and reptiles of the Lore Lindu National Park area , Central Sulawesi , Indonesia. *Salamandra*, 47(1): 17–29.
- Whitaker, R. and Andrews, H.V. 1997. Captive breeding of Indian turtles and tortoises at the Centre for Herpetology/Madras Crocodile Bank. In: van Abbema, J. (Ed.). *Proceedings: Conservation, restoration and management of tortoises and turtles: An international conference, July 1993, State University of New York*. New York Turtle and Tortoise Society, New York. 166–170.
- Wilbur, H.M. 1975. The evolutionary and mathematical demography of the turtle *Chrysemys picta*. *Ecology*, 56: 64–77.

Anguilla anguilla: Algeria, Morocco, Tunisia

A. Summary

RST Selection Selected in the RST under the “Endangered species” criterion, as well as meeting the criteria for ‘high volume trade’ 2011-2015 for a globally threatened species, and showing a sharp increase in trade in 2015, both globally and for Morocco and Tunisia.

Global status The species is considered to be a single spawning stock. It is globally Critically Endangered according to the IUCN, with declines in recruitment and population size as well as escapement of the species from rivers to the spawning site. ICES advice indicated that the species is outside safe biological limits. There are a range of threats to the global stock, including overexploitation, habitat destruction, migration obstructions, pollution, climate change, and disease. Annual advice from ICES since 2006 was that all anthropogenic impacts should be reduced as close to zero as possible. Widespread distribution across Europe and occurs in N. Africa. Regionally Endangered in N. Africa according to the IUCN, with a declining population trend and 50% decline in recruitment of glass eels in the past 10 years; further regional decline anticipated unless management action is taken.

ALGERIA: Occurs along coastal wetlands. Declines in spawner production estimated since the 1950s. One study suggested that production is very low compared to levels expected in pristine conditions, and preliminary modelling data suggested that the escapement of silver eels in 2014 was only 14.6% of pristine levels in Algeria. Annual reports submitted by Algeria in most years 2009-2016 (since species listing), but not yet for 2013 or 2016. Annual quota of 12 000 kg. Total trade 2009-2016 comprised 22 000 kg live, wild-sourced individuals as reported by Algeria and 15 000 kg as reported by importers. Algeria responded to the consultation relating to the RST. Some management measures implemented (e.g. restrictions to fishing gear and catch size limits), but no management plan exists. NDFs are considered particularly challenging for this species, however ICES have recommended several elements for making NDFs for *A. anguilla* (time-series population data or recruitment indices, effective management plan and indices reflecting a positive recruitment rate). These elements were not provided by Algeria. Fishing for international trade, along with other threats, appears to be impacting this regionally Endangered and declining species, and advice from ICES indicates that where there are uncertainties with regard to an NDF, a precautionary approach should be taken; therefore categorised as Action is needed.

RECOMMENDATION:
Action is needed

<p>MOROCCO:</p>	<p>Found in rivers and lagoons as far south as the Draa basin. Declining in the country according to fishing statistics, spawner production estimates and fishermen. Annual reports submitted by Morocco in all years 2009-2016 (since species listing). High levels of trade 2009-2016, comprising 715 518 kg live, wild-sourced individuals and 4542 fingerlings, as reported by Morocco, and 35 161 kg as reported by importers. Trade increased 2009-2016 by 45 times. Morocco responded to the consultation relating to the RST. Fishing is restricted to the Sebou Estuary with a quota of 2000 kg glass eels and 7000 kg >30 cm; fishing is prohibited elsewhere. Additional management measures implemented (e.g. six months closed seasons and fishing gear restrictions). Escapement of silver eels in the Sebou was estimated by Morocco to be >40% of original biomass. Other preliminary modelling data suggested that the escapement of silver eels in 2014 was only 22.3% of pristine levels in Morocco. NDFs are considered particularly challenging for this species, however ICES have recommended several elements for making NDFs for <i>A. anguilla</i> (time-series population data or recruitment indices, effective management plan and indices reflecting a positive recruitment rate). These elements were not provided by Morocco. Fishing for international trade, along with other threats, appear to be impacting this regionally Endangered and declining species, and advice from ICES indicates that where there are uncertainties with regard to an NDF, a precautionary approach should be taken; therefore categorised as Action is needed.</p>	<p>RECOMMENDATION:</p> <p>Action is needed</p>
<p>TUNISIA:</p>	<p>Occurs along the entire coast and inland waterways but considered more abundant in the north and north-east. Annual reports submitted by Tunisia in most years 2009-2016 (since species listing) but not yet for 2010 and 2012. A quota of 135 000 kg is in place, but the quota appears to have been exceeded in 2015 according to importers. High levels of trade 2009-2016, comprising 451 843 kg live wild-sourced individuals as reported by Tunisia, and 349 352 kg as reported by importers. Tunisia responded to the consultation relating to the RST. A management plan exists with four subunits, and a minimum market size of 30 cm is in place. Additional management measures implemented (e.g. closed seasons, prohibition on fishing elvers and fishing gear restrictions). Whilst some preliminary modelling results suggested that current escapement in Ichkeul Lake was >40% of pristine biomass, other modelling results suggested that the escapement of silver eels in 2014 was only 16.1% of pristine levels in Tunisia. NDFs are considered particularly challenging for this species, however, ICES have recommended several elements for making NDFs for <i>A. anguilla</i> (time-series population data or recruitment indices, effective management plan and indices reflecting a positive recruitment rate). These elements were not provided by</p>	<p>RECOMMENDATION:</p> <p>Action is needed</p>

Tunisia. Fishing for international trade, along with other threats, appears to be impacting this regionally Endangered and declining species, and advice from ICES indicates that where there are uncertainties with regard to an NDF, a precautionary approach should be taken; therefore categorised as Action is needed.

RST Background

Anguilla anguilla (European eel) from Algeria, Morocco and Tunisia were selected as priority species-country combinations for review under the RST at AC29, July 2017 (AC29 Com. 5 (Rev. by Sec.), AC29 Summary Record). *A. anguilla* was identified as a species that met the selection criteria for an endangered species, as well as meeting a high volume trade threshold for globally threatened species, on the basis of trade data for the period 2011-2015, and showing a sharp increase in trade in 2015, both globally and for Morocco and Tunisia (AC29 Doc. 13.3 Annex 2 (Rev. 1)).

B. Species characteristics

Biology: *A. anguilla* is a snake-like, nearly cylindrical, elongated fish (Deelder, 1984). It was reported that mature *A. anguilla* reach a length of between 40 cm and 1 m or more (Deelder, 1984), with females reaching between 26 cm and 101 cm, and males between 21 cm and 45 cm, but may grow up to 133cm (Dekker *et al.*, 1998). *A. anguilla* is semelparous (reproducing only once before death) and panmictic (mating is random) (Jacoby and Gollock, 2014; Nielsen and Prouzet, 2008).

A. anguilla is amphihaline (migratory between marine and freshwater), hatching in the marine environment then migrating to live in freshwater (catadromous) but also in brackish and fully saline waters, and has a complex life cycle that is still poorly understood (Nielsen and Prouzet, 2008). It is characterised by distinct life stages beginning with fertilised eggs hatching into immature larvae (pre-leptocephalus) (Kettle *et al.*, 2008; Henkel *et al.*, 2012). The larval stage (leptocephalus) is dominated by a migration from the spawning location of the Sargasso Sea along the North Atlantic current to Europe and North Africa (Kettle *et al.*, 2008). Sabatié and Fontenelle (2007) estimated that migration to the southern reach of the species distribution was at least nine months, and Bonhommeau *et al.* (2009) found that the minimum duration of the migration from the Sargasso Sea to the European continental shelf was 10 months. This contrasts to previous estimates of around three years (Schmidt, 1922).

During this migration, once reaching the European continental shelf, the larvae metamorphose into 'glass eels' which enter estuaries and freshwaters (Kettle *et al.*, 2008). The immigrating glass eel develops pigmentation, becoming an 'elver' (Deelder, 1984; Kettle *et al.*, 2008), however Dekker (2003) highlighted uncertainties pertaining to this stage, with it either referring solely to the pigmented stage (in the first summer following immigration) or also including the unpigmented glass eel stage. Once the elver has immigrated to continental waters a growth period occurs in which the elver is referred to as an immature yellow eel, remaining in inland and coastal rivers and estuaries, from cool oligotrophic freshwater systems to warm, hyper-saline eutrophic lagoons (Kettle *et al.*, 2008; Wickström, 2008; ICES, 2017a). The period of time spent in the growth phase varies, with estimates from two to 25 years, although could exceed 50 years (ICES, 2015). Once the eel reaches a certain critical length, estimated at a mean average of 40.56cm for males and 63.32 for females (Wickström, 2008), it metamorphoses to a mature silver eel in late summer (Kettle *et al.*, 2008). It then undertakes a trans-Atlantic migration to the Sargasso Sea to spawn and die (Kettle *et al.*, 2008; Wickström, 2008). Mating behaviour has not been observed in the wild (Dekker, 2003; Nielsen and Prouzet, 2008, ICES, 2014). Likewise, information on the number of eggs that are released and fertilised are unknown (Nielsen and Prouzet, 2008).

