



## Accounting for Nature Regional-Scale Native Vertebrate Fauna Method

### DOCUMENT DETAILS

**Method Name:** AfN Regional-Scale Native Vertebrate Fauna Method

**Method Reference #:** AfN-METHOD-F-03

**Relevant Environmental Asset Class:** Fauna

**Confidence Levels:** Level 3

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## 1. Introduction

Australian fauna has declined dramatically since European settlement. This decline has been best documented in the vertebrate taxa – mammals, birds, reptiles, amphibians, and fish. For example, more than 20% of Australian mammals are listed as threatened and this number is growing. Australia also has a high proportion of endemic fauna, with 84% of mammals and 45% of birds nowhere else. For many species, there has been a significant decline in both population size and their range as a result of threatening process such as habitat loss, introduced species and changed land management practices such as fire. Climate change is likely to add to these pressures for a number of native species. By measuring the condition of Australian fauna at a regional scale, this method provides a foundation for better understanding our iconic fauna and thereby improving their management and conservation.

### 1.1. Aim and Scope of this Method

Threatened species assessments by expert committees, such as the Commonwealth Threatened Species Scientific Committee, or the state-based equivalents, are an important tool for understanding the extinction risk of Australian species at a continental scale or state scale, aiding the prioritisation and conservation management of at-risk species. But it is also important to understand the conservation status of native species at regional scale, as this is often the scale at which species conservation is best managed. Regional scale assessments can provide invaluable information to local communities, conservation minded farmers, indigenous land managers, and Landcare groups, who are actively working to protect and improve the status of native species in their area. There may also be significant differences in the status of fauna populations between regions, with a species being of least concern in one region, while critically endangered in another (IUCN 2003). For example, the southern brown bandicoot (*Isoodon obesulus*) is widespread in Tasmania yet listed as Endangered in mainland Australia where predation by foxes has resulted in significant population decline and range contraction.



This Regional Native Fauna method aims to fill that gap, by providing regional land managers such as the 54 Australian NRM Regions and local governments, with a method for assessing the condition of vertebrate fauna at the regional scale. Documenting fauna condition in a Regional Environmental Account provides regional land managers with a tool for systematically prioritising environmental actions and measuring the impacts of those efforts on regional fauna condition. Producing such information in the form of an environmental account also makes it possible for local communities to gain a far greater understanding of the conservation status of their local fauna.

The method focuses on terrestrial, freshwater, and coastal vertebrate species including mammals, birds, reptiles, amphibians, and fish. It does not include marine species, as these species are usually outside the scope of operations of regional NRM agencies. The method is based on an elicitation process where experts in the ecology and management of vertebrate taxa are provided a compilation of available data and are guided through a structured decision-making process by an expert elicitation specialist, whereby they assign each species for which there is sufficient data to an IUCN Red List Category, based on the Red List Criteria (IUCN 2001). A similar approach was employed by Kerle et al (2007) to assess the conservation status of vertebrates in the Central West CMA and adapted for inclusion in the Wentworth Group’s regional environmental accounting trial in 2014.

<b>Purpose</b>	The purpose of this method is to enable regional natural resource and environmental management organisations to measure the condition of vertebrate fauna and trends in their extinction risk over time.
<b>Application</b>	Australia-wide
<b>Scale</b>	Regions > 250,000 hectares
<b>Scope</b>	Regions such as NRM Regions and Local Government Areas
<b>Target Audience</b>	Managers of NRM regions, Local Governments, large environmental NGOs
<b>Decisions to inform</b>	This method can be used to identify at risk species and prioritise conservation efforts accordingly.
<b>Confidence Level/s</b>	Level 3 (Moderate). A Level 3 confidence level applies to Methods that include a limited set of indicators and are likely to have moderate accuracy (i.e. the true value is captured 80% of the time) when measuring the condition of environmental assets and detecting change in their condition through time.

