NON-DETRIMENT FINDINGS FOR BIRDS

MODULE 8

NON-DETRIMENT FINDINGS GUIDANCE

2024

Convention on International Trade in Endangered Species of Wild Fauna and Flora

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Cover photo: Blue-and-yellow macaw (*Ara ararauna*), © Adobe Stock / Fernando Calmon

CITES Secretariat
Palais des Nations
Avenue de la Paix 8-14
CH-1211 Genève
Switzerland

Tel: +41(0)22 917 8139/40
Fax: +41(0)22 797 34 17

E-mail: info@cites.org
Web: www.cites.org

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1. WHAT IS IN THIS MODULE?

This module provides additional guidance to Parties on some of the key considerations for undertaking NDFs for birds. It is complimentary to module 1 and 2. At the time of writing, CITES lists 156 species of birds on Appendix I, 1,294 species on Appendix II and 60 species on Appendix III. CITES coverage of birds on the Appendices is most complete for Falconiformes (birds of prey), Strigiformes (owls), Psittaciformes (parrots) and Apodiformes (including hummingbirds, swifts and tree swallows) with between 75-100% of the total known species included. Birds are primarily traded live, though there is also large-scale trade in feathers, specimens, and derivatives. Most trade in live birds (2011-2022) was in species of Psittaciformes (parrots). The greater part of this trade was in captive-bred individuals, though there remains a considerable trade in wild-caught Psittaciformes (c.10% of live birds). In the live trade, the second most-traded order was Falconiformes (birds of prey). Much of this trade is also in captive bred individuals, with wild-caught individuals accounting for 8.5% of the trade.

The commercial trade in birds largely concerns Appendix II listed species, though both trade in Appendices I and III species is also recorded to a lesser degree. The trade in Appendix I species largely relates to trade in scientific specimens, though some trade in wild-caught live birds is recorded in the CITES Trade Database. For Appendix III, the live trade is predominantly in Galliformes (including pheasants and peacocks).

Ruby-throated hummingbird (*Archilochus colubris*)


Spotted eagle-owl (*Bubo africanus*)

2. HOW TO MAKE A NON-DETRIMENT FINDING FOR BIRDS

This bird-specific guidance module builds on the framework in module 2. It helps to identify cases for birds that are relatively simple (and when a simplified assessment is sufficient) and those that will require further detailed investigation (i.e., a comprehensive NDF assessment and potentially the preparation of management advice). Module 2 section 3 illustrates the step-by-step process for undertaking an NDF. To support its application this guidance is structured to follow these steps.

In the case of birds, the trade often concerns captive-produced specimens (Source codes C, D, or F). The approach for NDFs made on captive-bred specimens is described in general terms under module 2 section 4.7 and for birds specifically under section 3.3 of this module.

3. NDF INITIAL INFORMATION GATHERING FOR BIRDS

Module 2 section 4 provides details on the gathering of initial information needed to support assessment of non-detriment (see module 2 section 4).

The identification of the specimen (sections 3.1, 3.2 and 3.3) and assessing the quantity of the specimens (section 3.4) are given further consideration within this section as elements requiring specific guidance for birds.

3.1 IDENTIFICATION OF BIRDS

Critical to completing the NDF process is ensuring i) the correct identification of the specimen(s), ii) checking the listing under the CITES Appendices and confirming the relevant source code, and iii) verifying the legal acquisition finding (LAF) of the specimen(s). Verifying the legal acquisition findings is the role of the Management Authority and while it is a separate process to making an NDF, it is useful for Scientific Authorities to ensure the LAF has been done, and that it covers all scenarios of legality, before an NDF is carried out.

NDFs should be made at species level, with the scientific name agreeing with the CITES standard nomenclature. However, while it has been recognized that there may be cases where making the decision at the genus level is the only practical option; this should be the exception and not the norm. If the genus contains species known to be at different risks of extinction, or has some species more vulnerable to off-take than others, then suitable precautionary conditions will need to be applied to reduce the risks. Further, it will be important to ensure species specific data collection to ensure NDFs can be segregated as soon as possible (e.g., via traceability/monitoring schemes).

While identification is largely undertaken at the point of the application for export/import, with the onus on the applicant to provide the correct scientific name according to CITES standard nomenclature, there are methods available to Scientific Authorities to aid the identification of species. This is particularly relevant in cases where there is a higher risk of misidentification. This can occur as a result of i) recent nomenclatural changes not recognized in the standard taxonomic references adopted by the Conference of the Parties, ii) the existence of look-alike species, iii) a deliberate effort to conceal illegal trade. These methods include:

- national/ regional field guides,
- the Illustrated checklist of birds of the world (**1**), which includes species-level illustrations by genus,
- the online Birds of the World website, which is a searchable media archive including photographs,
- IUCN Red List of Threatened Species,
- BirdLife DataZone,
- asking for photographs of the specimens concerned if they cannot be examined directly, and/or
- advise the Scientific Authority in cases where the identification is uncertain to request the Management Authority or trader to provide further information.

The CITES Identification Manual for Aves provides general notes on species listed under the Appendices, their characteristics, distribution, population, and, for a limited number of species, details on intraspecific variation and similar species.

3.2 DEALING WITH LOOK-ALIKE SPECIES

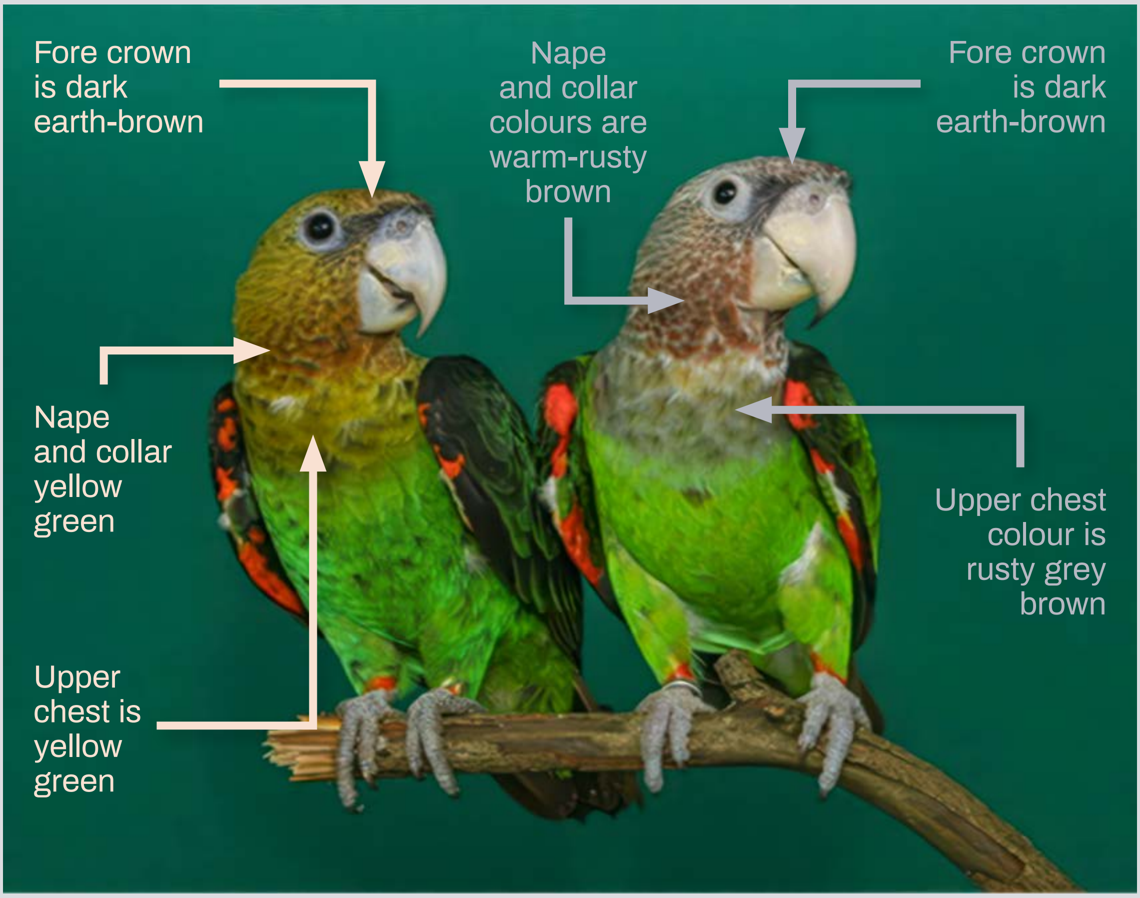
The degree to which there are morphological similarities (their physical characteristics) among bird species is widely acknowledged. This can complicate identification to the species level, especially for eggs and juvenile stages, and adds complexity when species with strong similarities are listed in different Appendices. The Psittaciform genus *Amazona* is one such group of hard to identify species listed across both Appendices I and II. One such identification guide has been produced in the case of the Cape Parrot (*Poicephalus robustus*) and Grey-headed parrot (*Poicephalus fuscicollis suahelicus*) (Box A).