Distribution: *A. anguilla* is generally considered to be distributed along most European and North African inland and coastal waters from the Barents Sea at the northern limit and either Morocco (Sabatié and Fontenelle, 2007; Qninba *et al.*, 2011) or Mauritania (Jacoby and Gollock, 2014; ICES, 2014; Nijman, 2017) at the southern limit, and throughout the Mediterranean basin (Feunteun, 2002; ICES, 2017b). The narrow spawning area in the Sargasso Sea is situated between latitudes 23° and 29.5°, and on a longitudinal range from 48° to 78° W (Tesch and Wegner, 1990)

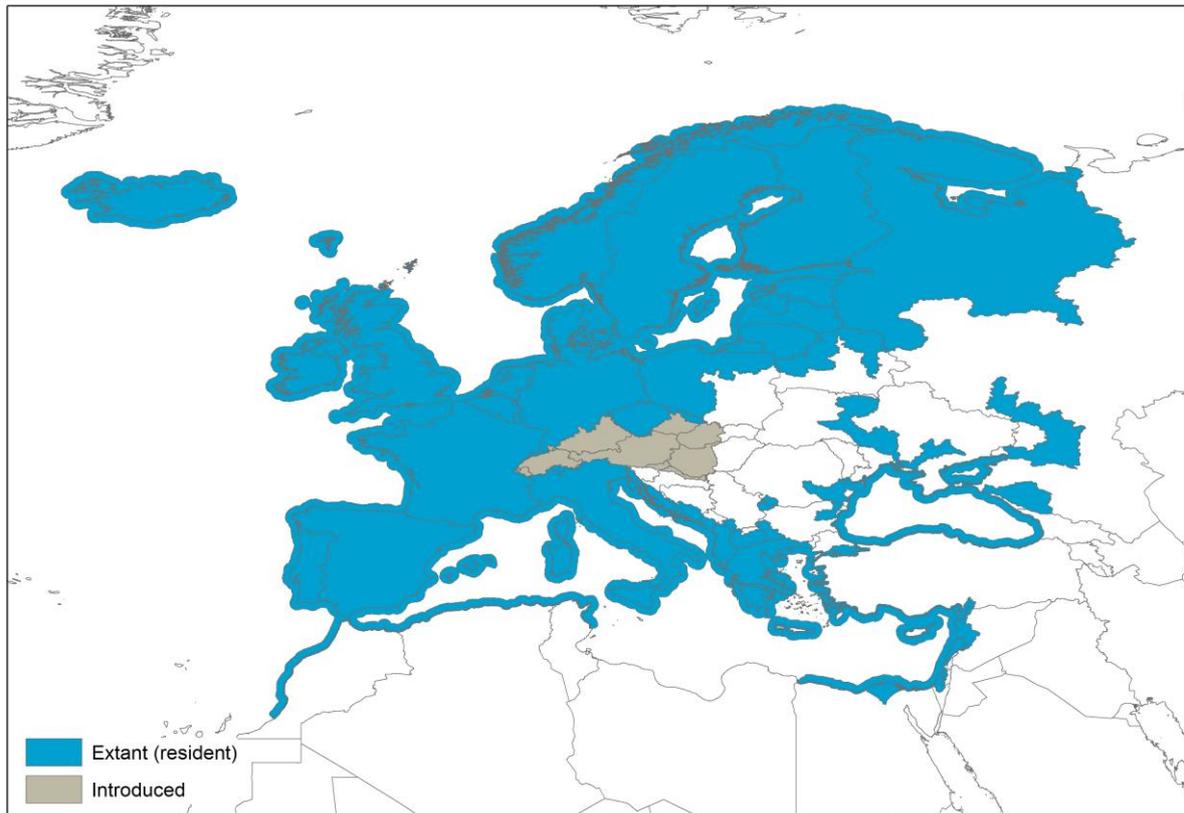


Figure 1. Distribution of *Anguilla anguilla*, based on Kottelat and Freyhof (2008). Reproduced with permission from IUCN.

Population status and trends: The species comprises a single spawning stock (Schmidt, 1909, 1925, Tesch, 1977, Avise *et al.*, 1986, Lintas *et al.*, 1998). It is not possible to determine population estimates (Dekker, 2003); neither spawning stock nor life cycle stages have been fully quantified. The ‘population’ of this species often refers to the yellow eel stock, with ‘recruitment’ referring to the juveniles or glass eels that replenish the population, and ‘escapement’ referring to the silver eels that migrate to spawn in the Sargasso Sea. The stock has been in decline for several decades (Feunteun, 2002). The International Council for the Exploration of the Sea (ICES) has provided advice on eel since 1999. In 2006, ICES considered that the population of *A. anguilla* had declined across most of its distribution and was “outside safe biological limits” (ICES, 2006). Subsequent ICES reports indicated that recruitment indices continued to decline to reach a minimum in 2010, since when there was a slight increase in 2011 to 2014, but in 2017, recruitment from the ocean remained far below 1960-1979 levels (1.6% in the North Sea and 8.7% elsewhere in Europe (ICES, 2017b).

A. anguilla is considered Critically Endangered by the IUCN on the basis of recruitment at the time of the last assessment (2014) being at its lowest historical level at 1-10% that of the 1980’s and the assumption that this would very likely translate to reduced escapement for at least a generation length

(15 years) (Jacoby and Gollock, 2014). Limited data also suggested that escapement of mature silver eels had declined by 50-60% over three generations (45 years) (Jacoby and Gollock, 2014).

It is challenging to assess the decline in mature adults for this species with a complex life cycle, and accordingly the IUCN assessment used an amalgamation of multiple life stages (Jacoby and Gollock, 2014). It was noted that the assessment was borderline between IUCN classifications, and if the increases in recruitment in 2012-2013 were to continue, as well as effective management actions and/or positive natural influences, the species might qualify for 'Endangered' when next assessed (Jacoby and Gollock, 2014). Another assessment is planned for late 2018, but recruitment indices did not continue to increase (ICES, 2017a).

Juvenile abundance was reported to have declined by 99% since the 1960's (Dekker, 2003, ICES, 2006), with glass eel recruitment in 2009 estimated at 3.5% of the 1960-1979 average (Bornarel *et al.*, 2017). Catches have been widely reported to have declined dramatically (Moriarty and Dekker, 1997; Dekker, 2003; Crook, 2010; ICES, 2017b).

The population in Europe was assessed as Critically Endangered (Freyhof and Kottelat, 2010). The IUCN assessed the species as Endangered for the northern African region, on the basis that recruitment of glass eels had declined by an estimated 50% in the past 10 years, and annual catches had declined by 10-25% since 1980 (Azeroual, 2010). Whilst it was reported that the decline in northern Africa was probably less than in Europe, declines of >50% from 1980 to 2025 were suspected to result if no immediate conservation actions are taken for northern Africa (Azeroual, 2010). It was reported that data for recruitment, stock or population since the 1960s for north Africa are not available (Azeroual, 2010).

Threats: There are a number of possible causes for the decline in *A. anguilla* since the early 1980s. It was suggested by Henkel *et al.*, (2012) that "its catadromous migratory behaviour, long life, serious habitat reduction, pollution, and overfishing" may be causes of the population collapse. Whilst Feunteun (2002) considered marine events to be the main cause of declines (as global change provokes a deviation of Gulf Stream currents northwards impacting on larval survival and migration), there are conflicting opinions on the degree to which oceanic factors contribute to population fluctuations (Jacoby and Gollock, 2014). Additional threats were reported to include migration obstructions, disease, pollutants and parasites, and poor condition of escaping eels (Jacoby and Gollock, 2014). The importance of specific individual threats and multiple synergistic threats are likely to vary by location (Jacoby and Gollock, 2014).

Exploitation was considered an undoubted factor in population declines (ICES, 2006). *A. anguilla* is a food resource and a global commodity, traded as live, fresh, frozen and smoked/prepared (Crook and Nakamura, 2013). Fisheries are considered a major threat to the population (Moriarty and Dekker, 1997; Dekker, 2003). A theoretical calculation by Dekker (2003) suggested exploitation by yield-optimised fisheries reduced the production of spawners to 2.5%-12.5% relative to the unexploited state, it was considered that the impact of exploitation was likely to be excessive. Almost all life stages are exploited by fishing, with the fishing industry completely dependent on wild-caught glass eels (Nielsen and Prouzet, 2008; Briand *et al.*, 2008; Crook, 2010). There is particular demand from East Asian markets, predominantly from Japan and China for the glass eel stage (Jacoby and Gollock, 2014).

A. anguilla aquaculture (often referred to as "farming"), stocked by glass eels, began around 35 years ago and reportedly supplied more than 80% of the world's consumption of the species in 2008, supplying approximately 45 000 tonnes/year at that time (Nielsen and Prouzet, 2008). Capture for farming occurs almost exclusively at the glass eel stage where they are used as "seed" (Briand *et al.*, 2008; Crook, 2010). Nielsen and Prouzet (2008b) report that 2.5 kg of glass eels are required in aquaculture to produce 1000 kg of live eels for trade in Europe. It was reported that the decline of *Anguilla japonica* in the 1990's

resulted in increased demand from the Asian market for *A. anguilla* (Kettle *et al.*, 2008; Crook and Nakamura, 2013). It is currently not possible to supplement wild-caught eels with sufficient farm reared individuals as *A. anguilla* is so-far not able to be reproduced in captivity on a commercial scale (Shiraishi and Crook, 2015; Butt *et al.*, 2016).

Illegal, unreported and unregulated fishing has been reported throughout the species range (ICES, 2017a). Based on traders' views, Briand *et al.* (2008) reported that an illicit trade in *A. anguilla* from unlicensed fishermen and poachers in Spain was estimated at between 20% and 40% of trade in glass eels in 2008, and suggested that a reduction in the availability of glass eels through quotas and higher prices incentivised a black market in glass eels. TRAFFIC (2016) reported on several seizures of live *A. anguilla* in the EU in 2015, totaling 175 kg. In 2016, Spain and France reported seizures of live eels involving approximately 234 kg and 190 kg respectively; these were destined for either China or Hong Kong, Special Administrative Region (SAR) of China (TRAFFIC, 2017). False declarations, where *A. anguilla* is listed as another species to circumnavigate the CITES listing, have been reported by EU Member States, particularly in relation to *A. japonica* (Crook, 2010).

Manmade obstacles are also considered a serious cause of decline in numbers (Nielsen and Prouzet, 2008). It was reported that 60-65% of all rivers in the EU in 2008 had some form of obstacle restricting eel access to their middle and upper reaches (Nielsen and Prouzet, 2008).

Pollutants, such as heavy metals have been identified in *A. anguilla* (El Morhit *et al.*, 2009); these are believed to have a large impact on the reproductive success of *A. anguilla* as contaminants accumulate in the body and affect the energy stores, resulting in a failure to migrate and/or impairment of successful reproduction (Belpaire and Goemans, 2007; Geeraerts and Belpaire, 2010).

