ANNEX 3

PROPOSED DRAFT METHODOLOGY FOR A RAPID ASSESSMENT OF CMS APPENDIX I TAXA

Introduction and scope

At the 13th meeting of the Conference of the Parties to CMS (COP13; Gandhinagar, 2020), the Parties to CMS highlighted the need for improved information in relation to Appendix I taxa and adopted several Decisions to improve the scientific evidence underpinning decisions impacting these species. The decisions highlighted a need for an improved understanding of the threats posed to Appendix I taxa from direct use and trade (Decisions 13.16-13.18; 13.24 c), as well as a review of the conservation status of CMS-listed taxa, including aspects around the eligibility for listing of some Appendix I species (Decision 13.24 b).

To make progress towards fulfilling these decisions, the CMS Secretariat requested the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) to provide a proposed methodology for an **assessment** that could improve the basis for decision-making for Appendix I taxa.

In particular, the purpose of the rapid assessment is **twofold**, aiming to assess Appendix I taxa to provide further insights on:

- the impact of **direct use and trade** on the conservation status of Appendix I-listed taxa (responding to Decision 13.17 and Decision 13.24 c); and

- the status of Appendix I-listed taxa in relation to the criteria for listing defined in CMS Resolution 13.17 (Decision 13.24 b)

The proposed rapid assessment methodology will assess criteria for both direct use and trade and Appendix I listing together, but proposes different combinations of criteria to account for the different approaches needed. For the assessment of **direct use and trade**, it was assumed that Appendix I taxa should be prioritised most highly if they were facing extinction risk, were threatened by (or biologically vulnerable to), use and/or trade, and were not subject to existing management efforts. Taxa considered priorities in relation to **Appendix I listing eligibility** were those with favourable conservation status and limited evidence of migratory status.

This document, developed by UNEP-WCMC in collaboration with IUCN, outlines the proposed approach to assess these two different aspects of interest to the CMS Parties. Work done by UNEP-WCMC and IUCN in the context of CITES to develop a Rapid Assessment of CITES Appendix I taxa (See CITES AC31 Doc.9 and AC31 Inf. 6) provides a model for this proposed approach, though the datasets and metadata provided for the CMS Rapid Assessment have been tailored to the specific requirements of the CMS taxa and purpose.

Once feedback received from the CMS Scientific Council and from wider taxonomic and data experts has been incorporated into the methodology and following approval of the proposed approach by the CMS Scientific Council, species/subspecies-level data available on conservation and migratory status and direct use and trade of the 171 species and nine subspecies listed on CMS Appendix I will be compiled in the form of a rapid assessment. It is envisioned that the results of the rapid assessment, including details of taxa and their corresponding 'score' in ranked order, will be made available as a filterable Excel file providing summary data for all Appendix I taxa.

Proposed output

The resultant rapid assessment output will provide a comprehensive Excel data file with the corresponding data, metadata and score for each CMS Appendix I taxon. It will provide a useful tool to assist with taxon prioritization, and can be filtered by different parameters to address different questions and priorities. It is envisioned that those species requiring more attention in terms of direct

use and trade (i.e. those most threatened by trade and use) would score highly in the proposed methods. Conversely, those taxa with low scores are likely to be of relevance in relation to the Appendix I eligibility criteria and ultimately may benefit from more detailed assessment through the preparation of case studies.

It is anticipated that the results of this rapid assessment will help CMS Parties to identify a short list of priority taxa where direct use and trade appear to be a threat and where more could be done to improve conservation outcomes for migratory taxa, as well as providing insights into the conservation status of Appendix I taxa overall through the compilation of relevant datasets into the rapid assessment output, which can inform CMS implementation generally, as well as the conservation status report envisioned under Decision 13.24.

Methodology

This section describes the proposed methodology and datasets for conducting the rapid assessment of Appendix I species. Following consultation, some parameters (e.g. criteria thresholds) may be refined (see Next Steps).

A different combination of criteria will be used to assess (a) direct use and trade and (b) Appendix I eligibility based on the prioritisation inherent in these two different questions (see Table 1). Within five overarching categories, 16 criteria are proposed to aid the assessment of Appendix I species (Table 1).

Details of the data and methodology for each criterion are described in Table 2.

Table 1: Criteria proposed based on available datasets, under each of five categories. Those criteria with '√*' are considered the highest priority and multipliers will be considered to ensure they are given increased importance within the scoring.