BOX A Identification of the Cape Parrot and the Grey-headed Parrot.

Morphological similarities between the Cape Parrot (*Poicephalus robustus*) and the Grey-headed Parrot (*Poicephalus fuscicollis suahelicus*) make distinguishing the two species challenging. The similarities are such that the Cape Parrot was previously considered a subspecies of *P. fuscicollis*. Whilst both species are Appendix II listed, the Cape Parrot is endemic to South Africa and assessed as Vulnerable on the IUCN Red List, whereas *P. fuscicollis* spp. are distributed across a much wider range and are classified as Least Concern on the IUCN Red List. This has clear implications for the preparation of an NDF.

To support correct identification, the South African National Biodiversity Institute (SANBI) has compiled the 'Cape Parrot Identification Guide' on behalf of the Scientific Authority of South Africa. This includes,

1. A brief description of the two species,
2. Tables listing the main ecological, morphological and biological differences between the two species,
3. Photographs of both sexes annotated to show the colour differences between the two species, and.
4. A colour palette to assist in recognising the various colours described.



Male Cape parrot (P. robustus – left) and male grey-headed parrot (P. fuscicollis suahelicus – right)

3.3 IDENTIFICATION OF PARTS AND DERIVATIVES

Resolution Conf. 9.6 (Rev. CoP19) on *Trade in readily recognizable parts and derivatives* provides guidance on the identification of readily recognizable parts and derivatives. Identification guides covering bird feathers and eggs are available, but with a limited number of species covered (2, 3, 4).

For birds, the identification of derivatives (any processed part of an animal or plant), which may include carvings, feathers and claws, to the species level can be challenging. Whilst these do not constitute the major part of the international trade in birds, the proportion is significant, particularly in specimens for medicinal purposes. Identification must therefore rely on the accompanying documentation, packaging, mark or label as outlined in Res. Conf. 9.6 (Rev. CoP19), although such information should not necessarily be taken at face value.

3.4 QUANTITY OF SPECIMENS

Guidance on assessment of the risk associated with the quantity of specimens being traded is included in module 2 section 4.5. Calculation of whole individual equivalents may be necessary if specimens are being traded as parts or derivatives. It is important to consider any mortality, loss or wastage associated with obtaining species, or parts and derivatives for export.

To calculate whole individual equivalents for birds,

- The following terms (as defined in CITES) should be considered directly equivalent to one bird: live, bodies, eggs, eggs (live), skeletons, skins, trophies and skulls.
- There are no recommended conversion factors for use with other terms (including feathers, claws, and specimens). However, it is recommended that in estimating the number of individuals traded under terms other than live, to use the most conservative estimation. For example, 20 claws could relate to five individuals having four toes each or 20 separate individuals, therefore the assessment should consider the impact of 20 individuals being traded.

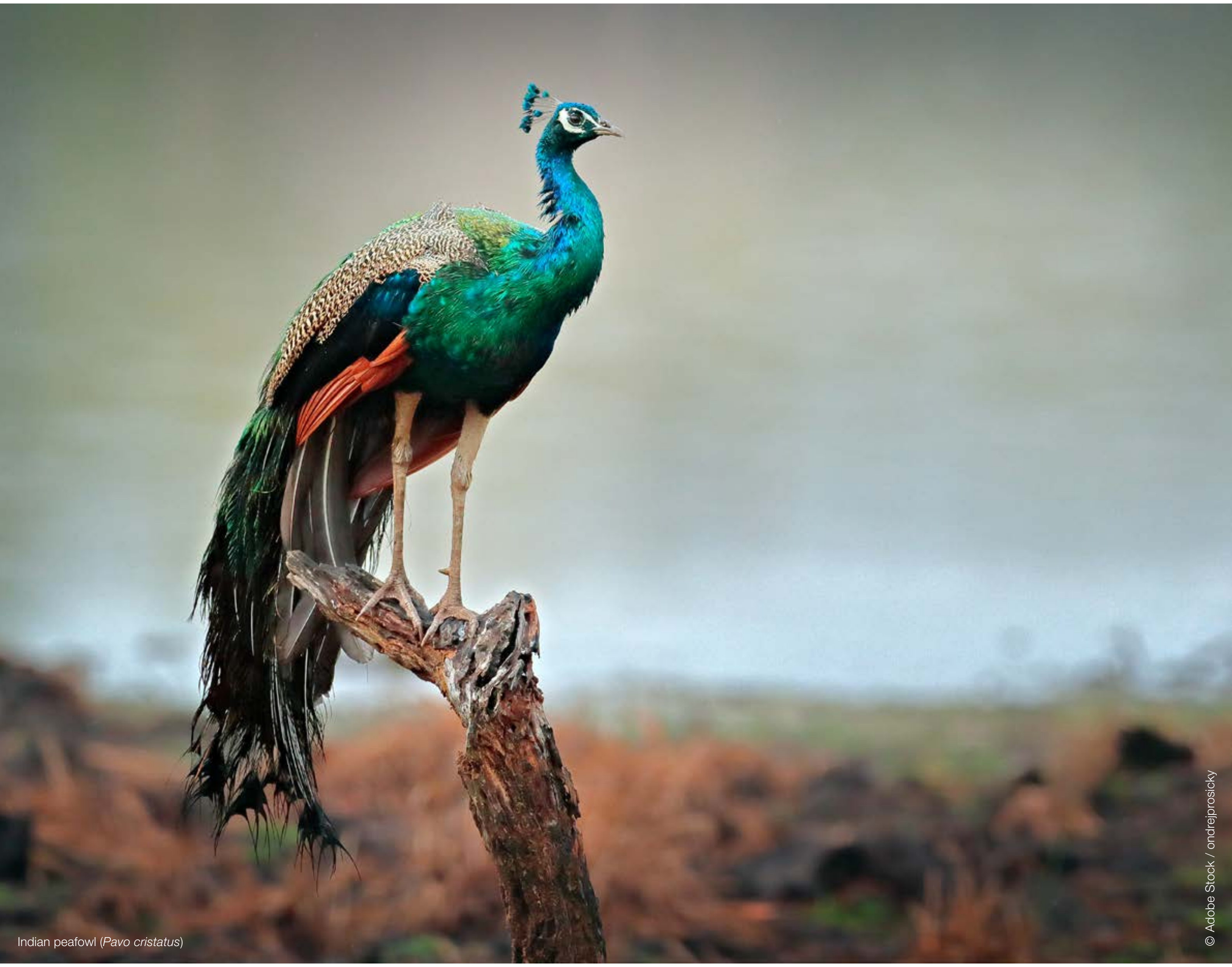
Low quantities of specimens for export relative to population numbers or a one-off export are likely to be low risk (although this will also depend on numbers, population numbers and whether this could be the start of a new trade trend). This needs to be considered in relation to the whole harvest for domestic use and export as well as mortality rates and other sources of threats. Even if the export makes up a very small percentage of harvest or is not the primary purpose of the harvest, if the whole harvest is detrimental, then the export should be considered to be detrimental too. The NDF process may have the benefit of improving harvest management overall by flagging the issues with the Management Authority.