Parasites are increasingly common in *A. anguilla*, particularly affecting the European stock (Hizem Habbechi, 2014). The nematode *Anguillicola crassus*, thought to originate from East Asia, was found to infest eels predominantly living in freshwater (Lefebvre *et al.*, 2012; Hizem Habbechi, 2014). The parasite affects the swim bladder of the eel, which is considered to have a possible effect on migration to the Sargasso Sea (Hizem Habbechi, 2014; Terech-Majewska *et al.*, 2015).

The decline of *A. rostrata* recruitment over the same period as *A. anguilla* has been put forward as evidence of a change in ocean climate as a cause of the decline in recruitment as both spawn in the Sargasso Sea (Castonguay *et al.*, 1994; Kettle *et al.*, 2011). The North Atlantic Oscillation affects precipitation around the North Atlantic basin, influencing drought in possibly critical areas for eel recruitment (Morocco and Iberian Peninsula for *A. anguilla* and the Caribbean for *A. rostrata*) (Kettle *et al.*, 2011). It is suggested that the spawning population of males could be restricted to the Atlantic coast of Morocco and the Iberian Peninsula; these populations impacted by climactic events have been further affected by the large-scale construction of dams, overexploitation to fuel a growing demand from China and swim bladder infection (Kettle *et al.*, 2011).

The primary threats to the species in northern Africa were considered to be glass eel overfishing in the Atlantic and Mediterranean Sea, pollution, dams, catching of silver eels along the north African coast and climate change induced impacts to oceanic currents (Azeroual, 2010). Drought effects as a result of habitat modification, and water or gravel abstraction were identified as specific threats in north Africa (Azeroual, 2010).

Overview of trade and management: *A. anguilla* was listed in Appendix II on 13th March 2009, as such trade data are only available for the eight-year period 2009-2016. According to data in the CITES Trade Database, global direct trade predominantly comprised live wild-sourced *A. anguilla* for commercial purposes: 979 124 kg as reported by exporters and 802 330 kg as reported by importers. In

addition, importers reported direct trade in over 23 million kg of pre-convention meat, almost entirely imported by Japan from China between 2009 and 2012 (>99%).

Due to the large number of range States and the species constituting a single spawning stock, there has also been recognition of the need for coordinated international cooperation for management of shared stocks of the species (Dekker, 2016; Nijman, 2017). *A. anguilla* was included in the OSPAR List of Threatened and/or Declining Species and habitats in the Northeast Atlantic (OSPAR Agreement 2008-6). The species was also listed in CMS Appendix II on 8 February 2015 (UNEP/CMS/COP11/Proceedings) to improve collaborative management, conservation and monitoring of the species. At CMS CoP12 (October 2017), it was proposed that a new instrument under CMS could engage all range States, including north African range States, to address collective management (CMS CoP12 Doc. 26.2.1). 'Concerted Action' for the species was adopted by CMS CoP12, (CMS, 2017). A policy meeting to explore options for strengthened conservation was due to be held in May 2018.

The severity of the decline of *A. anguilla*'s population was formally recognised in 1998 with ICES (1999) recommending the implementation of a stock recovery plan addressing all coastal and inland life stages. The International Eel Symposium of 2003 recommended the implementation of immediate precautionary actions, such as the curtailing of exploitation, safeguarding migration routes and wetlands, and improving access to lost habitats (Dekker *et al.*, 2003). Restrictions on fisheries alone was considered inadequate to promote recovery (ICES, 2006).

To attempt to halt the decline of the population of *A. anguilla* there have been regulations of fisheries at various biological stages, management of migration obstructions (in particular fish passes), and restocking (Feunteun, 2002). Stacey *et al.* (2015) recommended that restocking should be applied with caution, as it was found that stocked eels followed life-history patterns comparable with conspecifics in the geographic range of the donor streams where they were collected. This could reportedly result in stocked eels migrating at a smaller size and age than naturally recruited eels, possibly restricting their ability to successfully migrate (Stacey *et al.*, 2015).

In 2007, the European Commission established measures for the recovery of the stock of *A. anguilla* in the EU under Council Regulation EC. No.1100/2007, which obliges eel Member States that are range States for the species to draw up Eel Management Plans (EMPs) adjusted to regional and local conditions. Member States must report on implementation progress every three years. Each plan's target is the escapement of at least 40% of the silver eel biomass relative to the best estimate of escapement that would have existed if no anthropogenic influences had impacted the stock, and also requires 60% of *A. anguilla* caught measuring less than 12 cm in length be marketed for use in restocking for the purpose of increasing the escapement levels of silver eels (EC. No.1100/2007).

More than eighty EMPs have been adopted by the European Commission (Walker, *in litt* to UNEP-WCMC, 2018). EMPs encompass various measures to conserve *A. anguilla* including limiting fisheries, enabling migration through rivers, restocking suitable inland waters, reducing pollution and combating parasites. As of 2014, only 21% of EMPs had silver eel escapement above their long term targets (Jacoby and Gollock, 2014). EU Member States have published zero-export quotas since 2010.

ICES (2016) recommended that time-series for glass eel recruitment in non-EU countries (e.g Tunisia and Morocco) should be established as a priority. Aalto *et al.*, (2016) estimated the escapement of silver eels in coastal lagoons across the Mediterranean basin using data from nine countries, including Ghar El Melh lagoon in Tunisia and Mellah lagoon in Algeria to be 35% of the pristine biomass levels using a population dynamic model (i.e below the 40% of pristine threshold set in the EU's eel Regulation (EC 1100/2007)). ICES advised that all anthropogenic impacts should be reduced as close to zero as possible, or kept as close to zero as possible (ICES, 2013).

Since the EU trade ban in 2010 there has been a major shift in the destination of exports of North African *A. anguilla* constituting both live and chilled/frozen eels, with East Asia becoming the main importer of live *A. anguilla*, importing 92.7% (318.9 tonnes) from 2010 to 2015 according to research compiled from UN trade data (Nijman, 2017). Using the same dataset, chilled/frozen eel exports have shifted from Europe to Nigeria, who imported 63.1% (108.7 tonnes) and East Asia, who imported 25.5% (44.0 tonnes) between 2010 and 2015 (Nijman, 2017). In the ten years between 2006 and 2015 the value of all trade in *A. anguilla* from North Africa was calculated at USD 1.257 million/year, remaining relatively stable throughout the period, however the economic importance of live eels compared to chilled/frozen grew after 2010, from 75.5% to 93.0% (Nijman, 2017). Over the same period, the value of live eels increased from an average of USD 8.61/kg in 2006-2007 to USD 16.38/kg in 2014-2015 (Nijman, 2017). Glass eel fishing was reported to be banned in most of northern Africa, but not in Morocco (Azaroual, 2010).

CMS CoP11 Doc. 24.1.18 Rev. 1 highlighted the need for improved research and management of the species, which included *inter alia*, fisheries enforcement and management, freshwater habitat restoration, stock assessments, monitoring programs (particularly in North Africa and the Mediterranean), protection measures for key locations such as the Sargasso Sea, and removal of barriers to ease migration.

Gaynor (2014) highlighted some of the challenges in making non-detriment findings (NDFs) for *A. anguilla* which included: the panmictic nature of the stock, a large number of range States, complex regulations and management, trade in a number of different forms, and the variety of threats beyond exploitation. An ICES workshop in 2015 proposed the criteria/indicators for conducting NDFs for *A. anguilla* (ICES, 2015) as follows:

- Any index of abundance should be above 15% of a historical baseline, with the recruitment indices suggested as the most suitable time-series of data
- An implemented eel management plan that is effective at contributing to stock recovery;
- Spawner escapement should be above 40% of pristine biomass and the anthropogenic mortality biomass considered;
- A positive trend demonstrating an increase in recruitment, with abundance of the current generation higher than the one that spawned it and the recruitment index above 5% of recruitments between 1960 and 1979;

It was noted that the first two indicators were essential first steps to implementation of an NDF, and that as data for these indicators varied according to quality and comprehensiveness, a precautionary approach should be taken where data quality was poor (ICES, 2015). The workshop also considered the geographic scale at which an NDF could be made, and suggested that as a precautionary approach, an NDF should be made across the species range (considering it is a single spawning stock, and the assumption is that “*any or all parts of the continental stock might contribute to reproduction*”), but that NDFs at a smaller scale (regional, national catchment) could be possible, if all risks and benefits are taken into account (ICES, 2015). However, no specific guidance on NDFs at smaller geographic scales has yet been provided by ICES.

C. Country reviews

Algeria

Distribution: Found along all coastal wetlands of Algeria (Garcia *et al.*, 2010). *A. anguilla* has been recorded in the waterways of the El Kala complex National Park, in El Mellah lagoon, Tonga lake and Oubeira lake (Djebbari *et al.*, 2009).

Population status and trends: Boudjadi (2010) reported that aside from some research on parasite loads, *A. anguilla* in Algeria has not been the subject of many studies. In Algeria, it was estimated that the spawner production was 1.33 kg/ ha in 1950-1999, 1.21 kg/ ha in 1975-1999 and 0.74 kg/ ha in 2000-2012 compared to pristine spawner production of 19.55 kg /ha (Aalto *et al.*, 2016), indicating clear declines. However, it was noted that the results of such models should be treated with caution, as they represent a preliminary qualitative exercise rather than a comprehensive quantitative assessment (Aalto *et al.*, 2016).

The modelling approach of Alto *et al.* (2016) was applied to further data during the annual meeting of the ICES Working Group on European Eel (WGEEL), and used to make a preliminary estimate that the amount of silver eel biomass that would have existed (in Algerian lagoons primarily) if no anthropogenic influences had impacted the stock would have been at least 156.8 tonnes, whilst the current escapement is 22.9 tonnes, 14.6% of pristine levels (WGEEL report, ICES, 2016). The WGEEL report noted that there is potential for escapement of 54 tonnes of silver eels representing 42.5% of pristine levels if current anthropogenic influences were to be stopped. The WGEEL report also noted that the modelling was only a first attempt to obtain reference points for the species, there were data gaps which limited scope of habitats included, and the results should be seen as a starting point for future work (ICES, 2015).

