

THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

APPENDIX 4

QUALITATIVE THREAT ASSESSMENT METHODOLOGY

Introduction

The objective of this qualitative threat assessment methodology is to develop a qualitative analysis that provides a general indication of the level of threat(s) the species is potentially subject to, based on the likelihood and consequence of the threat if it were to occur, and to provide management recommendations to ameliorate the threats.

The methodology is based on the principles and procedures of the *Australian/New Zealand Standard for Risk Management ISO 31000:2009* (Standards Australia 2009; AZ/NZS 4360:1999) and *HB 203: 2000 Environmental Risk Management – Principles and Process* (Standards Australia 2009).

The methodology can use both quantitative and qualitative data and can make use of limited observed, estimated, inferred or suspected declines where applicable. It relies on the knowledge, experience, judgement and intuition of experts to identify, assess and propose appropriate management of the threats to the species, supported by whatever relevant information is available. The assessment and management recommendations will be based on available information as well as expert judgment where specific information and knowledge about the species is not available. It must be noted that the less information available, the less confident the assessor can be in the threat assessment and management recommendation decision.

The qualitative threat assessment methodology template is provided at [Appendix 5](#).

The methodology involves two steps:

1. Threat identification and assessment: identifying and characterising threats, assessing the vulnerability of the species to these threats and the level of threat to the species.
2. Threat management: defining actions to mitigate the threats so as to prevent the species from becoming threatened. The actions would be assessed on how effective they would be, how feasible they are and the cost-benefit of performing the action.

In undertaking this methodology a consultative group method is highly recommended to elicit as much knowledge, experience and intuition through group discussion and information exchange.

Step 1 Threat Identification and Assessment

This step involves the identification and characterisation of the threats, assessing the vulnerability of the species to these threats and the determination of the level of threat. The level of threat is determined by the likelihood and consequence of the threat to the species. Susceptibility to threats can be inferred by via biological variables known to affect extinction risks (such as population size, population decline, geographic ranges and number of extent populations (O'Grady et al. 2004; Mace et al. 2008)

In the absence of statistical data, the qualitative process estimates the degree of the consequence and likelihood of the threat to the species and assigns a score that is indicative

of reality. The process is set out in the attached spreadsheet, and includes the following considerations:

1. Identification of each threat and its magnitude, scale and sources (Columns 2 and 4 of the spreadsheet)
2. Determination of the impact of each threat if it was to occur (column 3)
3. Determination of the inherent threat rating based on consequence and likelihood (column 6)
4. Determination of the existing conservation strategies (column 7)
5. Following the determination and application of existing conservation strategies, estimating the residual threat rating (column 8)

Likelihood Criteria (column 6B)

Likelihood is the chance of an event occurring. In considering likelihood one must include the geographic extent of the threat, the duration of the threat, the magnitude of the threat and the confidence in the prediction of the likelihood. Chance of occurrence is generally described in terms of probability or frequency, and can be expressed qualitatively or quantitatively.

Score	Likelihood	Description
1	Rare	The outcome is not expected to occur; no record of occurring but not impossible; may occur in exceptional circumstances
2	Unlikely	The outcome will only occur in a few circumstances; uncommon but know to occur elsewhere
3	Possible	The outcome may occur; some evidence to support it will happen
4	Likely	The outcome will occur in most circumstances
5	Almost certain	The outcome is expected to occur

Consequence Criteria (column 6A)

Consequence is the impact or magnitude of the effect if the threat occurs, the impact that will occur if the threat is realised. These criteria provide a general framework for assessing the particular impacts identified for the species being considered. They draw on the Threatened Species Scientific Committee listing criteria and the Department’s ‘significant impact criteria’ for listed threatened species (DoE 2013).

In the examples provided the worst case approach was used to assess the consequence of each threat, which is if the threat was to actually occur what effect it would have to this species for each criterion. Expert opinion should be the basis for determining the levels of effect from threats to species. No weighting was applied so that no greater importance is placed on one criteria or combination of criteria.

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Consequence	Insignificant 1	Minor 2	Moderate 3	Major 4	Critical 5
Impact on population ³	Minimal impact on local population numbers; area affected negligible compared to total population; minimal or acceptable impact on population size	Minor impact on local population numbers. Population in other locations not impacted	Moderate impact on local population numbers. Some impacts on populations in other locations; moderate and/or short term effects	Major population reduction or loss of local population; recovery measure in years to decades; serious and significant impact on species	Population reduction which may result in species extinction; recovery period is greater than decades; very significant and serious impact on high value species
Fragmentation of habitat/loss of habitat connectivity/reduce the areas of occupancy ⁴	Minimal losses of local habitat only, recovery likely in a relatively short period of time; threats are covered by current management or legislation	Minor losses of local habitat requiring recovery over short term	Moderate loss of local habitat requiring recovery over a short to medium term and resulting in loss of connectivity between habitats at a local scale	Loss of local habitat with no potential for recovery, or partial loss of habitat across large areas and/or with limited potential for recovery in the medium to long term. Results in a net reduction in connectivity over a large area	Complete loss of local habitat with no potential for recovery and loss of habitat in other locations with limited potential for recovery in the long term resulting in a significant impact on habitat connectivity over a large area
Impact on the habitat critical to the survival of the species ⁵	Minimal modification, destruction, removal or decrease of local habitat only, recovery likely in a relatively short period of time; insignificant impact to habitat or threat activity only occurs in a very small area of habitat; limited damage to minimal area of low significance; minor effects on physical environment	Minor modification, destruction, removal or decrease of local habitat requiring recovery over short term	Moderate modification, destruction, removal or decrease of local habitat requiring recovery over a short to medium term and resulting in loss of connectivity between habitats at a local scale	Modification, destruction, removal or loss of local habitat with no potential for recovery, or partial loss of habitat across large areas and/or with limited potential for recovery in the medium to long term. Results in a net reduction in connectivity over a large area; habitat is affected which may endanger the species and habitat long term survival – 70-90% habitat affected or removed; 30% fragile habitat	Significant impact resulting in the removal, destruction, fragmentation and degradation of habitat; the entire habitat is in danger of being affected or removed, that >90% habitat, >50% fragile habitat, and >30% critical habitat

