A risk-based approach for native animal keeping

Introducing a risk-based tool for determining native species regulation

Department of Climate Change, Energy, the Environment and Water

NSW GOVERNMENT

Acknowledgement of Country

Department of Climate Change, Energy, the Environment and Water acknowledges the Traditional Custodians of the lands where we work and live.

We pay our respects to Elders past, present and emerging.

This resource may contain images or names of deceased persons in photographs or historical content.

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1. Introduction

A foundational purpose of the *Biodiversity Conservation Act 2016* (BC Act) is to regulate human interactions with wildlife by applying a risk-based approach. The National Parks and Wildlife Service (NPWS) is the regulating agency responsible for administering native animal keeping licences in New South Wales. Consistent with the objectives of the BC Act, NPWS is applying a risk-based approach to regulate private native animal keeping.

There are few rigorous, evidence-based tools or frameworks to aid regulators in determining what species should be exempt or licensed, and for determining relative risks associated with these decisions. The development of a risk-based tool (RBT) assists in determining what level of regulation is appropriate for native animals kept by private keepers in New South Wales. The risk-based approach is a systematic method of making these decisions based on best available knowledge from reliable information sources and experts, supported by evidence.

This document provides an overview of the process NPWS follows to consider and determine whether a species will move to a different regulatory category and for adding a new species to the *NSW Native animal keeper's list*.

The risk-based tool is designed to follow an iterative process that adapts to changes and can be improved over time as new information becomes available. This version of the RBT has been designed for bird species proposed to move from a licensing regulatory category to a code of practice (requires no licence). The next phase, for the purpose of assessing bird species, will detail assessment categories within licence (that is, basic and advanced). The RBT will be adjusted in future for assessing reptiles and amphibians.

1.1 Objectives

The over-arching objective of the risk-based approach is to provide a robust and transparent framework for decision-making regarding the level of regulatory protection required for native species that are intended to be privately kept in New South Wales. The outcome will determine whether a species should be licensed or subject to a code of practice under the BC Act, exempt from regulation or prohibited from private keeping in New South Wales.

1.2 How risk will be assessed

The RBT makes use of quantitative and qualitative data from multiple sources. It is a hybrid risk assessment approach that measures the likelihood and consequence of a potential risk event occurring when keeping the species as a pet.

The assessment follows commonly agreed risk parameters and standards considered for keeping native animals as pets in Australia. These include:

- the husbandry and welfare requirements of the species
- conservation risk to wildlife from poaching or release of the species from captivity
- the availability and cost to purchase the species from legal sources to support private keeping, breeding and commercial dealing
- human health, social and economic considerations.

The RBT is a risk tolerance-focused assessment that assigns a score to each response. When the level of risk increases beyond a threshold, the score increases (see section 3 for further details).

1.3 Evidence and review

An integral component of the RBT is that evidence will be used to support the response given. Where information is insufficient to make an informed decision, we may apply the precautionary principle, and the final determination may be declined or delayed until further information is available.

The assessment process has an embedded consultative process that uses a group of external stakeholders, called the Species List Advisory Committee (SLAC). They bring expertise in animal welfare, conservation, recreational animal keeping, animal husbandry, and wildlife health. The SLAC will review individual species risk assessments that have been submitted and assess whether they agree or disagree with the proponent's (applicants) responses. In the case of disagreement with a proponent's response, the SLAC reviewer will need to provide evidence to support their disagreement and alternate response to the question being asked.

1.4 Limitations

It is acknowledged that risk assessments involve various degrees of uncertainty. Risk assessments are often value judgements based on the skills and knowledge of the person making the assessment. Certainty is only as good as the quality of the information and evidence known at the time (Kirkpatrick and Page 2010, ISO 31000:2018).

In the wildlife and conservation field, there is often insufficient quality data available to make meaningful risk assessments or precise estimates, especially when the process is new or has not been done before (OIE – IUCN 2014). When meaningful qualitative data is lacking, a structured qualitative approach enables the use of available information to analyse risk and generate the insights needed to make informed decisions (OIE – IUCN 2014).