Threats: Whilst *A. anguilla* is consumed in Algeria, the bulk of catches were reported to be exported (Boudjadi, 2010). The exploitation of *A. anguilla* in Algeria is an artisanal activity (Management Authority (MA) of Algeria, *in litt.* to CITES Secretariat, 2017). Fishing pressure was recorded as the major impact to the species in Algeria when considering all human induced mortality (including damns, habitat loss etc.) (ICES, 2015).

The parasite *Anguillicola crassus* was considered a threat to *A. anguilla* in Algeria, affecting the swim bladder of infected individuals (Djebbari *et al.*, 2009). Parasites were found to be twice as abundant in individuals populating freshwater (Tonga and Oubeira lakes) than brackish water (El Mellah lagoon) (Djebbari *et al.*, 2009).

Trade: Algeria has submitted all annual reports to CITES for 2007-2012 and 2014-2015, but not yet for 2013 and 2016. Algeria has not published any export quotas for this species. According to data in the CITES Trade Database, all direct trade in *A. anguilla* from Algeria was in live, wild-sourced eels for commercial purposes, reported in 2009 only by Algeria and in 2009 and 2015 by importers (Table 1). Algeria reported direct exports of 22 000 kg in 2009. Italy, Spain and Tunisia were the only importers of *A. anguilla* from Algeria 2009-2016 (totalling 15 000 kg). No indirect trade in *A. anguilla* originating in Algeria was reported 2009-2016.

Table 1: Direct exports of *Anguilla anguilla* from Algeria, 2009–2016. All trade was in live, wild-sourced eels for commercial purposes.

Unit	Reported by	2009	2010	2011	2012	2013	2014	2015	2016	Total
kg	Exporter	22000				-			-	22000
	Importer	12000								12000
-	Exporter					-			-	
	Importer							3000		3000

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Management: Algeria became a Party to CITES on 23rd November 1983, with entry into force on 21st February 1984 (CITES, 2018).

Exploitation of *A. anguilla* is governed by Executive Decree No.06-372 of 19 October 2006. It is protected under Presidential Decree No.06-405 of 14 November 2006 that ratified the Protocol concerning specially protected areas and biological diversity in the Mediterranean adopted at Barcelona 1995, listing *A. anguilla* under Annex III stating that exploitation must be regulated. Algeria does not have a management plan for the species.

The MA of Algeria (*in litt.* to CITES Secretariat, 2017), stated that there were a number of management measures in place for the exploitation of *A. anguilla* including restrictions on authorised fishing gear, fishing season dates, 30 cm minimum catch size and the prohibition of trade in glass eels and elvers (except for scientific and aquaculture purposes with authorisation from the relevant administrative body). It is unclear if specimens produced from aquaculture could be traded. The number of licensed concessions nationally was reported to be limited to four, with the annual quota of 12 tonnes evenly split among them (three tonnes each) (MA of Algeria, *in litt.* to CITES Secretariat, 2017). The MA of Algeria requested expertise from the CITES Animal Committee in analyzing the species situation in Algeria due to a lack of capacity in the country (*in litt.* to CITES Secretariat, 2017).

Through its national legislation project, the CITES Secretariat categorised the national legislation in Algeria as Category 2, meaning “legislation that is believed generally to meet one of three to four requirements for effective implementation of CITES” (CITES Secretariat, 2017).

Morocco

Distribution: Morocco is generally considered to be at the southern limit of distribution for *A. anguilla* (Sabatié and Fontenelle, 2007; Garcia *et al.*, 2010; Qninba *et al.*, 2011). *A. anguilla* was reported to be found in the Oum Er-Rbia River in Central Morocco and Sebou, Loukkos and Moulouya Rivers and Merja Zerga lagoon in Northern Morocco (Garcia *et al.*, 2010). The occurrence of *A. anguilla* has been recorded in the Wadi Tissint (in the Draa basin in Southern Morocco) which was considered to be the new southernmost limit, previously believed to be the Wadi Massa (Qninba *et al.*, 2011).

Population status and trends: At the southern limit of *A. anguilla*'s range, Morocco was considered to hold a small population (Sabatié and Fontenelle, 2007). The contribution of silver eels of Moroccan stock to the global spawning biomass was reported to be unknown (Sabatié and Fontenelle, 2007). Kettle *et al.* (2011) hypothesized that Morocco's population was important to the global population, being close to the core of the population.

Initial estimates from 1974 demonstrated low densities of yellow eels in all aquatic habitats in Morocco, but it was reported that there was no available index of trends, with the last data of abundance in Morocco dating back to the 1970s (Sabatié and Fontenelle, 2007). Amateur fishermen reported that the *A. anguilla* stock had declined dramatically over the twenty years up to 2011, with the specimens being

caught growing increasingly larger (Qninba *et al.*, 2011). It was reported that Moroccan fishing statistics (1950 - 2003) showed a decline in eel captured at all stages of development (Azeroual, 2010). Studies by Sabatié and Fontenelle (2007) also pointed towards a decline of the species in Morocco. Kettle *et al.* (2011) also reported that *A. anguilla* had suffered a heavy decline in the region since the 1980's.

The Management Authority (MA) of Morocco noted that a national study conducted in 2013 estimated that silver eels numbered 15.67 tonnes/year in current conditions in Sebou, 5.97 tonnes/year in Merja Zerga, 4.2 tonnes/year in Loukkos Estuary and 2.95 tonnes/year in Moulouya Estuary (*in litt.* to CITES Secretariat, 2017). At all sites studied, the current population was recorded at 40.5% of the original, (MA of Morocco, *in litt.* to CITES Secretariat, 2017).

In Morocco, it was estimated that the spawner production was 16.72 kg/ ha in 1950-1999, 15.35 kg/ ha in 1975-1999 and 9.46 kg/ ha in 2000-2012 compared to pristine spawner production of 19.55 kg /ha (Aalto *et al.*, 2016), indicating clear declines.

The WGEEL of ICES (2016) reported that the amount of silver eel biomass that would have existed in Morocco if no anthropogenic influences had impacted the stock is 231.1 tonnes, whilst the current escapement is 51.5 tonnes, 22.3% of pristine levels. The WGEEL reported that there is potential for escapement of 138 tonnes of silver eels representing 37.3% of pristine levels were current anthropogenic influences to be stopped. However, these results based in preliminary modelling by Aalto *et al.* (2016) should be treated with caution.

Threats: There are a number of threats facing *A. anguilla* in Morocco, including both natural and anthropogenic (Azeroual, 2010; MA of Morocco, *in litt.* to CITES Secretariat, 2017). Natural threats were reported to include predation, parasites (including *Anguillicola crassus*), microbial infections, algal blooms and hydroclimatic changes (MA of Morocco, *in litt.* to CITES Secretariat, 2017). Anthropogenic impacts were reported to include fishing, obstacles such as dams, and chemical and water pollution (MA of Morocco, *in litt.* to CITES Secretariat, 2017).

Fishing pressure was recorded as the major impact to the species in Morocco when considering all human induced mortality (including damns, habitat loss etc.) (ICES, 2015). The MA of Morocco (*in litt.* to Secretariat, 2017) indicated that eel fisheries were mainly located in the northwest Atlantic, in the Sebou Basin, Moulay Bousselham lagoon and Loukkos and estuary of Moulouya. A variety of fishing gear including trabaque, fyke-nets, hand-nets and mosquito nets were reported to be used (Sabatié and Fontenelle, 2007).

Based on official FAO statistics, the exploitation of *A. anguilla* in Morocco was regarded to have been “moderate” for decades (as of 2006), although it was reported that exploitation had actually been “considerable” based on a Spanish market, but the extent of overexploitation was difficult to assess (Sabatié and Fontenelle, 2007). In the Sebou Wadi, fisheries were reported to be operating by using much larger nets than they had done in 1987; it was considered this could have been a compensation based on decreasing catches or a race to gain a bigger share of a lucrative market (Sabatié and Fontenelle, 2007).

Morocco continues to fish for glass eels, but landings data were not available (ICES, 2017b). Large rivers (Moulouya, Loukkos, Sebou) were reported to provide the main bulk of glass eels for fishing (Sabatié and Fontenelle, 2007), with Sebou and Loukkos being the most important (Wariaghli *et al.*, 2015). *A. anguilla* at the glass eel stage are collected using large traps stretched across rivers with the industry employing around 200 to 300 fishermen in Morocco, suggested to support the livelihoods of at least double that figure (Nielsen and Prouzet, 2008).

Overfishing was considered to be the primary cause of the decline in fish production in Merja Zerga, the largest lagoon on the Atlantic coast of Morocco, with various human disturbances caused by hydrological modifications contributing to declines (Kraïem *et al.*, 2009).

The fragmentation of habitats and the risk of drying, forming natural barriers to migration, means freshwater in Morocco provides limited habitats for *A. anguilla* (Sabatié and Fontenelle, 2007). The draining of marshland areas since the 1960's to eradicate malaria, the conversion of wetlands to rice cultivation and importantly, the construction of dams that has caused the drying of marshlands and formed barriers to migration, have all contributed to a loss of suitable habitat (Kettle *et al.*, 2011). Periods of extended drought have affected Loukkos and Sebou that provide large wetland areas, with climatological dryness considered to be an important factor affecting the population in Morocco (Kettle *et al.*, 2011). The high levels of heavy metals in sediment in Morocco, particularly cadmium were highlighted by El Morhit *et al.* (2009), who concluded that this could be a cause for the disappearance of the species from aquatic systems.

Trade: Morocco has submitted all annual reports for the period 2009-2016. Morocco has not published any export quotas for this species.

According to data in the CITES Trade Database, direct trade in *A. anguilla* from Morocco 2009-2016 predominantly comprised live, wild-sourced animals for commercial purposes; 715 518 kg reported by Morocco and 351 161 kg reported by importers (Table 2). The Republic of Korea was the destination for approximately 90% of direct exports of live, wild-sourced eel for commercial purposes; the Republic of Korea has not yet submitted an annual report for 2016. Live wild-sourced trade increased 2009-2015, by more than 45 times according to trade reported by Morocco and by nearly 65 times based on importer reported data.