## 1.2. Justification of Confidence Level

Level 3 – this method has the capacity to detect categorical changes in the extinction risk of species on a six-point scale, based on a regional interpretation of the conservation status of each species. Allocation of a species to a category is based on evaluation against five quantitative and qualitative criteria, of which at least one must be met.

### 1.3. What an Environmental account looks like

The *Accounting for Nature*® Framework requires accounts to be comprised of three key components for them to be certified:

1. An **Environmental Account Summary** – a public document that summarises the results of the environmental account in a form that is readily communicated to the public.
2. An **Information Statement** – describes in detail the method used and the actions taken to address each of the five steps under the framework including rationale behind asset selection, choice of indicators, Method used, analysis and management of data and calculation of the Econd®.
3. The **Environmental Account** – a database (such as an excel file) that contains all the data described in Asset Tables, Data Tables, and Balance Sheets.
4. An **Audit Report (for ‘certified accounts) or an AfN Technical Assessment (for ‘self-verified’ Accounts)**– both reports verify (to differing degrees) that the Account was prepared in accordance with the approved Methods, the *AfN Standard* and AfN Audit rules.

Upon certification of the account, the Environmental Account Summary and Information Statement will be published on the AfN Environmental Account Certification Registry.

### 1.4. Overview of Process

This method includes the following six steps:



## 2. Creating the Environmental Account

### Step 1. Define purpose, scope, and accounting area

The preliminary step to developing an Environmental Account is to **describe** the Environmental Account through defining its intended **purpose**, **scope** and **accounting area**.

**Purpose:** Describe the specific purpose of the account.

**Scope:** Describe the scope of the account. This method is suitable for:

- *Snapshot* – a one-off assessment of environmental condition

**Accounting Area:** Describe the accounting region (include location and size details). Provide a map of the accounting region that shows location and size information.

*NB. The accounting area must stay the same for the lifespan of the account. If the accounting area changes (such as a new area to be added, or an area to be removed), then a new account must be developed, or the account, 're-set' and started again with the new accounting area.*



#### Output of Step 1

- A description of the accounting area including **location** and **size**
- A table describing the **purpose** and **scope** of the account
- A **map** showing the accounting area



## Step 2. Compile existing data

The expert elicitation process is guided by a review of a wide range of data sources so that species can be evaluated against the five IUCN Red List Criteria. This data is to be provided as a package to the panel of expert reviewers in order to aid them in their decision-making processes.

### Data Sources

- IUCN Red List of Threatened Species
- Atlas of Living Australia Species Observations
- Australian Government Threatened Species Listings, Conservation Advices and Recovery Plans
- State Government Threatened Species Listings
- Bird Life Australia's Bird Atlas
- Native vegetation community extent maps (habitat loss)
- Other relevant sources



### Output of Step 2

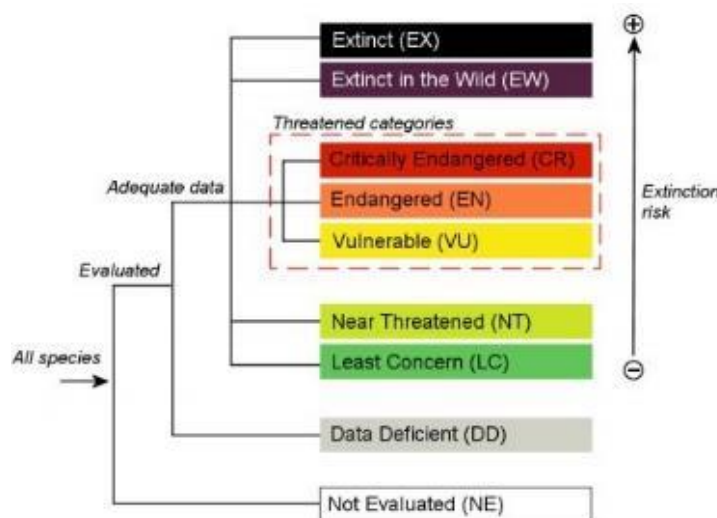
- An **assessment package** containing relevant documentation and documents, a list of data sources, and links to online resources