Category	Criteria	Direct use/trade	Appendix I eligibility
1. Extinction risk	1.1 Red List status	√	√*
	1.2 Population trend	√	√
2. Biological vulnerability	2.1 Body size	√	
	2.2 Reproductive output	√	
	2.3 Habitat breadth	√	
	2.4 Range size	√	
3. Threat to species	3.1 Threat from use	√*	
	3.2 In legal international trade	√*	
	3.3 Domestic use/consumption	√	
	3.4 Illegally harvested	√	
	3.5 Impact of ongoing threats		√*
4. Management effort	4.1 Existing measures under CITES	√	
	4.2 Conservation actions in place	√	
	4.3. Prohibition of take	√	
5. Migratory behaviour	5.1 Movement pattern		√
	5.2 Proportion of global population migrating		√

Each taxon is scored for each criterion, subject to data availability. Final scores will then be calculated for each taxon for (a) impact of direct use and trade and (b) eligibility for Appendix I listing. These final scores are based on the mean score across all relevant criteria (see Table 1 for relevant criteria) for which a score could be assigned. Criteria for which a score could not be assigned for an individual taxon would not be included in that taxon's final score to avoid skewing the score: this includes instances where taxa do not yet have an IUCN Red List assessment, where data were unknown or not available, for example.

Impact of direct use and trade

The direct use and trade in Appendix I species and the application of Article III of the Convention regarding international trade in Appendix I-listed species was highlighted as a particular concern at CMS COP13 (Decisions 13.16-18). As described in Article III 5 of the Convention, Appendix I-listed species cannot be harvested except under very specific circumstances.

Taxa identified as highly impacted by direct use and trade (i.e. with **high overall scores**) will be those with:

- high global extinction risks (category 1);
- high biological vulnerability due to, for example, slow reproductive rate or a high degree of habitat specialism (category 2);
- evidence of both legal and illegal international trade, as well as domestic use/consumption (category 3); and
- those taxa with no/few existing management effort/measures (category 4).

The results will help improve the understanding of which species are impacted by direct use and trade.

Eligibility for Appendix I listing

Taxa identified with low potential eligibility for Appendix I listing (i.e. with **low overall scores**) will be those with low current extinction risk (category 1) and limited impact from ongoing/future threats (criterion 3.5), and/or those where there is limited evidence of migratory behaviour (category 5)[1].

In relation to migration considerations (category 5), data from several sources will be compiled to give an indication of migratory status. It is important to note, however, that given the differences in the definition of "migratory" used by CMS, IUCN and other data providers, these criteria do not provide a conclusion as to whether or not species meet the CMS definition of migratory.

The results will provide insights into the conservation status and migratory status of individual Appendix I species to help improve the understanding of the suitability and eligibility of the listings.

Data included

The assessment relies on publicly available datasets (CMS National Reports[2], CMS range State list, CITES Trade Database, The IUCN Red List of Threatened Species[TM], TRAFFIC seizure data, UENP/CMS/COP13/Doc.27.3 Annex 3[3], and several additional sources of biological/ecological data), as well as the United States of America import data acquired from LEMIS via a FOIA request.

The CMS Scientific Council may wish to consider whether some categories or criteria are a higher priority than others (e.g. category 3 for prioritising species threatened by use/trade) and may benefit from having weighted scores. Suggestions for criteria that may merit weighting are indicated with an asterisk in Table 1.

In addition to providing a score for each criterion and, where possible, the data underpinning that score[4], non-scoring contextual information will also be provided to support the identification of the highest priority taxa based on (a) direct use and trade and/or (b) eligibility for listing in Appendix I, including:

- The **year listed** in CMS Appendix I;
- Where the taxon is also listed in CMS **Appendix II**;
- The **year** of the most recent **IUCN Red List assessment** (from which the Red List data in the relevant criteria derive);
- All **historic IUCN Red List assessment categories** (date of assessment and Red List criterion, ordered chronologically);
- **National Red List assessments**, where available, for the CMS Appendix I species with population-level listings;
- The **number of range States** according to distribution records in CMS range State list (additionally listing the range States by ISO2 code);
- The **estimated global population size** based on the number of mature individuals in the most recent Red list assessment[5];
- Summary of existing measures in the CMS family (e.g. whether there are CMS action plans, daughter agreements, MoUs and/or special species initiatives); and
- Nomenclature considerations, where relevant (e.g. differences between CMS and CITES).

