Appendix 1

Threatened Species Scientific Committee Guidelines

for assessing the conservation status of native species according to the *Environment Protection and Biodiversity Conservation Act 1999* and *Environment Protection and Biodiversity Conservation Regulations 2000*

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Part A: **Criterria for listing species in the critically endangered, endangered or vulnerable categories under the *Environment Protection and Biodiversity Conservation Act 1999* and *Environment Protection and Biodiversity Conservation Regulations 2000***

For section 179 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), a native species is eligible for listing in the critically endangered, endangered or vulnerable category, if it meets any of the criteria for the category identified in Part 7.01 of the *Environment Protection and Biodiversity Conservation* Regulations 2000 (EPBC Regulations).

Criteria for listing threatened species (Part 7.01 of the EPBC Regulations)			
Criterion	**Critically Endangered**	**Endangered**	**Vulnerable**
1. It has undergone, is suspected to have undergone or is likely to undergo in the immediate future:	a very severe reduction in numbers	a severe reduction in numbers	a substantial reduction in numbers
2. Its geographic distribution is precarious for the survival of the species and is:	very restricted	restricted	limited
3. The estimated total number of mature individuals is:	very low	low	limited
and either of (a) or (b) is true:			
(a) evidence suggests that the number will continue to decline at:	a very high rate	a high rate	a substantial rate
(b) the number is likely to continue to decline and its geographic distribution is	precarious for its survival	precarious for its survival	precarious for its survival
4. The estimated total number of mature individuals is:	extremely low	very low	low
5. The probability of its extinction in the wild is at least	50% in the immediate future	20% in the near future	10% in the medium-term future

These criteria define situations in which a relatively large risk of extinction in the wild, some time in the future, is deemed to exist for a species (for the purposes of section 179 of the EPBC Act). It is not necessary to identify a quantitative risk of extinction, but it is important to ensure that judgements about the criteria (for example, whether a reduction in numbers represents a severe decline).

Due to the subjective nature of the criteria provided in the EPBC Regulations, the Threatened Species Scientific Committee (the Committee) have adopted guidance thresholds (Part B) based on the "IUCN Red List Categories and Criteria Version 3.1, 2001", that may be used by the Committee to judge the subjective terms for listing in the EPBC Regulations. It should be noted that the Committee has an obligation to have regard to these guidance thresholds and generally applies them but there can be exceptions.

Part B: Guidance thresholds that may be used by the Committee to judge the subjective terms provided by the criteria for listing

When assessing a species' eligibility against the listing criteria for inclusion in the critically endangered, endangered or vulnerable categories, the Committee exercises its judgement to give practical meaning to the subjective terms of the criteria. The Committee does this by considering the information provided to it via the nomination form in the context of the species' biology and relevant ecological factors, and having regard to the degree of complexity and uncertainty associated with that context and the information provided.

To provide guidance for the Committee to interpret the subjective terms provided by the criteria for assessment of eligibility for inclusion listing in the categories of vulnerable, endangered and critically endangered in the list of threatened species, the Committee has adopted Indicative Thresholds. The Committee is informed, but not bound by, Indicative Thresholds which have been adapted from the IUCN Red List Categories and Criteria Version 3.1, 2001 to conform to the EPBC Regulations. The IUCN Red List Categories and Criteria are an internationally accepted system developed for classifying the extinction risk for a wide range of species.

When interpreting the Indicative Thresholds for particular species, the Committee judges their appropriateness to characteristics of the species in question. . This consideration of biological attributes is placed in the context of matters such as the relative population size so as to judge whether, for the species in question, a decline is substantial, severe or very severe, for the purposes of the criteria for listing.

To provide guidance as to the use of the Indicative Thresholds the Committee refers to the IUCN Guidance Documents that explains how to apply the criteria to determine if a taxon is eligible for inclusion in a category and provide explanations and definitions of the terms used in the criteria.