In addition, Morocco directly exported 314 000 kg wild-sourced meat to Hong Kong, SAR for commercial purposes in 2010 and 2013-2014; Hong Kong, SAR did not report this trade. Exports of meat reported in 2013 and 2014 represented a six-fold increase compared to levels reported in 2010. Exports figures reported by the MA of Morocco (*in litt.* to Secretariat, 2017) for live individuals plus meat (Table 3) were comparable to the data reported in annual reports included within the CITES Trade database. Importers reported imports of 2000 kg of live, captive-bred individuals from Morocco in 2015, which is likely to be erroneous as there is no evidence of captive-breeding of this species on commercial scales.

Table 2: Direct exports of *Anguilla anguilla* from Morocco, 2009-2016. Scientific specimens have been excluded. Quantities have been rounded to whole numbers, where applicable.

Term	Unit	Purpose	Source	Reported by	2009	2010	2011	2012	2013	2014	2015	2016	Total			
bodies	kg	T	W	Exporter			24000					48180	72180			
				Importer												
fingerlings	kg	T	W	Exporter		4542							4542			
				Importer												
live	kg	B	W	Exporter												
				Importer						2000				2000		
				T	C	Exporter										
						Importer							2000			2000
		T	C	W	Exporter	5250		4795	7577	29823	211620	254834	201619	715518		
					Importer	4750	2960	3930	5917	9165	13936	303508	8495	351161		
				-	T	W	Exporter									
							Importer			270			163822	6000		
meat	kg	Q	W	Exporter						30			30			
				Importer												
		T	O	Exporter		48650								48650		
				Importer												
		W	O	Exporter		24000				144000	146000				314000	
				Importer												

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018.

Table 3: Direct exports of *Anguilla anguilla* (kg) as provided by the MA Morocco (*in litt.* to Secretariat, 2017), rounded to whole numbers (includes live and meat).

Year	Volume exported (kg)
2013	173335
2014	359790
2015	229654
2016	248417
2017	177417
Total	1188613

Indirect trade in *A. anguilla* originating in Morocco was reported in 2013, 2014 and 2016 and mainly comprised 1.6 million kg of wild-sourced meat, almost all of which was re-exported via China to Japan for commercial purposes (>98%). Lower levels of live, wild-sourced *A. anguilla* were reported 2013-2016, and was also predominantly re-exported via China to Japan.

Following the 2010 EU ban on *A. anguilla* exports from Member States, Moroccan exports in live eels were reported to remain relatively level, however the trade in chilled/frozen eels rose from 27.4 tonnes to 237.2 tonnes (Nijman, 2017). The destination of the majority of Moroccan exports of *A. anguilla* also changed, from the EU to East Asia (Nijman, 2017).

Management: Morocco became a Party to CITES on 16th October 1975, with entry into force on 14th January 1976 (CITES, 2018).

According to the MA of Morocco (*in litt.* to CITES Secretariat, 2017), an eel management action plan is in place with the objective of rebuilding the eel stock and minimising factors influencing mortality, particularly in relation to exploitation. The plan is structured around several interventions: establishment of a fishing quota; outlining requirements for fishing rights to be granted; implementing sustainable exploitation; establishing an annual restocking programme; initiating a traceability system

for fishery and aquaculture products; combating poaching and illegal trade; and the establishment of a scientific monitoring programme.

In 2013, a national study on eel stocks was implemented to collect data on the species and estimate national stocks (MA of Morocco, *in litt.* to CITES Secretariat, 2017). Catch quotas were estimated using the ICES Eel Working Group (WGEEL) eel management modelling software²¹ in four areas: a) Sebou estuary (1559 ha), b) Merja Zerga, O. Drader and Nador Canal (2771 ha), c), Loukkos estuary (423 ha) and d) Moulouya estuary (293 ha) (MA of Morocco, *in litt.* to CITES Secretariat, 2017). Subsequently, only the fishery in the Sebou Estuary and its tributaries was permitted to remain open in 2013, with an estimate of 15.67 tonnes of annual silver eel biomass in current conditions (with all other sites estimated at current production of less than 5 tonnes annually) (MA of Morocco, *in litt.* to CITES Secretariat, 2017). An annual quota of 2000 kg of glass eels and 7000 kg eels > 30 cm has been established for this fishery, with fishing prohibited in other sites (MA of Morocco, *in litt.* to CITES Secretariat, 2017).

Export of eels >10 cm and dead glass eels was reported to be prohibited, with all captures of live glass eels for the purposes of aquaculture only (MA of Morocco, *in litt.* to CITES Secretariat, 2017), however the size restriction was noted inconsistently as both 10 cm and 12 cm in the response to the Secretariat's consultation. Fisheries are also required to use acceptable equipment, provide traceability of their activities and restock the areas of exploitation (MA of Morocco, *in litt.* to CITES Secretariat, 2017).

A number of other measures were reported to be in place, including the restriction of the elver fishery to six months of the year, prohibition on one day a week, requirements on nets allowed for capture, the requirement to return captured fish other than glass eels [presumed to include yellow and silver eel, which are prohibited from catch], and the retention of 10% for the purposes of restocking (MA of Morocco, *in litt.* to CITES Secretariat, 2017).

The exploitation of *A. anguilla* is governed by Dahir (Decree) of April 11th 1922, amended in 2015 by Law No.130-12 on inland fisheries and aquaculture (*in litt.* to CITES Secretariat, 2017). As outlined in Law No.29-05, penalties for the illegal exploitation and trade of *A. anguilla* in Morocco were reported to range from MAD 20 000 to 50 000 per specimen [approx. USD 2100 – 5300] (MA of Morocco *in litt.* to CITES Secretariat, 2017). The MA of Morocco (*in litt.* to CITES Secretariat, 2017) indicated that the national legislation (Law 29-05 on the protection of wild flora and fauna, and implementing decree of 2015) was categorized as Category 1 by the CITES Secretariat, however this was unclear from the most updated list on the CITES website (CITES, 2017).

According to the MA of Morocco (*in litt.* to CITES Secretariat, 2017), estimates for the Sebou Estuary based on the (WGEEL) eel management modelling software indicate that the amount of silver eel biomass that would have existed in pristine conditions is 38.69 tonnes, with current escapement at 15.67 tonnes, 40.5% of pristine levels, respecting the EU target for > 40% escapement within Eel Management Units as laid out in the EU regulation. However caveats to the modelling approaches must also be considered²¹.

The method by which Morocco determined a level of trade that was not detrimental to the survival of *A. anguilla* in the wild was considered by Nijman (2017) to be unclear.

²¹ This model was used by Aalto *et al.* (2016) who noted that the results should be treated with caution as it provided only preliminary qualitative assessments.

Through its national legislation project, the CITES Secretariat categorised the national legislation in Morocco as Category 1, meaning “legislation that is believed generally to meet all four requirements for effective implementation of CITES” (CITES Secretariat, 2017).

Tunisia

Distribution: *A. anguilla* has been recorded along all coastal wetlands of Tunisia (Garcia, *et al.*, 2010). The species has been identified in all inland waters and marine waters, in 1347 natural and artificial wetlands covering an area of about 950 000 ha, primarily in lagoons and to a lesser extent in coastal waters, sebkhas and dam reservoirs (Toujani and Hafsia, 2017). *A. anguilla* can access the majority of dams and reservoirs in Tunisia through hydraulic structures and interconnections, despite a lack of fish passes (Romdhane, 2012).

Population status and trends: The species was considered more abundant in the North and North-East and Mejerda zones than the East and Central and South zones in Tunisia, but no data was available in terms of the stock status or trends (Toujani and Hafsia, 2017).

The recruitment of elvers occurs between January to July, and occasionally August with the majority arriving in June (Romdhane, 2012). Silver eel escapement was recorded in the lagoon of Ghar El Melh and Ichkeul in November and December according to Romdhane (2012), coinciding with a significant drop in the number of yellow eels. The MA of Tunisia (*in litt.* to Secretariat, 2017) provided no details of population trends, but referred to literature by Derouiche *et al.* (2015). A mark-capture recapture study was undertaken by Derouiche *et al.* (2015) in Ichkeul Lake, one of the main fishing sites in Tunisia, during the winter downstream run in December 2013 - February 2014. Using the Eel Stock Assessment Model, it was estimated that 342 221 silver eels migrated (biomass of 200 tonnes), translating to an escapement rate of 45% of the pristine biomass²².

The WGEEL of ICES (2016) reported that the amount of silver eel biomass in Tunisia that would have existed if no anthropogenic influences had impacted the stock is 1 741.7 tonnes, whilst the current escapement is 276.2 tonnes, 16.1% of pristine levels.

The National Institute of Marine Sciences and Technologies (INSTM) provided data of catches from 2000-2016, showing overall catches in 2016 having increased compared to the previous seven years, and with the majority of catches in lagoons in the country (Toujani, *in litt.* to UNEP-WCMC, 2018) (Figure 2). General trends are comparable with records from ICES for commercial landings of yellow and silver eels from Tunisia, which indicate that 2000 was the lowest year for landings (54 000 kg), then landings subsequently fluctuated from 97 000 kg and 290 000 kg, but 2016 was the highest on record, at 303 000 kg (ICES, 2017b). The Management Authority of Tunisia (*in litt.* to Secretariat, 2017) reported that average national catches were 191 000 kg annually, with a low of 123 000 kg in 2009 and a high of 317 000 kg in 2008.

²² This model was used by Aalto *et al.* (2016) who noted that the results should be treated with caution as it provided only preliminary qualitative assessments.