## Step 3. Describe environmental indicators and determine reference benchmarks

The AFN Regional Native Fauna Method assesses the extinction risk of all terrestrial and freshwater aquatic vertebrates in a defined region (mammals, birds, reptiles, amphibians, fish). The calculation of an environmental indicator for regional fauna condition follows a two-step process, first classifying species based on the IUCN Red List Categories and Criteria, then calculating the Red List Index for each of those taxonomic groups. An Econd can then be calculated based on a simple adjustment of the scale of the Red List Index (i.e. from 0-1 to 0-100).

### IUCN Red List Categories and Criteria

The IUCN Red List Categories and Criteria is a framework that is used to systematically assess the extinction risk of a diverse range of taxonomic groups at a range of scales from regional to national and global. The Red List framework has been designed to be applied consistently and objectively, so that comparisons can be made across different taxa. The structure of Red List Categories is shown in the adjacent diagram.



### IUCN Red List Index

The IUCN Red List Index (RLI) has been designed to track trends in the extinction risk of groups of species (Butchart et al 2004; Butchart et al 2007). It is used internationally by governments and organisations to track progress towards targets for reducing biodiversity loss. The RLI is a measure of the proportion of species within each of the Red List Categories, with each species assigned a score based on their classification. An RLI of 1 indicates that all species in that group are of least concern, whereas an RLI of 0 indicates that all species are extinct.

### Reference condition

**Species category:** Red List Category – Least Concern

**Species score:** Red List Index – Score 1

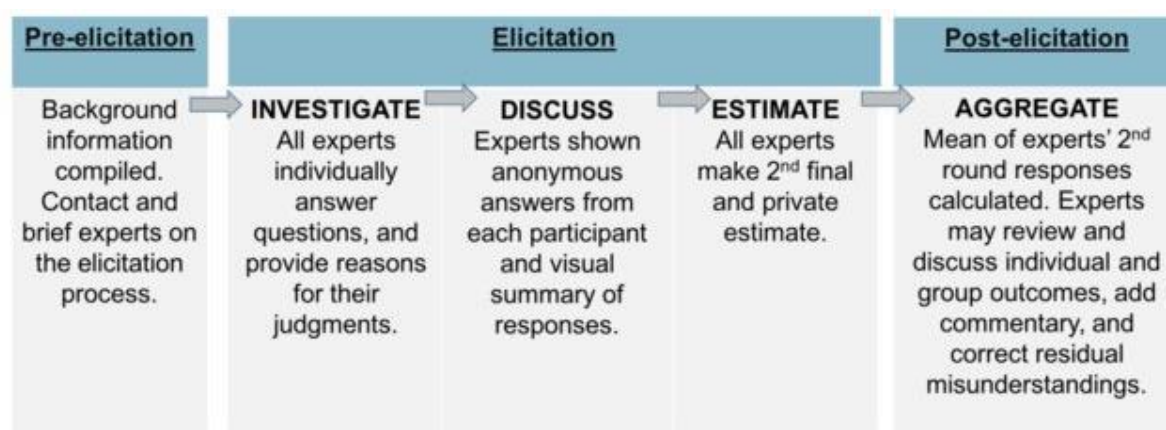
### Output of Step 3

- A description of the **environmental indicators** to be measured in the account

## Step 4. Collect and analyse data

### Expert elicitation framework

A structured expert elicitation process is used to classify each species according to one or more of the IUCN Red List Categories and Criteria. AFN recommends project proponents engage a specialist to facilitate the expert elicitation process. In order to maintain consistency between assessments, we recommend using the IDEA Protocol (Figure 1), described in detail by Hemming et al (2017). The elicitation process may be run via in-person or remote workshops. A diverse group of 6-12 scientists and managers with expertise in fauna conservation, ecology and management are invited to participate in the elicitation process, with at least one taxonomic specialist, with experience in the region being assessed, per fauna subgroup.