Threatened Species Scientific Committee's Guidance Thresholds
to judge the subjective terms provided by the criteria for assessment of eligibility for inclusion listing in the categories of vulnerable, endangered and critically endangered in the list of threatened species

1. Population size reduction (reduction in total numbers) Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered Very severe reduction	**Endangered Severe reduction**	**Vulnerable Substantial reduction**
A1	**≥ 90%**	**≥ 70%**	**≥ 50%**
A2, A3, A4	**≥ 80%**	**≥ 50%**	**≥ 30%**

A1   Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

A2   Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.

A3   Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(*a*) *cannot be used for A3*]

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.

based on any of the following

(a)   direct observation [*except A3*]

(b)   an index of abundance appropriate to the taxon

(c)   a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d)   actual or potential levels of exploitation

(e)   the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

2. Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy

	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1. Extent of occurrence (EOO)	< 100 km^2	< 5,000 km^2	< 20,000 km^2
B2. Area of occupancy (AOO)	< 10 km^2	< 500 km^2	< 2,000 km^2
AND at least 2 of the following 3 conditions indicating distribution is precarious for survival :			
(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			

3. Population size and decline

	Critically Endangered Very low	Endangered Low	Vulnerable Limited
Estimated number of mature individuals	< 250	< 2,500	< 10,000
AND either (C1) or (C2) is true			
C1 An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future)	Very high rate 25% in 3 years or 1 generation (whichever is longer)	High rate 20% in 5 years or 2 generations (whichever is longer)	Substantial rate 10% in 10 years or 3 generations (whichever is longer)
C2 An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on 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			

4. Number of mature individuals

	Critically Endangered Extremely low	Endangered Very Low	Vulnerable Low
Number of mature individuals	< 50	< 250	< 1,000

Note: The IUCN Red List Criterion D allows for species to be listed as vulnerable under D2[1]. Criterion 4 under the EPBC Act Regulations does not include the provision for a species assessment for listing in the vulnerable category similar to D2.

5. Quantitative Analysis

	Critically Endangered Immediate future	Endangered Near future	Vulnerable Medium-term future
Indicating the probability of extinction in the 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

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[1] IUCN Criterion D2: *Only applies to the VU category*. Restricted are 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.

Part C: Eligibility for listing species in the extinct, extinct in the wild, or conservation dependent categories under the *Environment Protection and Biodiversity Conservation Act 1999*

For section 179 of the EPBC Act (which provides general eligibility for inclusion in a category of the list of threatened species), a native species is eligible for inclusion in the extinct, extinct in the wild or conservation dependant category, if it meets the criteria for listing in that category as defined in the EPBC Act.

Extinct (section 179(1))

A native species is eligible to be included in the *extinct* category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.

The EPBC Act uses the same eligibility criteria for listing in the extinct category as the IUCN Red List and the Committee refer to the guidelines for applying the category in the Guidelines for Using the IUCN Red List Categories and Criteria.

The Committee uses an evidentiary approach and considers each taxon on a case-by-case basis to assess its eligibility for inclusion in the extinct category. Taxa that are listed as extinct under are not considered Matters of National Environmental Significance under the EPBC Act and are afforded no protection under the EPBC Act. If an extinct species is rediscovered in nature and considered to be extant, it is offered no protection under the EPBC Act until it is transferred from the extinct category, this process could have implications for the protection of the taxon. The Committee needs to be confident that there is no reasonable possibility that the taxon may still be extant in recommending listing as extinct.

Extinct in the wild (section 179(2))

A native species is eligible to be included in the *extinct in the wild* category at a particular time if, at that time:
- (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
- (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

The Committee uses an evidentiary approach and considers each taxon on a case-by-case basis to assess its eligibility for inclusion in the extinct in the wild category. The Committee refer to the guidelines for applying the category in the Guidelines for Using the IUCN Red List Categories and Criteria.

Conservation dependent (section 197(6))

A native species is eligible to be included in the *conservation dependent* category at a particular time if, at that time:
- (a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; **or**
- (b) the following subparagraphs are satisfied:
  - (i) the species is a species of fish;
  - (ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised;
  - (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory;
  - (iv) cessation of the plan of management would adversely affect the conservation status of the species.