Catches (thousands of kg) of *Anguilla anguilla* in Tunisia 2000-2016 by habitat type

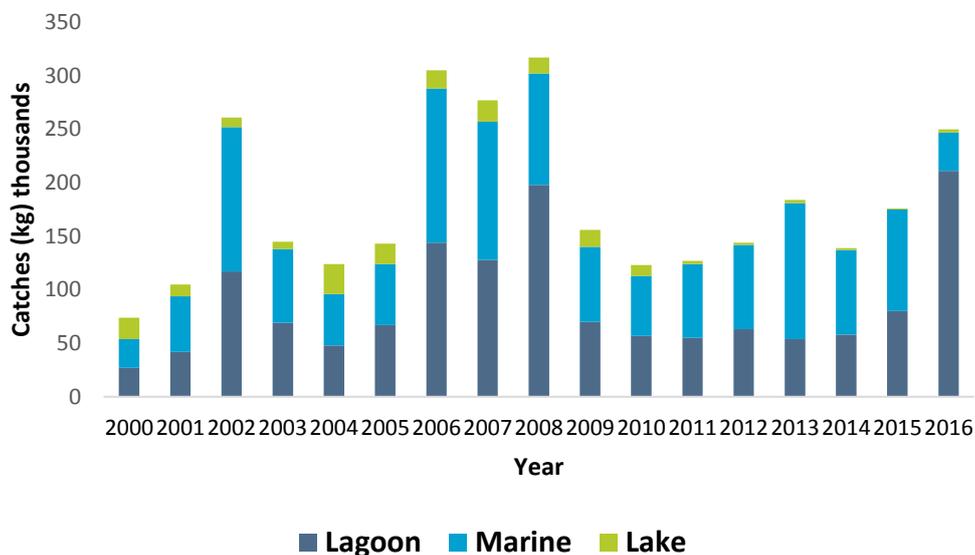


Figure 2. Overall national catches of *A. anguilla* in Tunisia 2000-2016 by habitat, created from data provided by Toujani, *in litt.* to UNEP-WCMC. 2018).

Threats: Population decline in northern Africa was attributed to overexploitation, river management (including dams water and gravel extraction), pollution and parasites (Azeroual, 2010). Fishing pressure was recorded as the major impact to the species in Tunisia when considering all human induced mortality (including damns, habitat loss etc.) (ICES, 2015). The exploitation of *A. anguilla* in Tunisia is concentrated in three main sites in the north of the country, the lagoons of Ichkeul-Bizerte, Ghar El Melh and Tunis North (Toujani and Hafsia, 2017). To a lesser extent fisheries are found in the Gabes gulf, in Kerkenna, El Bibane and Zarat, where *A. anguilla* is not specifically targeted (Romdhane, 2012).

In response to CITES Notification No. 2018/18 Annex 1, the MA of Tunisia reported that *A. anguilla* was not commonly consumed in the country (approximately 10% of harvests, which had not changed since the CITES listing), with 90% exported. Tunisia was previously second only to Norway in terms of exports of *A. anguilla* to the EU (Crook, 2010), but following EU trade restrictions, Tunisian exports of live and chilled/frozen eels were reported to have remained relatively level, but with the destination changed to East Asia (Nijman, 2017).

Toujani (*in litt.* to UNEP-WCMC. 2018) noted disease as a threat to the species in Tunisia. *A. anguilla* was reported to be exposed to parasites and pathogens in the northern lagoons (Toujani and Hafsia, 2017). Of silver eels recorded in Ghar El Melh, 59% demonstrated morpho-anatomical anomalies associated with parasites/pathogens, along with 33% in Tunis Lake and 17% in Ichkeul lagoon (Toujani and Hafsia, 2017). The nematode *Anguillicola crassus* was found to infest eels living in freshwater more than those in salt water with infestation higher in summer and/or winter (Hizem Habbechi, 2014). The parasite affects the swim bladder of the eel which is considered to have a possible effect on migration to the Sargasso Sea (Hizem Habbechi, 2014). However, it was reported that prevalence, intensity and abundance of the parasite was lower in Tunisia than in Algeria, Morocco and Europe, and there were still populations in Tunisia free of the parasite (Hizem Habbechi, 2014).

Contamination of *A. anguilla* by concentrations of trace metals including lead, cadmium, mercury and copper, were identified in specimens caught in Tunis, Ghar El Melh and Ichkeul lagoons (Toujani and Hafsia, 2017). Toujani (*in litt.* to UNEP-WCMC) reported that there is a current project on pollutant release management in the Gahar el Malh lagoon. Climate change was considered an emerging threat as a result of seasonal shifts and increased drought, along with poaching and new emerging diseases (Toujani and Hafsia, 2017). Habitat loss is also presumably a threat, as one of the recommendations for management plan actions outlined by Romdhane (2012) was to restore migration routes and eel habitat.

Trade: Tunisia have submitted all annual reports to CITES 2009-2016 with the exception of reports for 2010 and 2012. Tunisia published a quota of 135 000 kg of “specimens of at least 30cm in 2010 and a quota of 135 000 kg wild-sourced *A. anguilla* 2014-2018 (Table 4). Trade in *A. anguilla* reported by Tunisia appears to have exceeded the specified quota in 2014 and 2016; however based on trade figures provided by Tunisia in response to consultation as part of this review it appears that Tunisia’s annual reports are based on permits issued rather than actual trade, and that trade was within quota all years (Tables 4 and 6). The MA of Tunisia (*in litt.* to Secretariat, 2017) noted that quotas had not been exceeded. However, importer reported data indicates that the quota appears to have been exceeded in 2015 by >56 000 kg (Table 4).

Table 4: CITES export quotas (kg) for wild-taken *Anguilla anguilla* from Tunisia, 2009-2018 and all direct trade in *A. anguilla* as reported by countries of Tunisia and trading partners, 2009-2016. Tunisia has submitted an annual report for all years except 2010 and 2012.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Quota (wild-taken) (kg)	-	135000*	-	-	-	135000	135000	135000	135000	135000
Reported by Tunisia (kg)		-		-	148387	134970	128499	137116.5	-	-
Reported by importer (kg)		45961		11620	73088	43268	191008		-	-

*Specimens of at least 30 cm.

According to data in the CITES Trade Database, direct trade in *A. anguilla* from Tunisia 2009-2016 predominantly comprised live, wild-sourced eels for commercial purposes; with 451 843 kg reported by Tunisia and 349 352 kg as reported by importers (Table 5). The Republic of Korea was the main destination for exports of wild-sourced eel, accounting for 63% according to Tunisia and 87% according to importer reported data. Exports of live eels peaked in 2013 and decreased 37% between 2013 and 2015 according to Tunisia. Importer reported data peaked in 2015; it should be noted that the Republic of Korea has not yet submitted an annual report for 2016. According to data provided by Tunisia in response to a consultation on this review, a total of 368 568 kg of eels were exported 2012-2016, with peak exports reported in 2013 (95 452 kg; Table 6). Data provided by Tunisia is comparable with that included in the CITES Trade database, however Table 6 also includes export data for 2010 and 2012.

Table 5: Direct exports of *A. anguilla* from Tunisia, 2009-2016. Quantities have been rounded to whole numbers where applicable.

Term	Unit	Purpose	Source	Reported by	2010	2011	2012	2013	2014	2015	2016	Total	
bodies	kg	T	W	Exporter	-		-						
				Importer			3111					3111	
live	kg	B	W	Exporter	-		-				5000	5000	
				Importer									
		T	C	Exporter	-		-						
				Importer						2000		2000	
			I	Exporter	-		-						
				Importer						235		235	
		W	Exporter	-		-	148387	118256	92879	92321	451843		
			Importer	45961		4000	73088	43268	183008		349325		
		-	T	W	Exporter	-		-					
					Importer		10960	8960		34945	7688		62553
meat	kg	T	W	Exporter	-		-	16714	35620	39796	92130		
				Importer			4509			8000	12509		
		-	T	W	Exporter	-		-					
					Importer		4509			300	30	4839	

Source: CITES Trade Database, UNEP-WCMC, Cambridge, UK, downloaded on 27/02/2018

Table 6: Direct exports of *Anguilla anguilla* from Tunisia 2012-2016 as provided by MA of Tunisia *in litt.* to Secretariat, 2017).

Year	Volume exported (kg)
2012	16 525
2013	95 452
2014	90 377
2015	77 180
2016	89 034
Total	368 568

Indirect trade in *A. anguilla* originating in Tunisia entirely consisted of live, wild-sourced animals re-exported for commercial purposes, reported both by number and by weight. The Republic of Korea reported re-export of 300 kg and 1200 individual live animals in 2012 and 2014, as well as indirect import of 4500 kg and 5500 individuals in 2015.

Management: Tunisia became a Party to CITES on 10th July 1974, with entry into force on 1st July 1975, (CITES, 2018).

An Eel Management Plan (EMP), ‘plan de gestion Anguilla de Tunisie’, was drawn up in 2010 in consultation with stakeholders to support the protection of *A. anguilla* (Derouiche *et al.*, 2016; UNEP/CMS/COP12/CRP14). It was reported that a number of administrative bodies intervened in eel management at a national and local level to support the coordination of the EMP in collaboration with the Institut National des Sciences et Technologies de la Mer (INSTM) (Toujani and Hafsia, 2017). The EMP set up four Eel Management Units (EMUs) (MA of Tunisia, *in litt.* to Secretariat, 2017), however no further details of the plan were provided. According to Romdhane (2012), the four units were reported to be the Northern area; North-East and Mejerda; East and Central area; and South zones. It was reported that EMPs should ensure that silver eel escapement is at least 40% of the potential level of the system (Toujani and Hafsia, 2017).

The MA of Tunisia (*in litt.* to Secretariat, 2017) reported that a national working group, composed of representatives from INSTM and La Direction Générale de la Pêche et de l’Aquaculture (DGPA) monitored the state of the stock to assess annual quotas based on “statistical series of catches”, and the annual quota had been set at 135 tonnes from 2010-2017. Research on the eel stock was referenced,

included age structure, annual growth analysis, reproduction, recruitment and migration (MA of Tunisia, *in litt.* to Secretariat, 2017), although it was unclear if this was ongoing.

Toujani (*in litt.* to UNEP-WCMC, 2018) noted that although catch data indicated that the stock is recovering, this needed to be confirmed by population monitoring and biological sampling to estimate abundance of stages (grass, yellow and silver eels) as well as the population structure and values of biomass and mortality indicators. It was reported that monitoring had begun in 2017 and would continue until 2020 (Toujani, *in litt.* to UNEP-WCMC, 2018).