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[1] Note: the absence of data on migratory behaviour should not be taken as evidence of a taxon not being migratory, rather it may indicate taxa that are understudied or missing movement pattern data.
[2] Available at https://www.cms.int/en/documents/national-reports.https://www.cms.int/en/documents/national-reports. Only 61% of current CMS Parties submitted National Reports during the latest national reporting cycle.
[3] Available at https://www.cms.int/sites/default/files/document/cms_cop13_doc.27.3_annex3_e.xlsx
[4] Only where these data are publicly available.
[5] Where a range of population size estimates are provided, the mean will be taken. The estimated population size according to the Red List assessment could not be included as a scored criterion because it is a key factor in assigning Red List status and so the two are highly correlated.

<u>Next steps</u>
The next step will be to consult on the proposed methodology with the CMS Secretariat, CMS Scientific Council, relevant taxonomic experts from the IUCN Species Survival Commission and data providers (from the IUCN Red List Partnership, including BirdLife International).

Table 2: Overview of proposed Appendix I rapid assessment scoring criteria to address. Where data are available, criteria will be scored between 1 (high) and -1 (low). Each taxon will be assigned a final score based on the mean score across all criteria that could be assessed; criteria with missing or incomplete data will not be scored to avoid distorting the final outcome.

Criteria	Data source	Methods	Scoring criteria	Not scored[6]
Conservation status				
1.1 Red List status category	IUCN Red List[7]	Priorities ❖ *Threat from use/trade:* globally threatened taxa ❖ *App I eligibility:* Least Concern taxa	1: CR & EW[8] 0.8: EN 0.6: VU 0.4: NT 0: EX -1: LC	Red List status: DD (Data Deficient). Taxon not yet assessed by IUCN.
1.2 Population trend	IUCN Red List[7]	Priorities ❖ *Threat from use/trade:* declining populations ❖ *App I eligibility:* increasing/ stable populations Population trend according to IUCN Red List assessment.	1: Decreasing 0.5: Stable 0: Increasing	Population trend: unknown. Taxon not yet assessed by IUCN.
Biological vulnerability				
2.1 Body size	Amniote Life History Database[9] AnAge[10] FishBase[11]	Priorities ❖ *Threat from use/trade:* large bodied taxa are likely to be more vulnerable in the face of over-exploitation Upper (top 33%) and lower (bottom 33%) thresholds will be calculated for each class based on measures of **adult body mass** (or maximum length for fish) for each available species. Where a range of measures are available for a taxon, the mean value will be used.	1: > upper threshold 0.5: between upper and lower threshold 0: < lower threshold	Body size data not available.

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[6] When a criterion cannot be scored for a given taxon, it will be excluded to avoid skewing the taxon's final score.
[7] Available at www.iucnredlist.org.
[8] Extinct in the Wild (EW) will be given an equal score to CR on the assumption that re-introductions of taxa that are extinct in the wild would have small population sizes, and these taxa may still be vulnerable to trade threats
[9] Nathan P. Myhrvold, Elita Baldridge, Benjamin Chan, Dhileep Sivam, Daniel L. Freeman, and S. K. Morgan Ernest. 2015. An amniote life-history database to perform comparative analyses with birds, mammals, and reptiles. Ecology 96:3109
[10] Available at https://genomics.senescence.info/
[11] Available at https://www.fishbase.se/