A further consideration is the mortality rate associated with the trade described in more detail under section 4.2.1.

4. CONDUCTING A SIMPLIFIED ASSESSMENT FOR BIRDS

This section concerns the application of the Simplified Assessment to birds. The following sections provide more detail on how to address common issues associated with making NDFs for birds, alongside the rationale for the scoring criteria outlined in Table 8B. It has been arranged to follow the compilation of information according to the NDF process outlined in the module 2 section 5. The Simplified Assessment template can be found in module 13.

In some cases, conducting a Simplified Assessment alone will not be sufficient due to the complexity of some bird trade situations – for example, cases considering migratory species and transboundary populations of birds. See additional guidance on the application of the NDF process for migratory species and transboundary populations (module 6).



Indian peafowl (*Pavo cristatus*)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Fischer's lovebird (*Agapornis fischeri*)

4.1 ANNUAL HARVEST LEVEL

Guidance on the assessment and scoring of harvest level for the Simplified Assessment is included in module 2 section 5.2.1. In the assessment of harvest level, three factors are important:

i) harvest for export including mortality in processing or post-harvest,

ii) harvest for domestic use at the site and in other parts of the species' range at the national level, as well as in relation to the entire species' range,

iii) non-harvest related mortality / loss (natural mortality, climate change, land conversion etc.).

In relation to birds, further detail on harvest-related mortality rates is provided under section 5.2.2.

Consideration of data on recent trends in harvest level can also be relevant here. In particular, if there is any evidence to suggest there has been a sharp increase in either global and/or national trade. If a sharp increase is detected in either, this should be considered as indicating an uptick in demand and scored an additional point. Where annual harvest level cannot be characterised and is considered 'Unknown' a score of 3 should be attributed.

4.2 AREA OF DISTRIBUTION

Module 2 section 5.4 details how to score area of distribution and describes the several ways to determine a species' geographic distribution, including:

i) area of occupancy,

ii) area of habitat,

iii) extent of occurrence.

Area of occupancy (AOO) estimates for birds are rare and where information is available this is regionally biased and is largely only available for well-studied species. Where these are available for bird species these should be prioritised as the primary source of information for assessment. The robustness of an area of occupancy estimate is impacted by the following factors: the quality of the data, method of derivation, and year of estimate. Each of these should be noted and considered as part of the assessment.

Where genetically distinct populations are known, AOO should ideally be considered at the sub-population scale, and in the absence of this information given due consideration in the weighting against the other criteria in the NDF report.

4.2.1 USING AREA OF HABITAT MAPS FOR BIRDS

In lieu of AOO estimates for birds, global-scale Area of Habitat (AOH) maps have been produced for c.95% of bird species, both non-migratory and migratory. The repository for the AOH data tables (including estimates in km²) and maps, can be downloaded from the Dryad Open Access Repository. These estimates can also be clipped to the national level (*see* National area of occupancy). Further, for migratory species a series of sub-maps have been created for breeding, non-breeding, resident, and uncertain areas of occupancy. An R script is available to combine these to create one AOH map and area in km². It is important to appropriately caveat the use of AOH given that for exploited species and those with strict habitat specificity (**5**) they will likely overestimate the potential area.

4.3 LIFE HISTORY TRAITS

This section concerns the intrinsic vulnerability of a species or population based on life history traits (including reproductive capacity) and biological characteristics (i.e., niche breadth). The biological attributes or life history traits of an organism determine in part to what extent it can sustain a level of wild-take or harvest. Understanding the basic biology of a species, and its vulnerability to harvest, helps you to assess the degree of risk.

Module 1 section 3.3.1 provides more detail on the life history concept and module 2 section 5.5 describes how to score life history.

Sources of information on life history traits for birds include the Amniote Life-History Database, Birds of the World (subscription version), alongside others, as described in module 2.

In instances where these traits have not been described, it may be possible to estimate them using proxies, though this should be noted and caveated appropriately see module 2 section 5.7. One such proxy is generation length.

4.3.1 USING GENERATION LENGTH AS A PROXY FOR LIFE-HISTORY TRAITS IN BIRDS

Bird et al. (2020) systematically estimated generation lengths of birds based on published life-history and trait data for all species, using linear models to estimate generation lengths where life-history data was unavailable. Generation length ranges from 1.42 to 27.87 years, with most bird species having generation lengths of <3.33 years (61% of all birds). For CITES-listed birds, generation length ranges between c.1.5 years to c.27 years, with a median generation length of c.4.2 years. There is a lot of interspecific variation at the Family level. For example, within the listed Cacatuidae (Cockatoos) the range in generation length c.6.8 years (*Callocephalon fimibriatum*) to 27.2 years (*Cacatua galerita*).

To score the criteria 'life history' for the primary evaluation consult the publicly available generation lengths (GenLength, supplementary table 4). The following table uses this rationale to determine whether the life-history is considered 'fast', 'medium' or 'slow' based on the IUCN Red List Criterion A relating to population size reduction. Using this interpretation would categorise species with generation lengths of under 3.33 years as having 'fast' life histories based on the period of 3 generations <10 years. This includes the Trochilidae (Hummingbirds) and several Families of the Passeriformes (Songbirds).

Table 8A Scoring bird life history rates using generation length as a proxy and how this can be scored in a Simplified Assessment for birds.

QUALIFIER	FAST	MEDIUM	SLOW
Generation Length	< 3 years	3-4 years	> 4 years
Simplified Assessment score	1	2	3

Sulphur-crested cockatoo (*Cacatua galerita*)

Straw-headed bulbul (*Pycnonotus zeylanicus*)

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4.4 CONSERVATION STATUS

Module 2 section 5.8 details how to score conservation status. It may be that there are conflicting status assessments; a national or sub-national assessment may be more relevant to assessing the impact of harvest than a global conservation status assessment, although the latter can also give a useful complementary indication of risk.

4.4.1 USING GLOBAL CONSERVATION STATUS ASSESSMENTS FOR BIRDS

Where a national or sub-national assessment is unavailable, the global conservation status for birds is comprehensively assessed and recorded in the IUCN Red List of Threatened Species.

To score this criterion using the IUCN Red List assessment, check the threat status of the species under consideration on the IUCN Red List website, for any species classified as Vulnerable, Endangered or Critically Endangered score the species '1'. Further, in situations where the species is assessed Data Deficient or is Not Evaluated score '1'.