(Figure 1. IDEA Protocol expert elicitation workflow, from Hemming et al 2017)

### Aggregation of regional species list

Prior to the expert elicitation process, a regional vertebrate species list is extracted from an appropriate state or national online database of species observations. Conservation status information for each species is compiled from IUCN, EPBC and State Government listings, relevant Action Plans, and other expert assessments. A list of sources is provided in Table 1, but please note that these sources are being regularly updated and this list should be reviewed every 5 years. All native mammals, birds, reptiles, amphibians, and freshwater fish occurring in the focal region are included and are provided to the experts in an organised list to facilitate their classification.

VERTEBRATE GROUP	CONSERVATION STATUS SOURCE
Mammals	Environmental Protection and Biodiversity Conservation Act 1999
Birds	Action Plan for Australian Birds 2021
Reptiles	EPBCA, Mitchell et al 2017
Amphibians	EPBCA, Gillespie et al 2020
Fish	EPBCA, Lintermans 2016

Table 1. Current data sources for conservation status of vertebrate groups



## Information pack

- Each expert is given an information pack to guide the elicitation process.
- The information pack details the elicitation procedure, following the guidelines of the IDEA Protocol.
- The context of the regional assessment is explained in terms of spatial scale, species to be assessed, and evidence sources.
- A list of data sources is provided for reference during the elicitation process (Step 2 Compile existing data).
- A copy of the *IUCN Red List Categories and Criteria* (IUCN 2019 and *IUCN Regional Guidelines for Red List Classification* (IUCN 2003) are also provided.

## Expert Elicitation Process

<p>1. <i>Shortlisting and information-pack preparation</i></p>	<ul style="list-style-type: none"> <li>- An information package introduces the project and explains the expert elicitation process. Experts have an opportunity for experts to discuss the topic with the project team.</li> <li>- A table of threatened species occurring within the region is compiled by the project team and their conservation status is presented to the experts for review.</li> <li>- A survey is prepared by the project team, using an online platform such as Qualtrix (<a href="http://www.qualtrix.com">www.qualtrix.com</a>), to enable the shortlist of species to be assessed by experts. Instructions and supporting information are embedded throughout the survey, to facilitate a rapid assessment by experts.</li> </ul>
<p>2. <i>IUCN category estimation</i></p>	<ul style="list-style-type: none"> <li>- The short list of threatened species is assessed by the experts individually ideally within a timeframe of 2 weeks.</li> <li>- Experts may add additional species, (i.e. species not listed as threatened by state or national legislation) to the list if they feel that there is justification for listing them as threatened at a regional scale.</li> <li>- Each expert is asked to use their expert judgement to assign the short list of species to an IUCN Red List Category based on IUCN Red List Criteria (</li> <li>- Experts are directed towards sources of data to support their decision making as required (see Step 2 – Compile Existing Data).</li> <li>- At a regional scale, there is likely to be limited data for many species upon which to base an assessment. Even though there may be considerable uncertainty for those species, experts are asked to make a best estimate of the appropriate IUCN category for each species (IUCN 2003).</li> <li>- To further document the degree of uncertainty in assessments, experts are asked to estimate upper and lower bounds within which the true value might fall (Figure 2).</li> <li>- In the case of an IUCN categorisation, this means the highest plausible category and lowest plausible category to which each species could be assigned.</li> </ul>

## Expert Elicitation Process (continued)

3. <i>Group discussion</i>	<ul style="list-style-type: none"> <li>- Once each expert has made their assessment, the results are summarised.</li> <li>- Results are presented to the group for review.</li> <li>- A workshop is convened to discuss the outcomes of the assessment.</li> <li>- In particular, the species for which there is disagreement are reviewed and reasons for conflicting assessments are identified.</li> </ul>
4. <i>Category re-estimation</i>	<ul style="list-style-type: none"> <li>- Experts then have an opportunity to revise their assessment based on the workshop discussion, again within a timeframe of 2 weeks if possible.</li> </ul>
5. <i>Data aggregation</i>	<ul style="list-style-type: none"> <li>- The mean of experts second round responses is calculated.</li> <li>- The final results are summarised and circulated to the group.</li> </ul>

### Output of Step 4

- A **data table** (e.g. a spreadsheet) containing a list of species with regional conservation status classified using the IUCN Red List Category



## Step 5. Calculate Indicator Condition Scores

### Calculation of Red List Index

The Red List Index is calculated for each vertebrate group as per the methods outlined in Butchart et al 2007.