Criteria	Data source	Methods	Scoring criteria	Not scored[6]
2.2 Reproductive output	Amniote Life History Database[9] AnAge[10]	<u>Priorities</u> ❖ *Threat from use/trade:* taxa with relatively slow life-histories (producing fewer offspring or reaching maturity at a later age) Reproductive output will be scored based on two metrics. These are considered complementary metrics and combined to maximise data coverage without 'double counting'. (a) Number of offspring produced (b) Age at maturity Upper (top 33%) and lower (bottom 33%) thresholds for these two metrics will be calculated separately for each class based on data available for each species in those classes. Where a range of measures are available for a taxon, the mean value will be used. The (a) mean number of offspring produced and (b) age at maturity for each Appendix I taxon will be scored against these thresholds. Where data were only available for one metric, taxa will be scored based on that metric only.	1: 'slow' life history (> upper threshold for age at maturity AND < lower threshold for number of offspring) 0.66: > upper threshold for age at maturity OR < lower threshold for number of offspring (but not both) 0.33: between upper and lower threshold for at least one metric 0: 'fast' life history (<lower threshold for age at maturity AND > upper threshold for number of offspring)	Data on number of offspring and age at maturity not available.
2.3 Habitat breadth	Ducatez *et al.* (2016)[12]	<u>Priorities</u> ❖ *Threat from use/trade:* taxa occupying a narrow range of habitats (specialists) are likely to be more vulnerable than those occupying a broad range (generalists). Upper (top 33%) and lower (bottom 33%) thresholds will be calculated for each class based on **habitat breadth** data for each species assessed by Ducatez *et al.* (2016). The habitat breadth for each Appendix I taxon will be scored against these thresholds.	1: > upper threshold 0.5: between upper and lower threshold 0: < lower threshold	Taxon not yet assessed by IUCN.

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[12] Ducatez, S., Tingley, R. and Shine, R. (2016) Using species co-occurrence patterns to quantify relative habitat breadth in terrestrial vertebrates. Ecosphere, 5(12): 1-12. https://figshare.com/collections/Using_species_co-occurrence_patterns_to_quantify_relative_habitat_breadth_in_terrestrial_vertebrates/3308385

Criteria	Data source	Methods	Scoring criteria	Not scored[6]
2.4 Range size	IUCN Red List[7]	<u>Priorities</u> ❖ *Threat from use/trade:* taxa with small ranges Upper (top 33%) and lower (bottom 33%) thresholds will be calculated for each order based on the **Extent of Occurrence (EOO)** for each taxon assessed by IUCN. Where EOO is provided as a range, the mean value will be used. The mean EOO for each Appendix I taxon will be scored against these thresholds.	1: < lower threshold 0.5: Between upper and lower threshold 0: > upper threshold	EOO data not available from IUCN. Taxon not yet assessed by IUCN.
Threat to species				
3.1 Threat from use	IUCN Red List[7]	<u>Priorities</u> ❖ *Threat from use/trade:* taxa where 'trade/use' is a documented threat Whether the IUCN Red List assessments considered **intentional biological resource use** to be a threat (threat classifications: 5.1.1, 5.4.2)[13], and if so, how severe those threats were considered to be. Where there were multiple threats and severity, the highest score will be taken. Threats considered 'Past, Unlikely to Return' will be excluded.	1: Considered a threat (severity: very rapid decline or rapid decline) 0.66: Considered a threat (severity: unknown or fluctuating) 0.33: Considered a threat (severity: decline negligible, slow or no decline) 0: **Not** considered a threat	Red list status: LC. Taxon **not** assigned a threat classification. Taxon not yet assessed by IUCN.

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[13] Available at https://www.iucnredlist.org/resources/threat-classification-scheme.

Criteria	Data source	Methods	Scoring criteria	Not scored[6]
3.2 In legal international trade	CITES Trade Database[14] LEMIS IUCN Red List[7]	Priorities ❖ *Threat from use/trade:* taxa in wild-sourced legal international trade Data on legal, wild-sourced international trade will be obtained from several sources and analysed separately. Where taxa were CITES-listed, data from the CITES Trade Database will be used exclusively, since this records the official legal trade data reported to CITES by Parties. However, for non-CITES-listed taxa, additional trade data sources will be used. Methods for each of these are detailed below. *CITES-listed taxa* An upper (top 33%) threshold will be calculated for each order based on the annual mean level of raw/semi-raw wild-sourced trade[15] (2015-2019) in the CITES Trade Database for each CITES-listed taxon (across all Appendices). Trade levels for each Appendix I taxon (based on the above parameters) will be scored against these thresholds[16]. *Non-CITES-listed taxon* Non-CITES-listed taxa will be classified as in trade, but in unknown relative quantities based on one of the following: (a) EU Annex D taxa imported into the EU as raw/semi-raw wild-sourced trade (2015-2019) in the CITES Trade Database[15] (b) taxon imported into the United States of America as raw/semi-raw wild-sourced trade (2015-2019) in the LEMIS Database[15] (c) Whether IUCN Red List assessments classified any end uses (other than research and establishing *ex-situ* production) as 'international'	1: high levels of wild-sourced legal international trade (CITES-listed species >upper threshold) 0.5: wild-sourced legal international trade, but levels are either relatively low (CITES-listed species <upper threshold) or are not known (for non-CITES-listed species) 0: no evidence of wild-sourced legal international trade	

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[14] Available at https://trade.cites.org/.