4.5 ILLEGAL TRADE

Illegal wildlife trade can have a significant impact on species persistence. This can be assessed using a qualitative approach – firstly by looking for evidence to determine whether illegal trade exists and, secondly, by estimating the suspected magnitude of illegal trade in general terms (e.g., low, medium, high). Module 2 section 5.9 details how to score illegal trade.

If there is any evidence at the national level that illegal trade is occurring, even where evidence is patchy or the trade is considered minimal, this factor should be accounted for in the NDF process. If national data is not available, datasets which record seizures of illegally traded wildlife include i) CITES Illegal Trade Database (available exclusively to governmental representatives of CITES Parties) ii) the TRAFFIC International Wildlife Trade Portal (open access) and iii) LEMIS, the Law Enforcement Management Information System, from the United States Fish and Wildlife Services) (closed, accessed by via a Freedom of Information Act request).

BOX B Example Simplified Assessment for the Mealy Amazon (*Amazona farinosa*) in Suriname.

The full case study including sections providing the justification for the simplified assessment score is included within module 14 on case studies.

Species name	Mealy Amazon – *Amazona farinosa*
Range state name	Suriname
Report compiled by	Chair of the Scientific Authority Suriname
Date compiled	5 December 2023

SECTION 1: SUMMARY
Please provide a short overview (1-2 paragraphs) of the trade in this species in the country of interest.
In terms of international trade, Suriname is a significant exporter of live *Amazona farinosa*. Suriname's wildlife trade sector is contributing to its economy, especially bird species, including *A. farinosa*, account for a significant portion of its exports. This species is widespread with a continuous distribution at the national level and is harvested from the wild for the export with the following purposes: commercial trade, breeding in captivity, zoo and scientific. From 2013 to 2020, live specimens were exported with a mean of 181 individuals each year. Since 2022 till now, Suriname has implemented a zero-export quota for this species after the publication regarding this matter by the CITES Secretariat in 2022.

SECTION 2: SIMPLIFIED ASSESSMENT SCORE				
	NUMBER OF POINTS			SCORE
Criteria	1	2	3	
Annual Harvest level	Low	Medium	High/ Unknown	1
Area of distribution	Large	Medium	Small / Unknown	1
Life-history	Fast	Medium	Slow / Unknown	2
Conservation or threat status	**If the status of the species is** threatened or Unknown, give a **max score of 1 point**.			0
Illegal trade	If levels of illegal trade are inferred by reference to seizure data, they should be included under "Annual harvest level". If illegal trade is known to be occurring, but levels are unknown give a **max score of 1 point**.			1
Final Score and justification	(If score lower than five (5) = **trade is non-detrimental** (record the score and justification in the worksheet provided). If the Simplified NDF score is equal to or greater than five (5) then a **Comprehensive Assessment should be undertaken**.			5

5. CONDUCTING A COMPREHENSIVE ASSESSMENT

5.1 PART 1: RISK EVALUATION

If after a Simplified Assessment has been completed and it is not possible to establish non-detriment, then a more detailed evaluation – called the Comprehensive Assessment - should be completed. Module 2 section 6 provides generic guidance on the application of the Comprehensive Assessment. This includes outlining a number of key factors to help determine the level of risk and therefore the data requirements needed to determine with confidence that trade is not detrimental (see module 2 Fig. 2D). These include,

- Species' biology and life-history characteristics
- Species' range (historical and current) and trends
- Population structure, status and trends
- Conservation status
- Threats

The following guidance considers these factors with respect to birds and seeks to provide solutions to address issues associated with data scarcity. It is intended as a guide to the criteria that could be considered in the process and not intended as an exhaustive list. The importance or relevance of any one of these criteria will vary across bird species and regions. The main text provides detail of potential data sources and their interpretation.

Sword-billed hummingbird (*Ensifera ensifera*)

Oriental pied hornbill (*Anthracoceros albirostris*)

5.1.1 SPECIES BIOLOGY AND LIFE HISTORY CHARACTERISTICS

Module 2 section 5.5 describes in general terms the biological attributes or life history traits which determine to what extent it can sustain a level of wild-take or harvest, and therefore the degree of risk associated with trade.

There are many life history traits that could be considered, however, in the case of birds, the criteria concerning mean body size, minimum body size at maturity and catch-per unit effort are considered less effective in supporting a conclusion for non-detriment. Therefore, detail on their assessment has not been included instead, the focus is placed on habitat specificity, food specificity and reproductive capacity, important aspects in determining the degree to which a species is specialist and therefore at heightened risk from harvest, when considered in conjunction with the other key factors.

5.1.1.1 HABITAT SPECIFICITY

Habitat specificity describes the relationship between individual species and spatial elements within the landscape (6), such as breeding habitat or nesting sites. The degree to which a species is a habitat specialist has a bearing on the level of risk associated with harvest. A habitat specialist will be at higher risk than a generalist due to its reliance on specific habitat features being present in its environment: i.e., a specific species of tree. The species' degree of habitat specificity will also determine to some extent how it is distributed throughout the area of distribution.

Birds with specific habitat requirements may be less numerous than suspected and be less widely distributed in their area of occupancy than might be assumed from simply calculating areas on a map. Such birds may be particularly at risk from habitat degradation if it affects their particular needs. Examples include hole-nesting birds such as parrots (Psittaciformes) and hornbills (Bucerotidae), which may be dependent on suitable nesting sites, often large dead trees with hollow limbs or suitable cavities in their trunks.

The Helmeted Hornbill (*Rhinoplax vigil*) is an extreme example. It requires a natural cavity in a large, living tree, and, because it is unable to cling vertically to a trunk, the cavity must have a ledge near the nest opening where the male can perch. Like almost all hornbills the male seals the female inside the nest cavity and feeds her until the young have fledged, so that the loss of the male during the nesting period dooms the female and young to death by starvation.

Data on these factors is available on the Birds of the World (subscription), as well as in field guides and academic literature, among other sources.

5.1.1.2 FOOD SPECIFICITY

Food or diet specificity relates to the range of food preferences of a species and can bring associated risks/vulnerability to harvesting. For example, frugivores which may congregate at local feeding sites (i.e. fruiting tree) may be more vulnerable to the risk of overcollecting, as these sites can be focus points for hunters and trappers.

CITES-listed examples include frugivores (fruit-eaters) such as parrots (Psittaciformes), fruit-eating pigeons (e.g., *Ducula mindorensis*), hornbills (Bucerotidae) and turacos (*Tauraco* spp.), and nectarivores (nectar-feeders) such as hummingbirds (Trochilidae), some of which may specialize in certain flowering plant species (e.g., the Sword-billed Hummingbird (*Ensifera ensifera*), which specializes in long, tubular flowers such as *Passiflora mixta*). The Helmeted Hornbill (*Rhinoplax vigil*), a species with a wide home range that is a specialist on certain fig species, is particularly vulnerable to hunters who wait for the birds at their fruiting trees.

Data on these factors is available on the Birds of the World (Subscription), as well as in field guides and academic literature, among other sources.

5.1.1.3 MATING SYSTEMS

Depending on the species, birds may be monogamous (males and females form pairs and both sexes may assist in nest-building or rearing young), polygynous (one male may mate with many females, and males often take no part in nest-building or rearing young), or some variant of these systems.