In response to Notification No. 2018/18 Annex 1, the MA of Tunisia reported that the Order of the Minister of Agriculture (of 28 September 1995) set out regulations on fishing activities, including a minimum market size of 30 cm and the prohibition of the exploitation of elvers. Spatial and temporal fishing restrictions were also reported to be in place in dams, streams and freshwater areas, including prohibitions from sunset to sunrise, and from 1st March to 30th April annually, and prohibition of fishing within 100 m of a dam or 200 m during flooding (Toujani, *in litt.* to UNEP-WCMC, 2018).

Glass eels are not permitted to be captured for commercial use (Romdhane, 2012). Gear restrictions are also in place, including a minimum size of mesh used in fishing, with destructive fishing practices prohibited, as well as a prohibition on fishing by the creation of obstacles at the mouth of rivers (Toujani, *in litt.* to UNEP-WCMC, 2018). Fisheries in Ghar El Melh lagoon were reported to be subject to authorisation, (Romdhane, 2012; Toujani, *in litt.* to UNEP-WCMC, 2018). In their response to Notification No. 2018/18 Annex 1, the MA of Tunisia reported that the impact of regulations along with the CITES listing and the introduction of a quota have contributed to a reduction in fishing (but see 'Population status and trends') and better management of *A. anguilla*. It was reported that migration possibilities were being restored by the creation of a glass eel pass at the Ichkeul sluice, and that a restocking programme was reported as "interrupted" since 2008 (Toujani, *in litt.* to UNEP-WCMC, 2018).

In response to Notification No. 2018/18 Annex 1, the MA of Tunisia reported that a non-detriment finding for *A. anguilla* had been conducted at the national level using the analysis of customs/trade and fishing data. Whilst the MA of Tunisia (*in litt.* to Secretariat, 2017), provided export data, a clear conclusion on non-detriment was lacking. The method by which Tunisia determined a level of trade that was not detrimental to the survival of *A. anguilla* in the wild was considered by Nijman (2017) to be unclear.

Through its national legislation project, the CITES Secretariat categorised the national legislation in Tunisia as Category 2, meaning "legislation that is believed generally to meet one of three to four requirements for effective implementation of CITES" (CITES Secretariat, 2017).

D. Problems identified that are not related to the implementation of Article IV, paras 2(a), 3 or 6(a).

A range of source code are reported for trade in this species including C and F, although only wild (W) and possibly ranched (R) are likely to be accurate. Illegal trade has also been reported.

E. References

- Aalto, E., Capoccioni, F., Mas, J.T., Schiavina, M., Leone, C., Leo, G. De, Ciccotti, E., Vergata, T., Scientifica, R. and Biologia, D. 2016. Quantifying 60 years of declining European eel (*Anguilla anguilla* L., 1758) fishery yields in Mediterranean coastal lagoons. *ICES Journal of Marine Science*, 73(November): 101–110.
- Als, T.D., Hansen, M.M., Maes, G.E., Castonguay, M., Riemann, L., Aarestrup, K., Munk, P., Sparholt, H.,

- Hanel, R. and Bernatchez, L. 2011. All roads lead to home: Panmixia of European eel in the Sargasso Sea. *Molecular Ecology*, 20(7): 1333–1346.
- Arai, T. 2014a. Do we protect freshwater eels or do we drive them to extinction? *SpringerPlus*, 3(1): 1–10.
- Arai, T. 2014b. How have spawning ground investigations of the Japanese eel *Anguilla japonica* contributed to the stock enhancement? *Reviews in Fish Biology and Fisheries*, 24(1): 75–88.
- Avise, J. C., Helfman, G. S., Saunders, N. C. and Hales, L. S. 1986. Mitochondrial DNA differentiation in North Atlantic eels: population genetic consequences of an unusual life history pattern. *Proceedings National Academy of Science, USA* 83: 4350–4354.
- Azeroual, A. 2010. *Anguilla anguilla* (Northern Africa). The IUCN Red List of Threatened Species 2010. Available at <http://www.iucnredlist.org/details/60344/20> [Accessed 23/04/18].
- Belpaire, C. and Goemans, G. 2007. Eels: Contaminant cocktails pinpointing environmental contamination. *ICES Journal of Marine Science*, 64(7): 1423–1436.
- Bonhommeau, S., Blanke, B., Tréguier, A., Grima, N., Rivot, E., Vermard, Y., Greiner, E. and Le Pape, O. 2009. How fast can the European eel (*Anguilla anguilla*) larvae cross the Atlantic Ocean? *Fisheries Oceanography*, 18(6): 371–385.
- Bornarel, V., Lambert, P. Briand, C., Antunes, C., Belpaire, C., Ciccotti, E., Diaz, E., Diserud, O., Doherty, D., Domingos, I., Evans, D., de Graaf, M., O’ Leary, C., Pedersen, M., Poole, R., Walker, A., Wickstrom, H., Beaulaton, L., and Drouineau H. 2017. Modelling the recruitment of European eel (*Anguilla anguilla*) throughout its European range. *ICES Journal of Marine Science*, 75 (2), 541–552.
- Bouchereau, J.-L., Marques, C., Pereira, P., Guelorget, O. and Vergne, Y. 2009. Food of the European eel *Anguilla anguilla* in the Mauguio lagoon (Mediterranean, France). *Acta Adriatica*, 50(2): 159–170.
- Boudjadi, Z. 2010. *Etat de sante de l’Anguille Anguilla anguilla peuplant deux hydrosystemes de l’extreme nord est Algerien (cas de l’estuaire du Mafrag et du lac Oubeira)*. Badji Mokhtar University.
- Briand, C., Bonhommeau, S., Castelnaud, G. and Beaulaton, L. 2008. An appraisal of historical glass eel fisheries and markets: landings, trade routes and future prospect for management. In: *Moriarty C. (ed.), The Institute of Fisheries Management Annual Conference 2007*. Wespport, Ireland. 49.
- Butts, I.A.E., Sørensen, S.R., Politis, S.N. and Tomkiewicz, J. 2016. First-feeding by European eel larvae: A step towards closing the life cycle in captivity. *Aquaculture*, 464: 451–458.
- Castonguay, M., Hodson, P.V., Moriarty, C., Drinkwater, K.F. and Jessop, B.M. 1994. Is there a role of ocean environment in American and European eel decline? *Fisheries Oceanography*, 3: 197–203.
- CITES Secretariat 2017. *Status of legislative progress for implementing CITES*. Available at: https://cites.org/sites/default/files/eng/prog/Legislation/CITES_national_legislative_status_table.pdf. [Accessed: 18/04/2018].
- CITES 2018. *List of contracting Parties*. Available at: https://www.cites.org/eng/disc/parties/chronolo.php?order=field_country_official_name&sort=asc. [Accessed: 11/04/2018].
- CMS. 2017. Concerted Action on the European eel (*Anguilla anguilla*). Available from https://www.cms.int/sites/default/files/document/cms_cop12_ca.12.1_european-eel_e.pdf [Accessed 24/04/2018].
- Crook, V. 2010. *Trade in Anguilla species, with a focus on recent trade in European Eel A. anguilla*. TRAFFIC report prepared for the European Commission
- Crook, V. and Nakamura, M. 2013. Glass eels: assessing supply chain and market impacts of a CITES listing on *Anguilla* species. *TRAFFIC Bulletin*, 25(1).
- Deelder, C. 1984. *Synopsis of biological data on the eel Anguilla anguilla*. FAO Fisheries Synopsis No. 80, Revision 1.
- juvenile abundance, W. 2016. Management of the eel is slipping through our hands! Distribute control and orchestrate national protection. *ICES Journal of Marine Science: Journal du Conseil*, 73(10): 2442–2452.
- Dekker, W. 2003. On the distribution of the European eel and its fisheries. *Canadian Journal of Fisheries and Aquatic Sciences*, 60: 787–799.
- Dekker, W., Casselman, J.M., Cairns, D.K., Tsukamoto, K., Jellyman, D. and Lickers, H. 2003. Worldwide decline of eel resources necessitates immediate action - Quebec declaration of concern. *Fisheries*, 28(12): 28–30.
- Dekker, W., van Os, B. and van Willigen, J. 1998. Minimal and maximal size of eel. *Bulletin français de la*