[15] Direct trade based on gross exports (the larger of the exporter- and importer-reported quantities) for the following:

sources: 'R', 'U', 'W' and unreported; **trade terms**: baleen, bodies, bones, bone carvings, bone pieces, carapaces, carvings, eggs, eggs (live), fins, gall, gall bladders, horn carvings, horn pieces, horns, ivory pieces, ivory carvings, live, meat, plates, scales, shells, skin pieces, skins, skeletons, skulls, teeth, trophies, tusks; **units**: number and weight (kg) only; **purposes**: all but scientific ('S')

[16]Where only certain populations are listed on CMS Appendix I, only trade from these populations will be included.

Criteria	Data source	Methods	Scoring criteria	Not scored[6]
3.3 Domestic use/consumption	IUCN Red List[7]	**Priorities** ❖ *Threat from use/trade:* taxa in domestic use Whether IUCN Red List assessments classified any end uses (other than research and establishing *ex-situ* production) as 'national' or 'subsistence' Taxa considered 'not utilised' under IUCN Red List assessment use and trade will be considered 'not in domestic use'	1: Taxon in domestic use 0: Taxon not in domestic use	Taxon **not** assigned end uses, or assigned end uses but with no data on scale. Taxon not yet assessed by IUCN.
3.4 Illegal harvest, capture and trade	LEMIS TRAFFIC wildlife trade portal[17] Supplemented with additional literature[18]	**Priorities** ❖ *Threat from use/trade:* taxa documented in illegal trade or illegally harvested for use One or more seizure(s) reported at species or subspecies level only[19] in the most recent ten years of LEMIS data (2010-2019, seizures reported as source 'I') and most recent twelve years of TRAFFIC data (2010-2021)[20]. Only data reported as 'seizure' or 'smuggling/illegal trade' were included from the TRAFFIC wildlife trade portal.	1: Taxon seizure reported	No seizure reported for the taxon.
3.5 Impact of ongoing threats	IUCN Red List[7]	**Priorities** ❖ *App I eligibility:* taxa documented as subject to severe current and/or likely future threats Ongoing or future threats, where assessed, classified as high or medium impact based on the IUCN threat impact scoring system[21]	1: all high impact 0.75: at least one, but not all, high impact 0.5: all medium impact 0.25: no high impact but at least one medium impact 0: no ongoing/future threats or, where there are, all assessed as low/negligible impact	Red list status: LC. Taxon **not** assigned a threat classification or impact score. Taxon not yet assessed by IUCN.

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[17] TRAFFIC International (2021). Wildlife Trade Portal. Available at www.wildlifetradeportal.org. Only direct taxonomic mapping between accepted names was included.
[18] E.g. Brochet *et al.* 2016. Preliminary assessment of the scope and scale of illegal killing and taking of birds in the Mediterranean. Bird Conservation International. 26 (1).
[19] Seizures reported at higher taxonomic level were excluded.
[20] Due to the reporting cycle, data from LEMIS were only available 2015-2019.
[21] https://nc.iucnredlist.org/redlist/content/attachment_files/Dec_2012_Guidance_on_Threat_Impact_Scoring_Revised.pdf