1. Each species is assigned a score based on its Red List Category (Table 2).
2. These scores are summed to give a measure of current extinction risk status (**ER**).
3. The potential extinction risk is calculated (**PER**). This is the sum of all species if extinct (i.e. all species score = 5).
4. The Red List Index is then calculated using the following formula (Equation 1).

Category	Score
Extinct	5
Critically Endangered	4
Endangered	3
Vulnerable	2
Near Threatened	1
Least Concern	0
Data Deficient	Not included

Table 2. Scoring system for IUCN categories

$$RLI = 1 - \frac{ER}{PER}$$

Equation 1. Red List Index Calculation

### Presentation of Regional IUCN Status of Individual Species

While an Econd is not calculated for individual species, in order to aid cross-comparison we recommend that account proponents present a ranked summary of the IUCN category of each species. The IUCN Red List Index uses an ordinal score which can lead to confusion about the relative magnitude of impact across categories. We therefore recommend colour-coding and including a summary of the classification system in the information statement in order to aid visual interpretation of the expert elicitation outputs. An example is provided in Appendix 1.

### Output of Step 5

- A **data table** presenting the Red List Index calculation for mammals, birds, reptiles, amphibians, and freshwater fish.

## Step 6. Calculate the Econd®

The Econd® is an index between 0 and 100, where 100 describes the ‘natural’ or ‘undegraded’ reference condition of an environmental asset, and 0 indicates the asset is completely degraded. In Australia, ‘natural’ is commonly referred to as the status of a species prior to European Settlement (1750).

### Worked example

Each of the 10 species listed below (Table 3) is assigned a score based on their regional Red List Classification (see Step 5, Table 2). The Red List Index is then calculated for that fauna group (see Step 5, Equation 1). The Red List Index is a scale from 0 to 1. To convert RLI to the Econd index is a simple calculation - the RLI is simply multiplied by 100 to give an Econd of 0 to 100 for that fauna group.

To calculate an overall Econd® for all fauna groups – the same approach as above and in Step 5 is taken, but for all species assessed across all fauna groups.

Fauna Group 1	IUCN Category	Score
Species 1	Least Concern	0
Species 2	Extinct	5
Species 3	Near Threatened	1
Species 4	Vulnerable	2
Species 5	Vulnerable	2
Species 6	Least Concern	0
Species 7	Endangered	3
Species 8	Least Concern	0
Species 9	Critically Endangered	4
Species 10	Data Deficient	n/a
Number of assessed species = 10		

Table 3. Hypothetical Red List Index scores for an assessment of ten species.

Extinction Risk	Potential extinction risk
ER = sum of scores	PER = N x 5
ER = 17	PER = 50
$RLI = 1 - (17 / 50)$ $RLI = 1 - 0.34$ $RLI = 0.66$ Econd = RLI x 100	$RLI = 1 - \frac{ER}{PER}$
<b>Econd for Animal Group</b>	<b>66</b>

## Output of Step 6

- A **data table** (e.g. a spreadsheet) containing all the raw data for each indicator for each sample, including the calculations for the ICS and Econd®.
- A **summary table** showing the Econd® scores.

### 3. Compile Environmental Account and submit for certification

Steps five to seven should be repeated at regular intervals (a minimum of every five years or where Base Year recalculation is required, as specified under the *Accounting for Nature*® Framework) to establish a trend over time. The assessment should also be repeated following a catastrophic event such as a major bushfire or drought. Updated information can also be used to hindcast previous assessments. In order to maximise consistency, when the expert elicitation process is repeated it should use the same question set and involve the same experts (if possible).