Part D: Calculating Area of Occupancy (AOO) and Extent of Occurrence (EOO)

Extent of occurrence

Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy (see Figure 1). This measure may exclude discontinuities or disjunctions within the overall distributions of taxa (e.g. large areas of obviously unsuitable habitat, see 'area of occupancy' below). However, such exclusions are not recommended for reasons detailed by IUCN (2014, section 4.9). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

Area of occupancy

Area of occupancy is defined as the area within its 'extent of occurrence' (see above) which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may contain unsuitable or unoccupied habitats. In some cases (e.g. irreplaceable colonial nesting sites, crucial feeding sites for migratory taxa) the area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon. The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon, the nature of threats and the available data. To avoid inconsistencies and bias in assessments caused by estimating area of occupancy at different scales, IUCN (2014) recommends standardization of estimates by applying a 2 x 2 km grid to occurrence data. IUCN (2014) give guidance on how standardization should be done, although conversion between different scales is difficult because different types of taxa have different scale-area relationships.
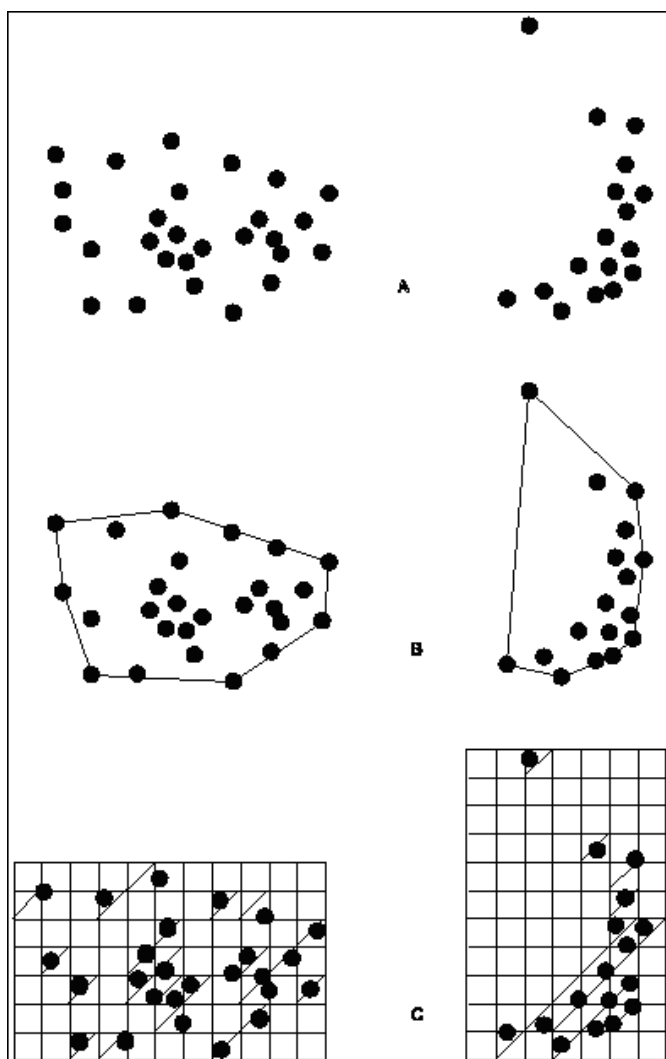

Figure 1. Two examples of the distinction between extent of occurrence and area of occupancy. (A) is the spatial distribution of known, inferred or projected sites of present occurrence. (B) shows one possible boundary to the extent of occurrence, which is the measured area within this boundary. (C) shows one measure of area of occupancy which can be achieved by the sum of the occupied grid squares

Part E: Data Deficient species

Section 178 of the EPBC Act identifies the [categories](#) under which species assessed can be and found eligible for listing. Unlike the categories for listing under the International Union for Conservation of Nature (IUCN) Red List, the EPBC Act does not provide for formal listing in a data deficient category. Species assessed by the [Threatened Species Scientific Committee](#) where insufficient data (evidence) are available to allow the taxon to be placed in a category against the criteria for listing are found ineligible and a recommendation is made to the Minister to not include the species in any category under the EPBC Act. For reasons of transparency and to inform future research, the Threatened Species Scientific Committee publishes the names of those species found to be [data deficient](#). As data deficient is not a listing category under the EPBC Act, this has no statutory implications and the species is not considered to be listed under the EPBC Act.