Criteria	Data source	Methods	Scoring criteria	Not scored[6]
Management				
4.1 Existing measures under CITES	CITES[22]	<u>Priorities</u> ❖ *Threat from use/trade:* taxa without CITES measures Whether CMS Appendix I taxa are also currently listed on the CITES Appendices, and if so, what Appendix they are on. CITES Appendix II taxa are further prioritised according to whether they are also covered by at least one of the following CITES measures: CITES Resolution(s); CITES Decision(s); CITES Task Force; and/or had CoP-approved quotas in place (quotas defined in Resolutions or listing annotations).	1: Not CITES listed/ CITES App III 0.66: App II with no dedicated measures 0.33: App II with measures 0: Appendix I	
4.2 Conservation actions in place	IUCN Red List[7]	<u>Priorities</u> ❖ *Threat from use/trade:* taxa with little/no conservation action Whether IUCN Red List assessments considered conservation actions to be in place for the following IUCN conservation action classifications: land/water protection; site/area management; and/or species management	1: Where classified, all are No 0.5: Where classified, more No than Yes 0: Where classified, all or most are Yes	All Conservation Actions 'unknown'. Taxon not yet assessed by IUCN.
4.3 Prohibition of take (Article III(5))	CMS national reports[23]	<u>Priorities</u> ❖ *Threat from use/trade:* taxa with a high proportion of range States where take is not prohibited Whether range States reported prohibiting take of Appendix I taxa in their CMS National Report from the latest reporting cycle in response to the question '*Is the taking of Appendix I species prohibited by national or territorial legislation in accordance with CMS Article III(5)?*'. Take was considered to be prohibited if it applied to across the entirety of the range State. Where no take was only reported for part of the country/territory or for 'some species' (without specifying the species), prohibition of take was considered 'not confirmed'. Range States are based on the taxon's native distribution. Range States that (a) are not Party to CMS, (b) did not submit a CMS National Report during the latest reporting cycle or (c) did not respond to the relevant question if they did submit a National Report were excluded.	1: take not confirmed to be prohibited in any range States 0.75: take confirmed to be prohibited in <25% of range states 0.5: take confirmed to be prohibited in 26-50% of range States 0.25: take confirmed to be prohibited in 51-75% of range States 0: take confirmed to be prohibited in >75% of range States	<20% of taxon's range States submitted CMS National Reports during the latest reporting cycle.

Criteria	Data source	Methods	Scoring criteria	Not scored[6]
Migratory behaviour[24]				
5.1 Movement pattern	IUCN Red List[7] UNEP/CMS/COP 13/Doc.27.3 Annex 3[25]	<u>Priorities</u> ❖ *App I eligibility:* no evidence of migratory behaviour Whether Appendix I taxa exhibit movement patterns according to the IUCN Red List assessment and/or are considered to be mobile across international borders in the disaggregation of bird families and genera listed in Appendix II (applies only to Appendix I bird taxa that are also listed in App. II as part of a higher level listing).	1: Taxon considered 'Full migrant' by IUCN/mobile across borders (birds) 0.5 Taxon considered 'Nomadic' or 'Altitudinal Migrant' by IUCN 0: Direct evidence that taxon is **not** considered migratory according to the IUCN definition of migratory	No evidence of movement pattern
5.2 Proportion of global population migrating	IUCN Red List[7] UNEP/CMS/COP 13/Doc.27.3 Annex 3[25] Eyres *et al.* (2017)[26]	<u>Priorities</u> ❖ *App I eligibility:* no evidence of migratory behaviour in any population Whether **all, or only some**, of the global population of Appendix I taxa exhibit movement patterns based on three data sources. Taxa will be considered partial migrants (i.e. some, but not all, individuals/populations within taxon exhibit migratory behaviour) if they are considered: (a) 'partial migrant'/'partially migratory' within IUCN Red List assessment habitat information; (b) 'partial migrants' in the disaggregation of bird families and genera listed in Appendix II; and/or (c) 'partial directional migrants' in Eyres *et al.* (2017) If there is no evidence of taxa being partial migrants, all populations of taxa identified as 'full migrant'/ mobile across borders in criterion 5.1 will be assumed to be fully migratory.	1: All individuals and populations within taxon assumed to migrate 0.5: Partial migrant (only some individuals/ populations within taxon migrate)	No evidence relating to the proportion of global population which migrates.

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[24] The data sources used in category 5 (migratory behaviour) may differ from CMS in their definition of 'migratory' and should not be used to draw conclusions on whether the specific definition of 'migratory' under CMS is met. Missing data (i.e. for taxa that are not scored) is not evidence that a species is not migratory.

[25] Species belonging to the disaggregated bird families and genera listed under Appendix II of CMS. https://www.cms.int/sites/default/files/document/cms_cop13_doc.27.3_annex3_e.xlsx

[26] Eyres, A., Böhning-Gaese, K. and Fritz, S. A. (2017) Quantification of climatic niches in birds: adding the temporal dimension. *Journal of Avian Biology* 48(12), 1517-1531. https://doi.org/10.1111/jav.01308. Data accessible via https://dataportal.senckenberg.de/dataset/migratory-behaviour-in-birds-a-classification-across-all-living-species.