- An Environmental Account may incorporate multiple Environmental Assets, and always needs to include the following information:
  - Information Statement and Environmental Account Summary,
  - Environmental Account (including raw data tables), and;
  - An Audit Report or Self Verification Report that verifies the Account was prepared in accordance with the approved Methods, the *AfN Standard* and *AfN Audit rules*.
    - o An Audit Report is completed by an AfN Accredited Auditor and is required if you are seeking to have your account “Certified” (Tier 1); OR
    - o A Self-verification Report contains the results of your self-verification assessment and AfN’s Technical Assessment and is required if you are seeking to have your account “Self-verified” (Tier 2).

If you wish for your account to be ‘certified,’ it must be verified in accordance with the *Accounting for Nature*® Standard, which outlines the criteria that must be satisfied. The benefit of having an account certified is that AfN allows you to display the Certified Account logo and you are able to make public claims about your account. AfN Certified accounts require the Environmental Account Summary and Information Statement to be made publicly available.



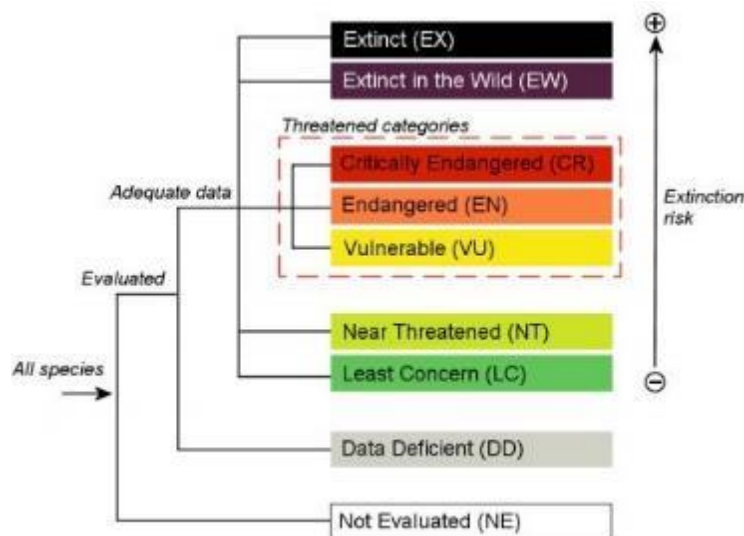
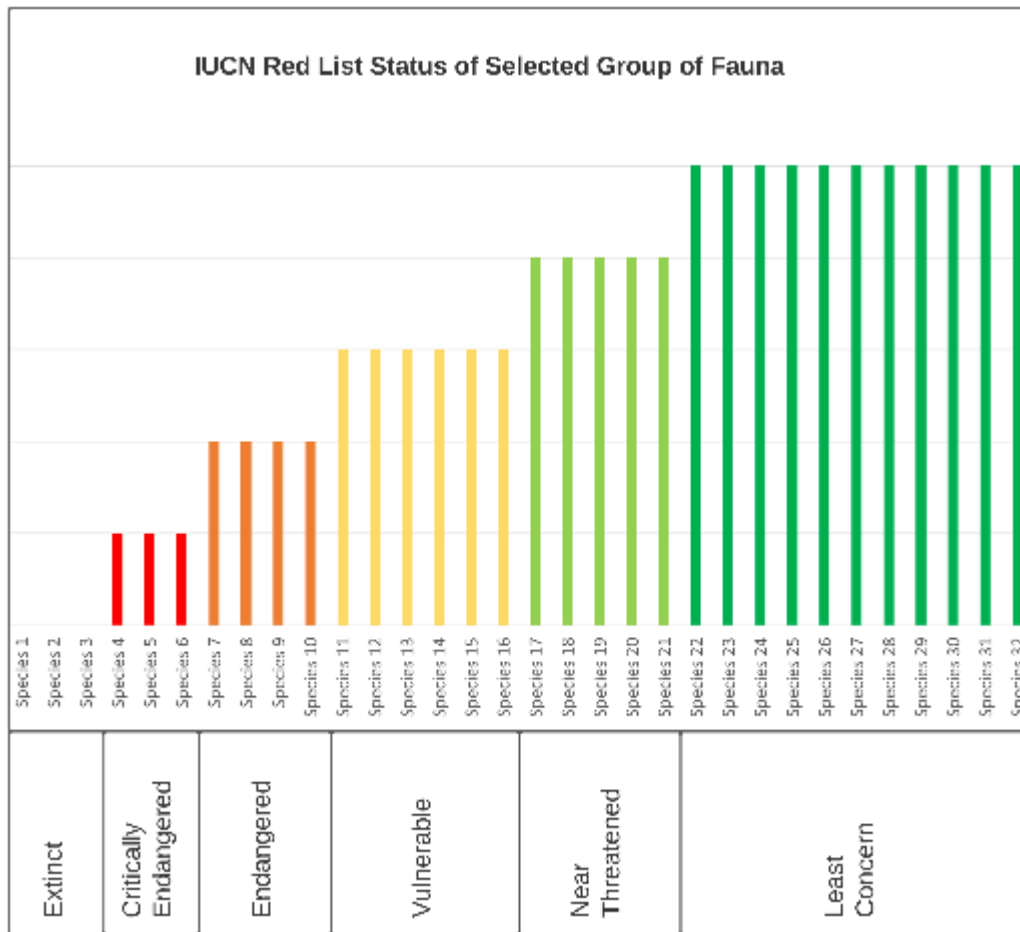
Red-eyed tree frog (*Ranoidea chloris*). Credit Burnett Mary Regional Group