Polygynous birds listed on CITES include hummingbirds (Trochilidae) and almost all birds of paradise (Paradisaeidae). Sexually mature adult males of these birds are often brightly coloured or have ornamental plumage, and may be specifically sought in trade. However, males of these birds may take years to acquire adult plumage (e.g., 5-6 years for the Greater Bird of Paradise (*Paradisaea apoda*)), and those that do may be responsible for most of the matings in the population. Selective harvest of adult males in these species may have a greater effect on the genetic health of the population than removing a similar number of males from monogamous species.

5.1.1.4 POPULATION STRUCTURE

Population structure is the makeup or composition of individuals in a population. Structure in populations can be characterized either by their demographic parameters (such as gender, age, fertility, mortality, and migration), or genetic markers (uniparental DNA, genomic sequences, gene products) or both. For migratory birds taking into account wintering, breeding and resident populations is relevant.

The White-rumped shama (*Copsychus malabaricus*) is widespread species distributed from India to Indonesia and encompasses many subspecies (between 13 to 17 subspecies) and subpopulations. Recent studies demonstrated distinct subpopulations confined to small islands, such as the western Sumatran islands and eastern Java population. The risk associated with harvest within these subpopulations is higher and a precautionary approach should be taken when evaluating the proposed harvest from those regions.

5.1.1.5 REPRODUCTIVE CAPACITY

Factors characterising reproductive capacity includes, number of offspring per reproductive event (i.e. clutch size), and frequency of reproduction.

Furthermore, when considering harvest impacts and management in birds the mating system and breeding season are important factors. Information on the breeding season can be used to assess/ guide management measures.

Data on these factors is available from the Amniote Life History Database (Open access) and Birds of the World (Subscription), among other sources.

5.1.2 SPECIES RANGE (HISTORICAL AND CURRENT) AND TRENDS

Module 2 Section 6.3 describes in general terms the importance of considering a species' range (historical and current) alongside trends in range over time (e.g., is stable, contracting, expanding. Further detail on considering this factor for migratory species is included under module 6 on migratory species and transboundary populations.

Distribution maps are compiled by BirdLife International and detailing the species' current global range, areas where species are known or thought to have gone extinct are illustrated for some species where data exist. eBird provides maps depicting frequency of occurrence based on eBird observational data.

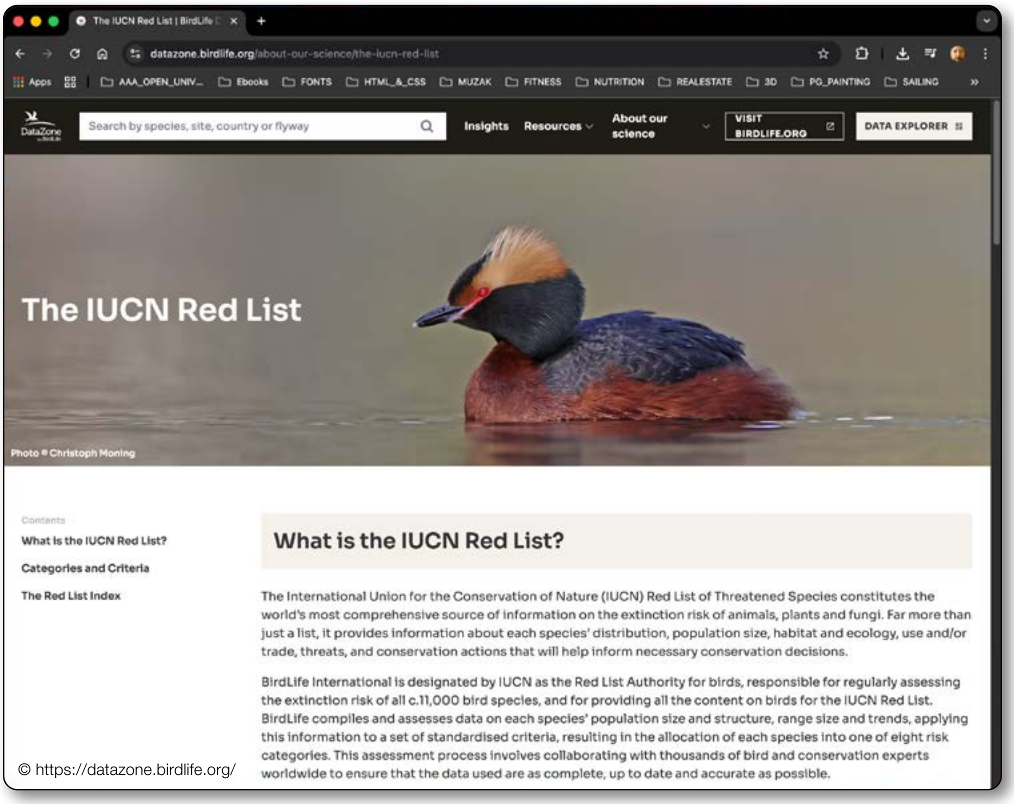
5.1.2.1 NUMBER OF LOCATIONS OR SUBPOPULATIONS

As a rule, species which are dispersed across several locations are less vulnerable to extinction, while those species with a low number of locations (typically five or fewer/ island endemics) are more prone to effects of human activities, such as harvest or stochastic events. The target of a single subpopulation for harvest can cause long-term declines in abundance. Similarly, severely fragmented species with geographically isolated subpopulations are more vulnerable due to a lack of immigrants and genetic exchange as well as greater vulnerability of small, isolated populations to overexploitation and to habitat degradation and loss.

The CITES Glossary defines subpopulations as: '*A geographically or otherwise distinct group which has little exchange with other groups in the population*.'

For birds, there are many species with subpopulations and recognised subspecies. In the absence of information on monitored locations, the Area of Occupancy *or* Area of Habitat maps could support understanding the pattern of distribution and the potential number of locations or subpopulations.

Bird subpopulations are often reflected taxonomically, by the attribution of subspecies status, and are increasingly being determined by advances in population genomics. Although subspecies are not generally listed on the CITES Appendices, understanding whether the harvest targets a subpopulation/ subspecies can be an important part of assessing risk of trade impact. All recognised subspecies are listed in the Handbook of the Birds of the World and BirdLife Checklist.



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5.1.2.2 POPULATION STRUCTURE, STATUS AND TRENDS

Population structure (including number/ abundance, density, sex, and age) is an important factor in the assessment of risk. For birds, unlike other taxa, population declines tend to be followed by further declines, with evidence that shows that full recovery of populations experiencing declines (of > 30%) is slower than in other taxa.(**11**) Data on population trends for birds at the global scale are assessed and published in the IUCN Red List for Birds, where current population trends are assessed as stable, increasing, decreasing or unknown. eBird also hosts status and trends maps for a limited number of species. Module 2 section 6.4 describes the importance of assessing population structure, status, and trends in the harvested area, nationally and internationally.

5.1.2.3 NUMBER OF MATURE INDIVIDUALS

Population estimates for birds (based on mature individuals) span six orders of magnitude (from below 10 to over 47 million individuals), with 73% of threatened birds (1,088 species) estimated to have fewer than 10,000 individuals.

IUCN Red List assessments at the national, regional and global level can be a useful resource containing estimates of mature individuals. National Red List processes can be accessed on the National Red List website, though these have only been carried out in a few countries globally. Where estimates for national populations are unavailable, the IUCN Red List for birds provides global estimates of species populations size measured as the number of mature individuals.

Applying IUCN Red List criterion C can support assessment of trade impact and potential detriment based on the number of mature individuals. IUCN criterion C states that population sizes <10,000 mature individuals globally or nationally, would indicate the species could be threatened and would trigger further considerations.

