NSW GOVERNMENT

SAVING OUR SPECIES

Framework for data-deficient species

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Photography
Cover photo: Singleton mint bush (*Prostanthera cineolifera*), Luke Foster
Page 2-3: pomaderris bodalla *(Bodalla Pomaderris)*, Jackie Miles
Page 4-5: lanky buttons *(Leptorhynchos orientalis)*, Geoff Robertson
Page 6 : alpine sun-orchid *(Thelymitra alpicola)*, Geoff Robertson
Page 7: Robertson's peppermint *(Eucalyptus robertsonii subsp. hemisphaerica)*, David Coote
Page 8: alpine she-oak skink *(Cyclodomorphus praealtus)*, David Hunter
Page 9: small-flower grevillea *(Grevillea parviflora subsp. parviflora)*, Barry Collier
Page 10: Mahony's toadlet *(Uperoleia mahonyi)*, Daniel O'Brien
Page 11: grey ternlet *(Procelsterna cerulea)*, Nicholas Carlile
Page 12: Creswick apple box *(Eucalyptus corticosa)*, Barry Collier

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Contents

Introduction

Saving our Species program

Saving our Species (SoS) is the overarching framework for threatened species management in New South Wales. SoS delivers strategies for securing threatened species and ecological communities from extinction in line with the provisions of the *Biodiversity Conservation Act 2016* (BC Act). The main objective of SoS is to maximise the number of threatened species that are secure in the wild in New South Wales for 100 years by:

1. identifying priorities so we make the best use of the investment in management of threatened species and communities
2. engaging the community in the effective management of threatened species and communities and aligning their efforts across New South Wales
3. making decisions about ongoing management of threatened species and communities based on best available evidence and evaluation of outcomes (OEH 2013a).

Under SoS, all listed species and ecological communities are allocated to a management stream based on their ecological characteristics and management needs (OEH 2013b). Each management stream has a framework that guides:

- the development of strategies for each of its species/communities
- the approach to monitoring and reporting
- a possible approach to prioritising investment.

Background and legislative context

Part 4 Division 6 of the BC Act includes provisions for a Biodiversity Conservation Program with a goal to 'maximise the long-term security of threatened species and threatened ecological communities in nature.' To meet this goal, the Biodiversity Conservation Program must:

1. set out the strategies to be adopted for promoting the recovery of each threatened entity
2. establish relative priorities for their implementation
3. establish performance indicators to help with reporting on the effectiveness of these strategies
4. provide a framework to guide the implementation of strategies.

Ensuring the long-term security of a species requires targeted management of any threats to the survival of important populations. This requires an adequate level of understanding about the locations of those populations, the threats impacting them, and the management actions needed to reduce these impacts. Therefore, the approach to the development and implementation of strategies for data-deficient species will be different to other management streams. Describing this approach is the purpose of this document.

Saving our Species data-deficient management stream

Species are allocated to the data-deficient management stream when there is not enough knowledge about their ecology, distribution, threats or management needs to inform an effective management strategy (Table 1). Typically, data-deficient species need investment in targeted research or survey to fill those knowledge gaps and determine the best approach to on-ground management.

By definition, these species have enough data to inform a threatened species assessment against the criteria for listing on the Schedules of the BC Act. However, this is often not enough data to inform development of a strategy under a different SoS management stream (e.g. site-managed).

SoS has allocated 105 (as of February 2019) species to the data-deficient management stream. This is 11% of the (February 2019) total number of species listed as threatened in New South Wales.

All species listed as **extinct** or **extinct in the wild** under the BC Act will be automatically allocated to the data-deficient stream, except for species that have:

- had populations recently rediscovered in New South Wales
- been reintroduced to New South Wales through a strategic program (e.g. the Reintroduction of locally extinct mammals project).

Such species will be moved to a different stream (e.g. site-managed) pending reassessment of their status under the BC Act by the NSW Scientific Committee.

Table 1: Examples of data-deficiency in threatened species management.

Common critical knowledge gaps effective management	Example priority action to address knowledge gap
The specific location and size of populations is unknown or poorly known (e.g. due to limited survey effort or cryptic nature of species)	Conduct a targeted survey in areas surrounding historical observation records and/or areas of known suitable habitat
Basic ecology of the species (e.g. life history, habitat requirements) is poorly understood	Undertake targeted research on species' basic ecology
Poor understanding of the species' critical threats or key drivers of viability (e.g. disturbance regime) and how to manage them	Conduct fundamental research or adaptive management focusing on the interaction between threats/drivers and species population
The species' occurrence and reproduction are highly variable or respond to stochastic environmental drivers (e.g. boom-bust life history), limiting opportunities for observation and protecting specific habitat (may be inferred)	Undertake a responsive survey program triggered by relevant environmental conditions

Data-deficient species stream approach

Alignment with the *Saving our Species* framework and program objectives

SoS has a program logic to guide implementation of its framework, including short-, medium- and longer-term outcomes, which links program activities to end-of-program outcomes. Figure 1 shows how the goals for the data-deficient management stream are placed within this program logic.

A key SoS principle is cost-effectiveness, which for data-deficient species, means getting the most from investment in research and survey activities. To achieve this, SoS must decide which research or survey activities are likely to provide information that will fill critical knowledge gaps and allow a species to be moved into another management stream.