A set of schemas have been developed to support the capture of qualitative data reliably, and a questionnaire for the proponent, the SLAC and NPWS, has been developed to facilitate structured decision-making.

2. Nominating a species using the risk-based tool

2.1 Overview of species determination process

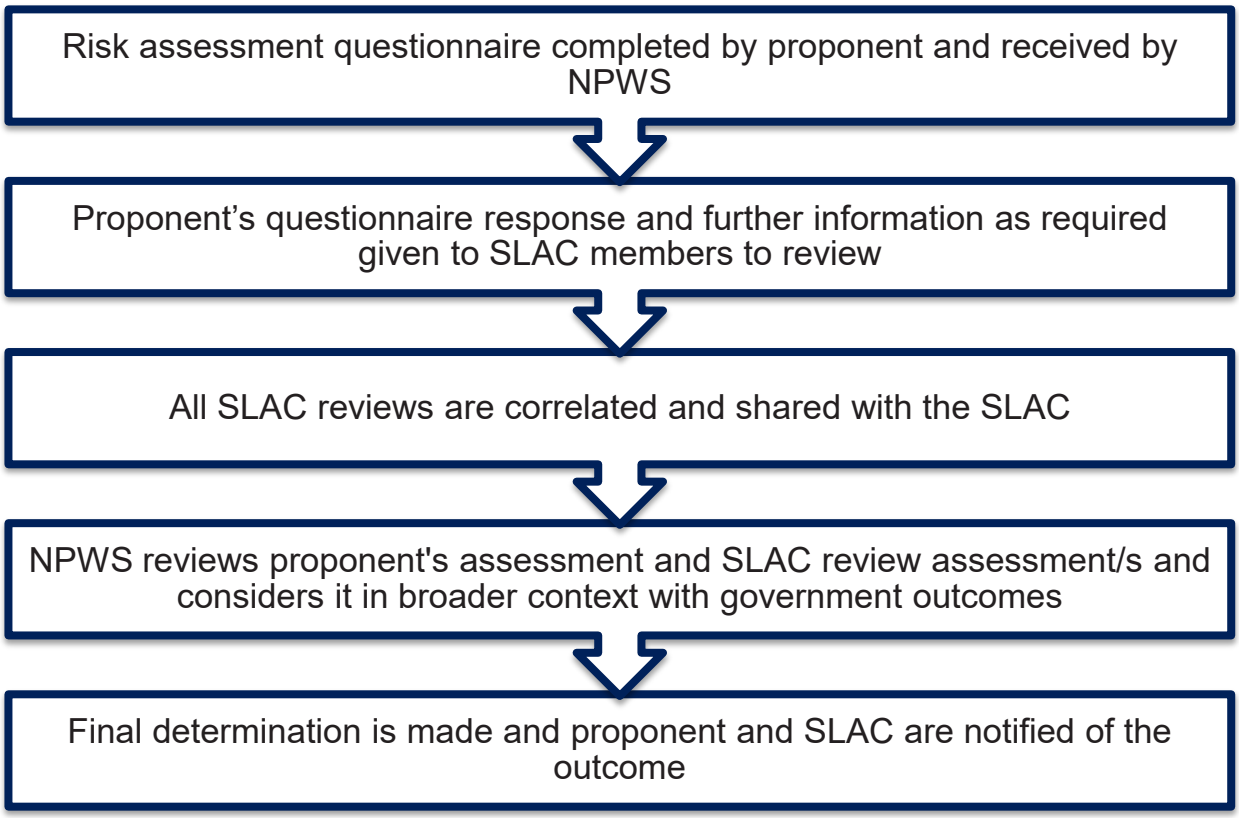

Figure 1 **Process flow chart**

Step 1: Species proposed

A proposal can be made to request either:

- a change to the current regulatory category of a species
- to add a new species to the *NSW Animal keeping species list*

by completing the proponent risk-based questionnaire.