5.1.2.4 POPULATION ABUNDANCE AND MONITORING

Birds are by far the most monitored species group globally. There are a growing number of records being contributed by citizen scientists (7) with the data being increasingly integrated into population analyses (8, 9). If estimates are available, this data should be prioritised. Population abundance data may be available in the form of national institution monitoring records, in published datasets, academic journals, and as part of civil society data holdings.

In the absence of national monitoring records, referenced data on population abundances have been compiled by the Living Planet Index for 17,576 populations (national and/or subnational populations) for 1,802 bird species. Ranked by region, the greatest degree of abundance data is available from studies in Oceania (n=7,260), Europe (n=2,050), North America (N=2,769) and Latin America and Caribbean (n=1,051). These data can be downloaded through the Living Planet Data Portal. The data recorded includes a time series of population abundance (1950-2020, with entries by year for which data are available), country, location (in country), unit (i.e., individuals), method, whether the species is migratory, and citation for the original study. In the absence of trends in abundance at the individual population or national level, assessments of trends in global populations have been made for many species. Data on population trends for birds at the global scale are, where available, compiled, synthesised and published by BirdLife International for the IUCN Red List of Birds, where overall global trends are assessed as stable, increasing, decreasing or unknown. These assessments may help inform the preparations of NDFs. eBird also hosts status and trends maps for a limited number of species.

5.1.2.5 AGE AND SEX RATIOS

Understanding population age structure and sex ratios is important, as harvest of particular individuals may have a different impact on the population. For birds, it is important to note evidence that female-male adult sex ratios in wild bird populations are regularly skewed towards higher numbers of males, though offspring sex ratio is largely equal. The main driver of this is higher female mortality rates. Therefore, the harvest of reproductive age females may have a greater impact on population structure than would be expected if the female-male adult sex ratio were equal.

5.1.3 CONSERVATION STATUS

See section 4.4 of this module and module 2 section 6.1.4.

5.1.3.1 THREATS / OTHER PRESSURES

Module 2 section 6.1.5 describes the importance of assessing additional threats or pressures a species or population is subject regarding its ability to sustain the proposed levels of harvest.

Red List assessments at the national, regional and global level can be a useful resource for accessing a threat assessment. National Red List processes can be accessed on the National Red List website, though these have only been carried out in a few countries globally.

Examples of threats to bird species that could prove relevant include but are not limited to, direct persecution of vultures and other birds of prey, the impact of invasive species on island birds and pathogens such as avian influenza and avian malaria.

The Hooded vulture (*Necrosyrtes monachus*) was formerly one of the most widespread vultures in sub-saharan Africa. It has been assessed as Critically Endangered on the IUCN Red List. It is suspected that this species is currently undergoing an extremely rapid population reduction owing to indiscriminate poisoning, domestic and regional trade for traditional medicine, hunting for food,

Hooded vulture (*Necrosyrtes monachus*)

persecution and electrocution, as well as habitat loss and degradation. Very rapid reductions have been estimated for the global population based on road transect data from West Africa, Cameroon, Botswana and Kenya. However, the West Africa data only covers the period preceding 2004, when the rates of reduction there were slower than central and East Africa. Since then, very rapid reductions and local extirpations have been reported from many West African countries to the extent that declines here are suspected to have exceeded the very rapid reductions. The extent of these declines and likely ongoing threat posed by widespread persecution and harvest would likely heavily influence any NDF assessment.

Other sources of information on threats include the Birdlife Factsheets and locally specific evidence e.g. from national researchers and national wildlife and agricultural agencies. Local ecological knowledge can also provide valuable insights into the threats posed to bird populations.

5.2 PART 2: IMPACTS AND MANAGEMENT EVALUATION

5.2.1 HARVEST IMPACTS

Where an optimum harvest level is exceeded, a population will begin to decline and harvest becomes unsustainable. For birds, evidence suggests that for some species there is a fine line between capture volumes being sustainable and unsustainable (**10**). Module 2 section 6.2.1 provides general guidance on harvest impacts.

There is not a robust method to assess optimum harvest levels and infer the potential trade impact for birds. Therefore, assessors must weigh the evidence available on annual harvest level data in relation to those factors described under section 4.1 on risk evaluation. The focus should be placed on achieving non-detriment through continuous monitoring of the impact of harvesting and other management interventions.

When considering the impacts of harvesting all effective harvest mortality/loss from the wild population should be considered when determining sustainability (e.g., from local consumption of meat to international trade); this may include landed by-catch, post discard or release mortality, as well as mortality or damage to individual specimens that are discarded at site.

5.2.2 HARVEST-RELATED MORTALITY

It is important to note that estimated harvest levels for live trade must consider pre-export mortalities. Data on harvest-related mortality rates is scarce, and some factors are likely to be highly context specific (e.g., species, country, regulation). Evidence on the mortality rates of parrots removed from the wild have been estimated to be as high as 75% prior to entering commercial trade.

To assess mortality rates related to harvest information on two stages of this trade has supported assessment of the rates associated with trade in African grey parrots (*Psittacus erithacus*) in Nigeria (**11**). First, the minimum number of nestlings that died between removal from the nest and selling to a trader, and discussion with those involved in the trade to provide an estimate of the proportion of dead birds arriving to market. By recording the number of birds trapped against the number of birds surviving to market across the two stages a mortality rate can be estimated. In the case of the African grey parrot example, using data from these two steps a mortality rate at this stage was estimated at 60-66% demonstrating the potentially high mortality rates associated with trade. Other factors that are useful in estimating mortality rates include mortality, i) at capture ii) during confinement by trappers, iii) during transport and quarantine.

5.2.3 TRADE IMPACTS

Module 2 section 6.2.2 describes the relevance of assessing trade impacts (relating to legal and illegal trade) in the assessment of non-detriment, including relevant data sources.

5.2.4 POPULATION MONITORING

Population monitoring is fundamental to understanding the impact of harvest, for a general overview see module 2 section 6.2.3. Further detail on monitoring approaches for birds with referenced examples is available in Table 8B.

Table 8B Survey methods for field monitoring of birds. Adapted from Irham (2018) (12).

METHOD	DESCRIPTION	SUITABLE ECOSYSTEMS	COMPLEXITY	COMMUNITIES / SPECIES
General bird census and survey techniques	General guidance to the various methods for bird census and survey techniques	All	From simple to complex	All species
				All species
				Raptors
				Parrots
				All species
Area search	Records a list of species observed in a given area/ or distance taken to record a pre-specified number of observations. It can be used to estimate species richness and relative abundance. This method can be used to inform more systematic quantitative monitoring (i.e., point count or distance methods).	All	Simple to conduct, provides a baseline assessment only. When combine with "10 species list", it could provide the frequency of occurrence that can reflect the abundance of species	All species
				All species
Point count	Records birds species and their number at a specified observation area. The observation area is determined as the radius around a specified point (i.e., 25m-50m). Records birds observed (detected) in a specified time period and place. These detections can be grouped by type of observation i.e., primary, supplemental, flyover etc. It can be used to estimate the actual population figure, relative abundance, population trend (if carried out periodically by time/ season). This can be combined with vegetation plots to determine its structure and composition. This information is useful in ecological modelling of bird communities/ habitat associations.	Suitable for high vegetation cover ecosystems i.e. forest/ uneven ground	This can be performed randomly or systematically i.e. according to a pre-determined system. Error rate can be higher than other methods given the potential for double-counting and errors in estimating distance.	Terrestrial birds
				White-fronted Parrot
				All species
				Communal roosting birds

Table 8B Survey methods for field monitoring of birds. Adapted from Irham (2018) (continued) (12).