- pêche et de la pisciculture*, 349: 195–197.
- Derouiche, E., Habbechi, B.H., Kraiem, M.M. and Elie, P. 2016. Estimates of escapement, exploitation rate, and number of downstream migrating European eels *Anguilla anguilla* in Ichkeul Lake (northern Tunisia). *ICES Journal of Marine Science*, 73(1): 142–149.
- Djebbari, N., Boudjadi, Z. and Bensouilah, M. 2009. L'infestation de l'anguille *Anguilla anguilla* L., 1758 par le parasite *Anguillicola crassus* Kuwahara, Niimi & Itagaki, 1974 dans le complexe de zones humides d'El Kala (Nord-Est algérien). *Bulletin de l'Institut Scientifique*, 31(1): 45–50.
- Feunteun, E. 2002. Management and restoration of European eel population (*Anguilla anguilla*): An impossible bargain. *Ecological Engineering*, 18(5): 575–591.
- Freyhof, J. and Kottelat, M. 2010. *Anguilla anguilla* (Europe). The IUCN Red List of Threatened Species 2010. Available at <http://www.iucnredlist.org/details/60344/1> [Accessed 23/04/18].
- Gaynor, K. 2014. *An assessment of the challenges faced in making a non-detriment finding (NDF) for Anguilla anguilla (European eel)*. Masters Thesis. Universidad Internacional de Andalucía.
- Garcia, N., Cuttelod, A. and Malak, D.A. 2010. *The status and distribution of freshwater biodiversity in Northern Africa*. IUCN, Gland, Switzerland, Cambridge, UK, and Malaga, Spain. 141 pp.
- Geraerts, C. and Belpaire, C. 2010. The effects of contaminants in European eel: A review. *Exotoxicology*, 19(2): 239–266.
- Henkel, C. V., Burgerhout, E., de Wijze, D.L., Dirks, R.P., Minegishi, Y., Jansen, H.J., Spink, H.P., Dufour, S., Weltzien, F.A., Tsukamoto, K. et al. 2012. Primitive duplicate hox clusters in the european eel's genome. *PLoS ONE*, 7(2).
- Hizem Habbechi, B. 2014. *Etude des fractions de populations d'anguille (Anguilla anguilla, L., 1758) dans quelques hydrosystèmes tunisiens: croissance, migration, production et infestation par Anguillicoloides crassus*. Université de Tunis El Manar. 317 pp.
- ICES 1999. *Report of the ICES Advisory Committee on Fishery Management, 1998*. Copenhagen 13–22 May 1998 and 20–29 October 1998. ICES Cooperative Research Report No. 229.
- ICES 2006. *Report of the 2006 session of the Joint EIFAC/ICES Working Group on Eels*. International Council for the Exploration of the Seas & European Inland Fisheries Advisory Commission Food and Agriculture Organization of the United Nations. Rome, Jan. 2006; ICES CM 2006/ACFM: 16.
- ICES. 2014. *Report of the Joint EIFAAC/ICES/GFCM Working Group on Eel, 3–7 November 2014, Rome, Italy*. ICES CM 2014/ACOM:18. 203 pp.
- ICES. 2013. *Report of the Joint EIFAAC/ICES Working Group on Eels (WGEEL), 18–22 March 2013 in Sukarietta, Spain, 4–10 September 2013 in Copenhagen, Denmark*. ICES CM 2013/ACOM:18. 851 pp.
- ICES 2015. *Report of the Workshop on Eel and CITES (WKEELCITES)*. 10–12 March 2015, Copenhagen, Denmark. ICES CM 2015/ACOM:44. 57 pp.
- ICES 2016. *Report of the Joint EIFAAC/ICES/GFCM Working Group on Eel (WGEEL), 2015*. ICES, Antalya, Turkey. 130 pp.
- ICES 2017a. *European eel (Anguilla anguilla) throughout its natural range*. ICES. DOI: 10.17895/ices.pub.3440
- ICES 2017b. *Report of the Joint EIFAAC/ICES/GFCM Working Group on Eels (WGEEL). In: 3–10 October 2017, Kavala, Greece*. ICES CM 2017/ACOM:15. 99 pp.
- Jacoby, D. and Gollock, M. 2014. *Anguilla anguilla*. The IUCN Red List of Threatened Species 2014: e.T60344A45833138. Available at <http://www.iucnredlist.org/details/full/60344/0> [Accessed 11/04/2018].
- Kangur, K., Kangur, A. and Kangur, P. 1999. A comparative study on the feeding of eel, *Anguilla anguilla* (L.), bream, *Abramis brama* (L.) and ruffe, *Gymnocephalus cernuus* (L.) in Lake Vortsjarv, Estonia. *Hydrobiologia*, 409(1979): 65–72.
- Kettle, A.J., Asbjørn Vøllestad, L. and Wibig, J. 2011. Where once the eel and the elephant were together: Decline of the European eel because of changing hydrology in southwest Europe and northwest Africa? *Fish and Fisheries*, 12(4): 380–411.
- Kettle, A.J., Bakker, D.C.E. and Haines, K. 2008. Impact of the North Atlantic Oscillation on the trans-Atlantic migrations of the European eel (*Anguilla anguilla*). *Journal of Geophysical Research*, 113(G3): G03004.
- Kottelat, M., and Freyhof, J. 2008. *Anguilla anguilla*. The IUCN Red List of Threatened Species. Available at <http://www.iucnredlist.org/details/60344/1> and <http://maps.iucnredlist.org/map.html?id=60344> [Accessed 14/05/2018].

- Kraiem, M.M. n.d. *Organisation de l'exploitation de l'anguille européenne (Anguilla anguilla) en Tunisie*. INSTM.
- Kraïem, M.M., Chouba, L., Ramdani, M., Ahmed, M.H., Thompson, J.R. and Flower, R.J. 2009. The fish fauna of three North African lagoons: specific inventories, ecological status and production. *Hydrobiologia*, 622: 133–146.
- Laffaille, P., Briand, C., Fatin, D., Lafage, D. and Lasne, E. 2005. Point sampling the abundance of European eel (*Anguilla anguilla*) in freshwater areas. *Archiv für Hydrobiologie*, 162(1): 91–98.
- Lefebvre, F., Wielgoss, S., Nagasawa, K. and Moravec, F. 2012. On the origin of *Anguillicoloides crassus*, the invasive nematode of anguillid eels. *Aquatic Invasions*, 7(4): 443–453.
- Lintas, C., Hirano, J. And Archer, S. 1998. Genetic variation in the European eel (*Anguilla anguilla*). *Molecular Marine Biology and Biotechnology* 7: 263–269.
- Management Authority of Algeria. 2017. *in litt.* to Secretariat, 22nd November, 2017.
- Management Authority of Morocco. 2017. *in litt.* to Secretariat, 9th November, 2017.
- Management Authority of Tunisia. 2017. *in litt.* to Secretariat, 24th November, 2017.
- El Morhit, M., Fekhaoui, M., Élie, P., Girard, P., Yahyaoui, A., El Abdi, A. and Jbilou, M. 2009. Heavy metals in sediment, water and the European glass eel, *Anguilla anguilla* (Osteichthyes: Anguillidae), from Loukkos River estuary (Morocco, eastern Atlantic). *Cybium*, 33(3): 219–228.
- Moriarty, C. and Dekker, W. 1997. *Management of the European eel*. Marine Institute. Dublin, Ireland and Ijmuiden, The Netherlands. 59 pp.
- Nielsen, T. and Prouzet, P. 2008. Capture-based aquaculture of the wild European eel (*Anguilla anguilla*), in: Lovatelli, A. and Holthus, P. (Eds.). *Capture-based aquaculture. Global overview*. FAO, Rome. 141–149.
- Nijman, V. 2017. North Africa as a source for European eel following the 2010 EU CITES eel trade ban. *Marine Policy*, 85(September): 133–137.
- Qninba, A., Lieron, V., Dieuleveut, T., Amairat, M. and Yahyaoui, A. 2011. Sur la présence de l' Anguille *Anguilla anguilla* (Linnaeus, 1758) dans l' Oued T issint, un affluent de l' Oued Dr' a (Maroc). *Bulletin de l'Institut Scientifique, Rabat, section Sciences de la Vie*, 33(2): 65–66.
- Righton, D., Westerberg, H., Feunteun, E., Økland, F., Gargan, P., Amilhat, E., Metcalfe, J., Lobon-Cervia, J., Sjöberg, N., Simon, J. *et al.* 2016. Empirical observations of the spawning migration of European eels: The long and dangerous road to the Sargasso Sea. *Science Advances*, 2(10): 1–14.
- Sabatié, R. and Fontenelle, G. 2007. The eel in Morocco: A resource on the edge? *Vie et Milieu*, 57(4): 213–221.
- Sadler, K. 1979. Effects of temperature on the growth and survival of the European eel *Anguilla anguilla* L. *Journal of Fish Biology*, 15(4): 499–507.
- Shiraishi, H. and Crook, V. 2015. *Eel market dynamics: An analysis of Anguilla production, trade and consumption in East Asia*. TRAFFIC. Tokyo, Japan. 53 pp.
- Schmidt, J. 1909. On the distribution of the freshwater eels (*Anguilla*) throughout the world. I. Atlantic Ocean and adjacent region. *Meddelelser fra Kommissionen for Havundersøgelser. Serie Fiskeri*. 3: 1–45.
- Schmidt J. 1922. The breeding places of the eel. *Philosophical Transactions of the Royal Society London B* 211:179–211
- Schmidt, J. 1925. The breeding places of the eel. *Smithsonian Institute Annual Report 1924*, 279–316.
- Stacey, J.A., Pratt, T.C., Verreault, G. and Fox, M.G. 2015. A caution for conservation stocking as an approach for recovering Atlantic eels. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 25(4): 569–580.
- Tesch, F.W. 1977. *The eel: biology and management of Anguillids eels*. Chapman and Hall, London.
- Tesch, F.-W. and Wegner, G. 1990. The Distribution of Small Larvae of *Anguilla* sp. Related to Hydrographic Conditions 1981 between Bermuda and Puerto Rico. *Internationale Revue der gesamten Hydrobiologie und Hydrographie*, 75: 845–858.
- Terech-Majewska, E., Schulz, P. and Siwicki, A.K. 2015. Influence of nematode *Anguillicoloides crassus* infestation on the cellular and humoral innate immunity in European eel (*Anguilla anguilla* L.). *Central European Journal of Immunology*, 40(2): 127–131.
- Toujani, R. and Hafsia, I. Ben 2017. *Report on the eel stock, fishery and other impacts, in: Tunisia 2017*. ICES. 410–427 pp.
- Toujani, R. 2018. Rachid Toujani (National Institute of Marine Sciences and Technologies, Tunisia) in

- litt.* to UNEP-WCMC. 12th April 2018.
- TRAFFIC 2016. *Overview of important seizures in the European Union. January to December 2015*. Briefing prepared by TRAFFIC for the European Commission. 12 pp.
- TRAFFIC 2017. *Overview of important seizures in the European Union. January to December 2016*. Briefing prepared by TRAFFIC for the European Commission. 12 pp.
- Walker, A. 2018. Alan Walker (Chair of EIFAAC/ICES/GFCM Working Group on Eel (WGEEL)), *in litt* to UNEP-WCMC 9th May 2018. Wariaghli, F., Kammann, U., Hanel, R. and Yahyaoui, A. 2015. PAH Metabolites in Bile of European Eel (*Anguilla anguilla*) from Morocco. *Bulletin of Environmental Contamination and Toxicology*, 95(6): 740-744.
- Wickström, H. 2008. *Non detriment findings for the European eel - The Swedish case*. CITES. 11 pp.