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Appendix 1 - Summary of Elicitation Outputs for Individual Species



## Appendix 2 – IUCN Red List Criteria Information Sheet

### SUMMARY OF THE FIVE CRITERIA (A-E) USED TO EVALUATE IF A TAXON BELONGS IN AN IUCN RED LIST THREATENED CATEGORY (CRITICALLY ENDANGERED, ENDANGERED OR VULNERABLE).<sup>1</sup>

<b>A. Population size reduction.</b> Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3 & A4	≥ 80%	≥ 50%	≥ 30%
A1 Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased.	} based on any of the following:	(a) direct observation [except A3]	
A2 Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.		(b) an index of abundance appropriate to the taxon	
A3 Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3].		(c) a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality	
A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.		(d) actual or potential levels of exploitation	
		(e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.	
<b>B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)</b>			
	Critically Endangered	Endangered	Vulnerable
B1. Extent of occurrence (EOO)	< 100 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
B2. Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
<b>AND at least 2 of the following 3 conditions:</b>			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			
<b>C. Small population size and decline</b>			
	Critically Endangered	Endangered	Vulnerable
Number of mature individuals	< 250	< 2,500	< 10,000
<b>AND at least one of C1 or C2</b>			
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2. An observed, estimated, projected or inferred continuing decline AND at least 1 of the following 3 conditions:			
(a) (i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(ii) % of mature individuals in one subpopulation =	90–100%	95–100%	100%
(b) Extreme fluctuations in the number of mature individuals			
<b>D. Very small or restricted population</b>			
	Critically Endangered	Endangered	Vulnerable
D. Number of mature individuals	< 50	< 250	D1. < 1,000
D2. Only applies to the VU category Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.	-	-	D2. typically: AOO < 20 km <sup>2</sup> or number of locations ≤ 5
<b>E. Quantitative Analysis</b>			
	Critically Endangered	Endangered	Vulnerable
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% in 100 years

<sup>1</sup> Use of this summary sheet requires full understanding of the IUCN Red List Categories and Criteria and Guidelines for Using the IUCN Red List Categories and Criteria. Please refer to both documents for explanations of terms and concepts used here.