METHOD	DESCRIPTION	SUITABLE ECOSYSTEMS	COMPLEXITY	COMMUNITIES / SPECIES
Line transect / Distance sampling / Point count distance sampling	Line surveys are conducted by walking continuously along a predetermined route recording species observed (seen/ heard) either side of the path. It Is used to estimate abundance and density of birds in a location.	Limited to ecosystems in which a relatively accessible pathway can be established, so is less suitable for dense vegetation/ undulating landscapes.	It Is a relatively fast method for covering a survey area, and has a lower error rate than a point survey. Drawbacks include, difficulties in assessing distance between the observer and bird, which is important for estimating density, and potential for birds to take flight on the observers approach.	Straw-head Bulbul
				Migratory and breeding birds (Passerine)
				Red-Knobbed Hornbill
				Raptors
				Blue-eye Cockatoo
				All species
				Tanimbar corella and blue-streaked lory
				White-cockatoo, chattering lory, violet-eared lory
				Montane birds
Citizen science	Avian survey conducted voluntarily by communities without specific survey techniques.	All	Data on the avian distribution and occurrence can be derived from citizen science.	All species
				All species
				All species
Trade monitoring survey	Based on the circulation of birds in the trade, population values are measured on the number of birds harvested from the wild and available for sale. If birds are frequently recorded in the surveys, then the assumption is the species population is still within its carrying capacity. If supply declines then it can be inferred the population is in decline in the wild.	Markets, Online markets, and media reports	As an indirect method it is less accurate than direct observation methods because it relies on trade dynamics (i.e. value and trapper effort). It is difficult to determine the provenance of specimens.	All species
				All species
				All species

5.2.5 MANAGEMENT MEASURES IN PLACE/PROPOSED, INCLUDING ADAPTIVE MANAGEMENT

Module 1 section 9 provides advice on adaptive management and conditional NDFs, including on pros and cons relating to different types of conditional NDFs. Module 2 section 6.2.4 sets out key questions that may be considered in the review of management measures in place/ proposed designed to ensure harvest and trade are non-detrimental and that risks identified are mitigated.

If detriment is suspected management interventions should be put into action. If a need has been identified for the implementation or revision of management procedures, but these are yet to be enacted, Parties should describe planned monitoring actions and management interventions, and how related results should be interpreted in the Non-Detriment Finding.

Bird Conservation - evidence for the effects of interventions' provides a comprehensive assessment of the types and effects of different interventions on bird conservation. Within that publication section 8, 'On Biological Resource Use' examines management interventions designed to address the impact of exploitation specifically. A summary of some reviewed interventions is given in the box below. Boxes C and D provide examples of species management that relates to adaptive management.

5.2.5.1 SUPPORT SUSTAINABLE COMMUNITY STEWARDSHIP OF EXPLOITED BIRDS

If a community relies on exploiting bird populations, then they may welcome support to exploit the population sustainably, to ensure it persists and can be exploited in the future. However, it might not be clear how best to do this and so programmes that assist local community stewardship that manages sustainable harvest may be useful in reducing over-exploitation. Examples exist where wild bird populations increased following interventions linked to sustainable, bird-based livelihoods.

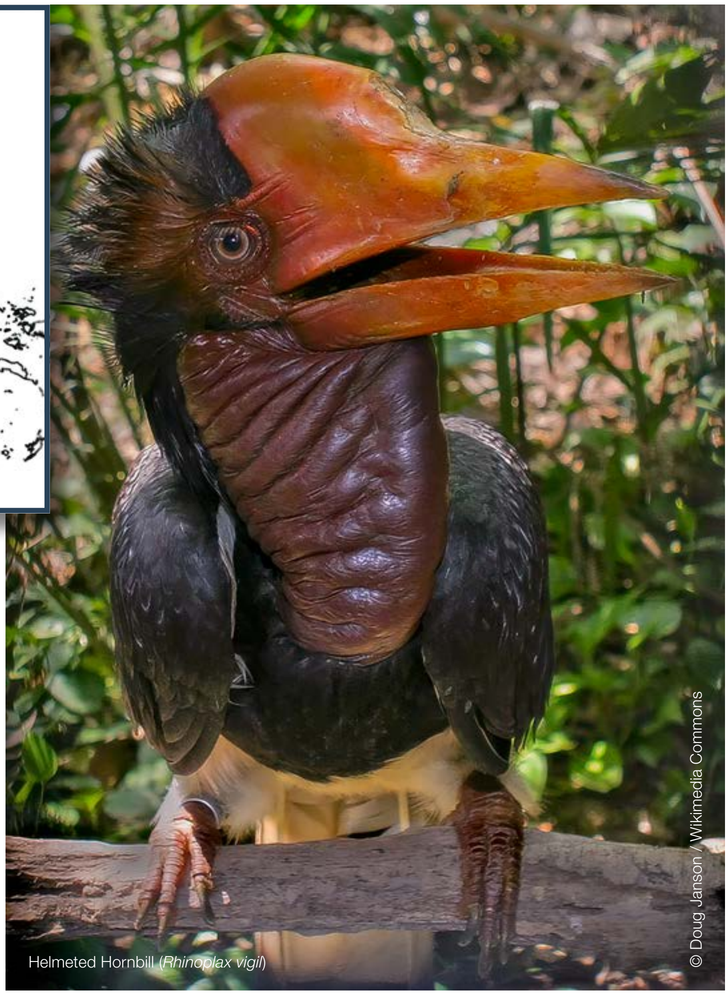
5.2.5.2 MARK EGGS TO REDUCE THEIR APPEAL TO COLLECTORS

In some cases, eggs might be the focus for exploitation that involves removing eggs from nests. This practice can be extremely damaging for some slow-reproducing species and is made more so by the greater value of, and demand for, rarer species' eggs. This has led to the prohibition of egg collecting in many countries. Marking eggs in a non-damaging way may reduce the desirability of eggs because collectors are interested in eggs for their aesthetic appeal.

5.2.5.3 RELOCATE NESTLINGS TO REDUCE POACHING

Nestlings are also particularly vulnerable to exploitation, as they cannot fly and are confined to nests. This is especially problematic with species such as parrots targeted for the pet trade, as nestlings can be easily raised in captivity and sold on. Moving nestlings into safer areas may reduce the threat of exploitation but is likely to be expensive or time-consuming. In one case study, yellow-shouldered amazons *Amazona barbadensis* chicks were taken from nests overnight and then returned in the morning, something that is only likely to be possible for species under very intense management.

Helmeted Hornbill (*Rhinoplax vigil*)



Helmeted Hornbill (*Rhinoplax vigil*)

BOX C Preventing illegal take, killing and trade of Helmeted Hornbill.

Helmeted Hornbill (*Rhinoplax vigil*), a species restricted to South-East Asia, is hunted throughout its range for its unique solid casque, which is used to make ornamental carvings. International trade in parts, products or specimens of this species for primarily commercial purposes has been illegal under CITES since 1975, while national legislation prohibits hunting and trade in most range states. However, high demand continues to drive unsustainable illegal take, killing and trade. A surge in trade resulted in the species being re-classified in 2015 as Critically Endangered on the IUCN Red List. In response, BirdLife and others developed a range-wide conservation strategy and action Plan for conservation of the species. The plan has been widely adopted across the range and many actions are already underway. These include: monitoring of hornbill populations and poaching activity; identification of the most important sites of hornbills; public engagement and awareness raising; disruption of trade routes with seizures at transit points; improved law enforcement at poaching sites; and working with indigenous peoples and local communities to appointment them as guardians for their local hornbill populations. This approach has been successful in securing several high priority sites across Indonesia, Malaysia, Myanmar and Thailand, with these countries' sites are acting as 'safe havens' where the hornbills breed and are shielded from illegal take.