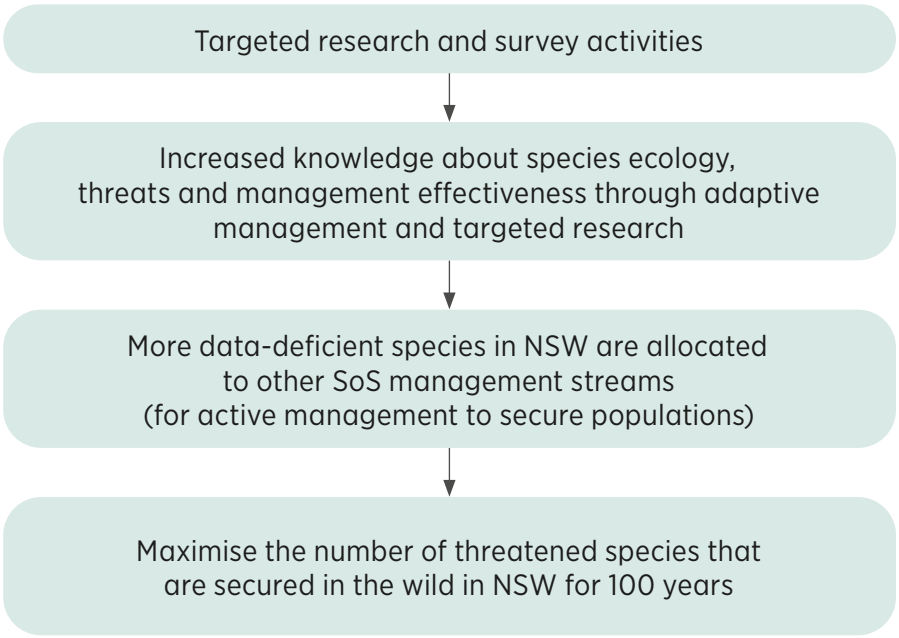

Figure 1. Activities, objectives and outcomes for data-deficient species, within the SoS program logic

Development of strategies for data-deficient species

Under the SoS program, a strategy for a data-deficient species has a simple list of research or survey actions needed to fill the critical knowledge gaps that are restricting our effective management of the species.

To ensure the cost-effectiveness of data-deficient strategies, it is important that each action is in response to a critical knowledge gap. The definition of a 'critical' knowledge gap in this context is one that hinders effective management.

For example, if there is not enough data or knowledge on the location of significant populations, this is a critical restriction on effective management. Similarly, if populations are known to be declining, but there is currently nothing known about the cause of decline, or we do not know the outcome of using a management technique, these are critical constraints.

In contrast, if the locations of several significant populations and the threats to them are understood, but we are not sure of the full distribution and abundance of the species across its range, this uncertainty is not a critical knowledge gap restricting effective management.

Given the relatively simple structure of data-deficient strategies, they can be developed without a formal expert panel used for complex strategies, such as site-managed species (OEH 2013b). The relevant SoS Species Project Coordinator (SPC) can draft a set of priority research/survey actions, in consultation with all relevant experts. Once developed, the priority actions are publicly exhibited according to the provisions of the BC Act before being formally adopted as a SoS strategy by the Environment Agency Head.

Implementation and investment prioritisation

The available information used to prioritise investment in data-deficient species is different to that for site-managed species, which uses a Project Prioritisation Protocol (PPP; OEH 2013, Brazill-Boast et al. 2018). However, it shares some elements, so we can apply a modified approach. A 'benefit' value, representing an estimate of the likelihood of a species surviving for 100 years (extinction risk), can be calculated for each species. This is based on its BC Act threat status (Vulnerable = 0.1, Endangered = 0.7 and Critically endangered = 0.9). This calculation follows the method used for site-managed species. The method equates the increasing importance or investment urgency with increased risk of extinction, aligning with the SoS program objective.

Cost is measured simply as the total implementation cost of the proposed research/survey action(s). We calculate a cost-effectiveness score by dividing **benefit** by **cost**, which can then be used to rank investment options (i.e. proposed data-deficient projects).

Another important consideration when assessing the relative benefits of data-deficient species projects is the likelihood that the project outputs will be enough to allow reallocation of the species to a different management stream. For example, the information we gain from a targeted survey is (generally) more likely to be suitable and useful for developing management priorities (e.g. for a site-managed species project) than information gained from genetic analyses.

External partners

Potential program partners outside of the Department of Planning, Industry and Environment (e.g. universities, research institutes, museums) are encouraged to align investment in data-deficient species with the relevant SoS strategies wherever possible and appropriate. Many of the priority research/survey actions included in strategies are likely to be appropriate as the focus of short-term (6-12 months) post-graduate research projects.

Biodiversity offsets scheme

An additional avenue for investment in data-deficient species is via the biodiversity offsets scheme (BC Act Part 6). Priority actions within a data-deficient species strategy that are listed in the ancillary rules may be funded by an organisation who must make a biodiversity offsets payment to meet that offset obligation (Biodiversity Conservation Regulation 2017, clause 6.5). The actions listed in the ancillary rules focus on:

- threatened species that are difficult to effectively manage at a biodiversity stewardship site due to limited understanding of its ecology, threats or management requirements, or
- threatened species with a limited known distribution that will benefit from research to find more locations where the species is present.

Knowing when to stop looking

By definition, information on the distribution and abundance of data-deficient species is often scarce. In some cases, this is despite significant survey effort. Therefore, a strategic approach to investment in these species must include an assessment of the likelihood of returns on further investment in particular species. For example, at a certain point it becomes inefficient to keep investing in targeted survey for a species which may not occur in New South Wales. To support these types of decisions, SoS will employ a decision science tool based on Partially Observable Markov Decision Processes (POMDP) (Chadès et al. 2008). The tool, developed with CSIRO, will help to decide whether it is cost-effective to keep investing (particularly in survey effort), or whether available funds should be used elsewhere in the program. This tool will be used as part of the broader process for prioritising investment in data-deficient species.

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