Acknowledging that the species is data deficient does not imply that the taxon is not threatened.

Examples of species that could be assessed and found to be data efficient included wide ranging species where information is only available on impacts and populations across part of their range. In some such cases, the available information can not easily be extrapolated across the entire range and therefore it is hard to determine whether a decline in one part of the range represents trends across the whole range. Without information across the national extent of the species justification for listing against the criteria is therefore difficult to determine.

As noted above a taxon cannot be assigned to a data deficient category under the EPBC Act. Under IUCN Red List, a taxon can be assigned data deficient where a taxon 'is known, but there is no direct or indirect information about its current status or possible threats'. 'If the data is so uncertain that both least concern and critically endangered are plausible categories, the taxon can be assigned as data deficient'.

Part F: Thresholds for assessing commercially harvested marine fish

When considering thresholds for assessing commercially harvested marine fish, the Committee refers to the [Commonwealth Government Harvest Strategy Policy](#). This policy defines declines of up to 60% (from pre-fishing biomass levels) as acceptable for commercially harvested fish species where depletion is a managed outcome. Variations in the extent of acceptable decline depend on the biology of the individual species. The Committee is informed, but not bound, by a series of limit and target biological reference trigger points (commonly referred to as B_{lim} and Bt_{arg}) provided in the policy for management intervention for species that decline below 60% of their pre-fishing biomass. These interventions include listing assessments.

Part G: Guidance for assessing climate change as a threat to native species

Anthropogenic climate change is occurring at an unprecedented rate and is likely to place greater climate stresses on species than has occurred for many thousands of years. Many species are affected by climate change and respond in a range of ways. Species will respond to these stresses in a range of ways: they may remain in areas where they are able to tolerate or adapt to conditions; move to more suitable habitats where possible; or die out. Despite the widespread effects of climate change, without detail specific to the species under consideration and without some ability to quantify its likely effects, it is difficult to incorporate the threat into the assessment of the species.

Refer to the *Guidelines for Using the IUCN Red List Categories and Criteria* (IUCN 2014) for explanation of key factors for determining whether the threat posed by climate change has had, is having, or will be important to the nominated species' across the entirety of the national extent of the species range and will increase the species' vulnerability to extinction in the immediate to medium term future (i.e. 10 to 50 years).When considering if climate change is a threat to a species, some key factors

to consider when determining eligibility against the criteria include time horizons for the impact, number of locations and the impact of climate change and using bioclimatic models.

A species' vulnerability to climate change will depend on a combination of biological traits, generation length, microhabitat use and behaviour, as well as its degree of exposure to climate change.

If climate change is an **important** threat to the nominated species it is important that you provide **referenced** information on exactly **how** climate change might significantly increase the nominated species' vulnerability to extinction.

Please cite the climate change references that you use to argue for significant climate change impact across the national extent of the nominated species over the immediate to medium term timeframe (i.e. 10 to 50 yrs). The impact of the relevant timeframe should be linked to the generation length of the species.

References:

Hobday AJ, Okey TA, Poloczanska ES, Kunz TJ, and Ricardson AJ (eds) (2006). Impacts of climate change on Australian marine life. Report to the Australian Grenhouse Office, Canberra, Australia. http://www.australiancoralreefsociety.org/pdf/Hobday%20et%20al%202006.pdf

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Steffen W, Burbidge A, Hughes L, Kitching R, Lindenmayer D, Musgrave W, Stafford Smith M & Werner P (2009). Australia's Biodiversity and Climate Change. CSIRO Publishing.

Steffen W, Burbidge A, Hughes L, Kitching R, Lindenmayer D, Musgrave W, Stafford Smith M & Werner P 2009. Australia's Biodiversity and Climate Change, Technical Synthesis. Technical synthesis of a report to the Natural Resource Management Ministerial Council. Department of Climate Change. Commonwealth of Australia. http://www.climatechange.gov.au/publications/biodiversity/biodiversity-climatechange.aspx