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BOX D Local self-regulation can be more effective at ensuring sustainable resource use than an outright ban.

An outright ban, though at times necessary, is not always the most effective or desirable mechanism for dealing with unsustainable levels of hunting. For example, at Lake Chilwa Important Bird Area (IBA) in Malawi, where wildfowl hunting is an important part of local livelihoods, hunting clubs have successfully implemented measures to control hunting. They have also created a framework of fines that are enforced locally and contribute to community projects. This system of self-regulation is working well and, crucially, is respected by the local community.

Lake Chilwa Important Bird Area (IBA), a shallow lake of about 700 km² bordered by swamps and seasonally flooded grassland, is very rich in fish and supports the livelihoods of about 60,000 people. It meets IBA criteria mainly because of its large congregations of waterfowl. Hunting these birds has long been part of local livelihoods, but large-scale commercial exploitation started in 1996, when the lake dried up and the fishery collapsed. This ability to shift between resources is an important dimension of the resilience of people dependent on natural resources and living in an uncertain environment. However, a survey in 1998/99 estimated that over a million waterfowl had been taken following the drying of the lake, a level that appeared unsustainable.

The response of BirdLife Partner the Wildlife and Environmental Society of Malawi (WESM) was not, as might have been expected, to seek a ban on bird hunting, but to find a way to give communities the responsibility and capacity to manage their resource sustainably. A revision of Malawi's Wildlife Act allows Community Conserved Areas to be established. Under the management of WESM's Zomba branch, 20 hunting clubs have been created around the lake, with representatives elected to an umbrella body. WESM worked with the clubs and local government to reach an agreement on measures such as a closed season, no-hunting zones, and licensing and bag-limits. These have been written into a by-law, with a framework of fines and measures for dealing with infractions. Importantly, the whole process operates at the local level— traditional chiefs deal with offenders, and fines contribute to community projects like repairing boreholes and improving school buildings.

So far, the system is working well, and the regulations seem to be respected. The hunting clubs are now looking at ways of diversifying their livelihoods. They are earning extra income by guiding tourists and, with WESM's help, have developed a tourism business plan. The hunters also carry out bird censuses four times a year, in January, April, July and October.

5.3 ECOSYSTEM IMPACTS EVALUATION (TO BE UNDERTAKEN IN HIGHER RISK SITUATIONS)

Where higher risk is assessed through the Comprehensive Assessment, evaluation of the impact of harvesting of the species for trade in its role in the ecosystem in which it occurs becomes relevant (see module 1 section 6 and module 2 section 6.2.5).

Birds have the most diverse range of ecological functions of all vertebrates. A synthesis of the ecological functions that birds provide is included below. Ecological functions are categorised as representing one of three major linkages: genetic, resource and process. Birds encompass all three. Habitat loss affects all bird functional groups, with large frugivores (seed dispersers) particularly vulnerable to exploitation.

Table 8C Examples of the roles of bird species in their ecosystems.

FUNCTION	DESCRIPTION	EXAMPLE
Genetic transfer	Responsible for the transfer of genetic material (i.e. by pollination or seed dispersal).	In the Philippines, the loss of seed dispersers, such as Palawan hornbills (*Anthracoceros marchei*), can result in most seeds being deposited under the parent tree and consumed by seed predators.
Resource cycling	Responsible for mineral and nutrient transport and deposit (i.e. through their guano resulting in crop fertilisation).	The elimination of Aleutian seabirds, such as tufted puffins *Fratercula cirrhata*, by introduced foxes can lead to reduced nutrient deposition, triggering a shift from grassland to maritime tundra.
Linking trophic process	Responsible for connecting habitats through their role as primary or secondary consumers across habitats (i.e., by insect control or scavenging).	Disappearance of scavenging Indian long-billed vultures (*Gyps indicus*) can cause increases in the number of rotting carcasses and of attending mammalian scavengers.
Linking non-trophic process	Responsible for facilitating essential processes in the physical environment (I.e. ecosystem engineers).	Reduced number of three-toed woodpeckers (*Picoides tridactylus*) in forest fragments can cause increases in spruce bark beetles (*Dendroctonus and Ips* spp.) and decreases in nesting holes used by other species.

5.4 ADDITIONAL CONSIDERATIONS FOR ASSESSING DETRIMENT FOR CAPTIVE-BRED BIRDS: SOURCE CODES 'C', 'D' AND 'F'

For some bird species, international trade in birds involves a significant proportion of captive bred specimens. For assessing non-detriment in captive bred species, performing an NDF of the initial breeding stock should be sufficient in closed-loop systems, with additional NDFs required when additional wild-caught individuals are harvested to maintain production. Module 2 section 4.7 provides generic guidance. Considerations on the definition and treatment of captive bred specimens are outlined in Res. Conf. 10.16 (Rev. CoP19). Box E is included to provide additional aspects to consider in the assessment of detriment relating to captive bred specimens.

BOX E Case study: UK Scientific Authority Generic Questions relevant to assessments of Captive breeding against the guidance found in Res. Conf. 10.16 (Rev CoP19).

The UK Scientific Authority developed the following questions to assist in the assessment of non-detriment for import permits for captive-bred individuals *and/or* specimens into the UK. Text in *italics* describes what aspect the question seeks clarification.

1. **Full details of the breeding facility (including the name and address, the date of establishment, and a full description of the facility).** (*Designed to establish whether it is a controlled environment*).

2. **The number and origin of the founder breeding stock, with the date and details of acquisition.** (*Designed to establish both the legal acquisition of the founder stock, and ensure it was acquired in a manner not detrimental*).

3. **The size of current breeding stock in total number of individuals including the male/female ratio.** (*Important to ensure that the numbers produced are within the biological capability of the species according to the number of breeding females held*).

4. **The year of first successful breeding.**

5. **Whether the breeder has bred this species to F2 generation.** (*Designed to assess and attribute source code*).

6. **Whether the breeding stock has been augmented with wild taken individuals, and if so details of how many and when.** (*Designed to understand the regularity of harvest of wild-caught individuals to supplement the breeding stock*).

7. **Full details of annual production for the last 5 years.** (*Important to ensure that the numbers produced are within the biological capability of the species according to the number of breeding females held*).

6. CONCLUSION OR DECISION

Detail on the preparation of the conclusion or decision is provided in module 2 section 5, including information on the types of NDF decisions and preparing a Non-Detriment Finding Report.

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The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), also known as the "Washington Convention", was signed in Washington, D.C., the United States of America, on 3 March 1973 and entered into force on 1 July 1975.

CITES regulates international trade in specimens of species of wild fauna and flora. It plays an important role in supporting sustainable development by ensuring that trade in wild animals and plants is legal, sustainable and traceable.

For Further Information:

Postal address:

CITES Secretariat
Palais des Nations
Avenue de la Paix 8-14
CH-1211 Genève 10
Switzerland

For Further Information:

Street address:

CITES Secretariat
International Environment House
11 Chemin des Anémones
CH-1219 Châtelaine, Genève
Switzerland

cites.org

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