				affected or removed; 10-20% critical habitat affected or removed;	
Disruption to breeding cycle ⁶	Minimal impact on any aspect of the breeding cycle;	Minor disruption to the breeding cycle	Moderate disruption to breeding cycle resulting in modification of behaviour both within the direct impact zone and at nearby locations; long term recruitment and/or population dynamics are not adversely impacted	Direct impacts on breeding cycle resulting in a net decline in size of the population; the is limited information to judge the impact	Complete disruption of breeding cycles over several seasons with significant population decline and possible extinction
Impact of invasive species and/or disease ⁷	Minimal impact on local population numbers or habitat quality	Minor impact on local population numbers or habitat quality. Population in other locations not impacted	Moderate impact on local population numbers or habitat quality. Some impacts on populations in other locations	Major population reduction or loss of local population or loss of habitat quality	Population reduction which may results in species extinction loss of critical habitat extent or quality
Interaction with species migration	Minimal impact on species migratory patterns	Results in minor behavioural modification on a local scale or impacts to physical conditions of animal interfering with migration for the short term only. Unlikely to negatively impact on the overall success of migration	Results in modification of behaviour or animal conditions such that there is potential for medium term impacts, with some possibility of individuals failing to complete migration	Results in modification of behaviour or animal condition such that there is potential for medium to long term impacts, both locally and in nearby locations, with some individuals failing to complete migration	Significant impact resulting in either complete failure, or failure of majority of individuals, to complete migration in that cycle

³ Refers to the proportional changes to the numbers of individuals; change in the size of the population

⁴ Refers to the physical destruction of the species habitat and/or chemical or physical barriers

⁵ Refers to species habitat resource includes modify, destroy, isolate or decrease the availability or quality of habitat

⁶ Breeding cycle including activities associated with breeding (mating, gestation, nesting). Assessment assumes that the species is present in the affected area during the breeding cycle

⁷ Refers to the invasive species that is harmful to the species becoming established in the species habitat and introduced disease that may cause the species to decline

Level of threat (column 6C)

The likelihood and consequence criteria are combined in a matrix to identify the level of threat. The format of this matrix is based on the Department’s risk framework.

The matrix is a qualitative measure of the likelihood that the current threats and/or activities will lead to detrimental effects (consequence) on major ecological processes, biodiversity loss, long term degradation of habitats, ecologically unsustainable impacts on species, population of a species or assemblages of species.

Threat level of high or severe is considered to have the potential for unacceptable impact (serious or irreversible harm).

	<u>Consequence</u>				
	Insignificant	Minor	Moderate	Major	Critical
<u>Likelihood</u>					
Almost Certain	Low	Medium	High	Severe	Severe
Likely	Low	Medium	Medium	High	Severe
Possible	Low	Low	Medium	High	Severe
Unlikely	Low	Low	Low	Medium	High
Rare	Low	Low	Low	Medium	High

Assessment of existing conservation management strategies (column 7)

The next step is to document existing conservation management strategies (column 7A). These are the measures in place now that eliminate, minimise or reduce the impact of each potential threat.

Each of these management controls is rated based on how effective they are (column 7B):

- *Weak*: control of the threat is low
- *Partial*: actions have been established to address the threat but not fully implemented or not fully effective
- *Adequate*: some improvement to address the threat is recommended
- *Strong*: actions addressing threats are being implemented and highly effective

Residual threat rating (column 8)

To assess the residual threat rating, the next step is to go through all the threats you have listed, the sources and the impacts. Review the threat ratings of each threat, including the specific likelihoods and consequences taking into account the existing conservation management strategies and their effectiveness.

There is not a set formula to do this, so consider the overall threat assessment to decide what the most accurate rating is. Some questions that can help you perform this step are:

- Think about the species as a whole. What is the threat to the species failing without any controls in place to prevent that from happening?
- Is there any threat that is more critical than the other ones? Is this so large as to drive the inherent threat rating?

If the residual threat rating is low, no further action using the matrix is required. If the residual threat is medium, high or severe, go to step 2 and consider threat management.

Step 2 Threat Management

This step involves assessing whether there are mitigation actions that can prevent the species from becoming threatened. The assessment considers how effective the action would be, how feasible the action is and the cost-benefit of performing the action. Once the management actions have been developed, monitoring actions should be developed to track the status of the species and the effectiveness of implemented management actions.

For each threat, the range of possible management actions would be identified and documented (column 9). These are actions that could be taken in the future to eliminate, minimise or reduce the impact of each potential threat.

Each of these management controls is rated based on their expected effectiveness, feasibility and cost-benefit (column 9B):

- *Weak*: not effective, not feasible or prohibitive cost-benefit
- *Partial*: feasible but only partially effective and/or with high cost-benefit
- *Adequate*: feasible and effective and reasonable cost-benefit
- *Strong*: feasible, fully effective and favourable cost-benefit.

Final threat rating

At this stage, reassess the residual threat rating to estimate the final threat rating that would apply if the mitigation actions were applied. Review the threat ratings of each threat if subject to the mitigation actions. This final threat rating will inform the listing assessment provided to the Minister.

Where a mitigation action involves the Ministers functions and powers under the EPBC Act, and if reduces a residual threat rating to low from medium, high or severe, consider providing advice to the Minister under section 190.

References

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