The proponent is asked a series of structured questions and must select the most appropriate response based on their knowledge. To help proponents, a set of guidelines and schemas have been developed. The proponent will be asked to provide evidence supporting their response to each question (see evidence table in Appendix A).

If required, NPWS may consult with the party making the request to ensure the required information has been supplied.

If the proponent is unfamiliar with the assessment questions, it is recommended that they consult with the relevant animal keeping group (reptiles, bird, amphibians) or a species specialist to prepare their risk assessment.

The proponent risk-based questionnaire for birds is made up of 17 questions that generates 12 results, comprised of:

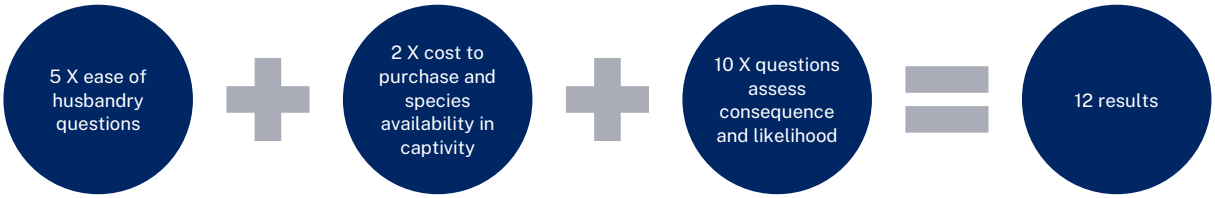

Figure 2 **Examples of questions**

Each of the 12 results generated by the responses has a level of risk assigned, as shown in Table 1 and Table 2. The scores are exponential (0,1,2,4) and for ease of understanding are assigned a colour.

Each possible result for each question is given a score based on the acceptable risk tolerance for a species changing regulatory category from licence to code of practice. Table 2 shows all combinations of response options in detail.

Table 1 **Code of practice risk categorisation**

Risk level		Point
Lowest risk	**Green**	**0**
Moderate risk	**Yellow**	**1**
Higher risk	**Tan**	**2**
Highest risk	**Red**	**4***

*No single result can receive a score of 3. The scores are exponential (0,1,2,4) not sequential.

Table 2 Detailed risk categorisation

Answers to the questions						
Ease of husbandry – housing	Simple	Complex	Highly specialised	No information		
Ease of husbandry – dietary	Simple	Complex	Highly specialised	No information		
Ease of handling – experience	Basic	Specialist	Expert	No information		
Ease of handling – behaviour	Simple	Complex	Highly specialised	No information		
Ease of breeding	Simple	Complex	Highly specialised	No information		
Unwanted animals – consequence and likelihood	Insignificant and almost certain	Minor and almost certain	Moderate and almost certain	Major and almost certain	Extreme and almost certain	
	Insignificant and likely	Minor and likely	Moderate and likely	Major and likely	Extreme and likely	
	Insignificant and possible	Minor and possible	Moderate and possible	Major and possible	Extreme and possible	
	Insignificant and unlikely	Minor and unlikely	Moderate and unlikely	Major and unlikely	Extreme and unlikely	
	Insignificant and rare	Minor and rare	Moderate and rare	Major and rare	Extreme and rare	
	Insignificant and almost certain	Minor and almost certain	Moderate and almost certain	Major and almost certain	Extreme and almost certain	

Answers to the questions						
Poaching risk – consequence and likelihood	Insignificant and likely	Minor and likely	Moderate and likely	Major and likely	Extreme and likely	
	Insignificant and possible	Minor and possible	Moderate and possible	Major and possible	Extreme and possible	
	Insignificant and unlikely	Minor and unlikely	Moderate and unlikely	Major and unlikely	Extreme and unlikely	
	Insignificant and rare	Minor and rare	Moderate and rare	Major and rare	Extreme and rare	
Commonly available – numbers in captivity	Very high	High	Moderate	Low	Extremely low	No information
Commonly available – species cost	Extremely low	Low	Moderate	High	Very high	No information
Spread of disease (wildlife) – consequence and likelihood	Insignificant and almost certain	Minor and almost certain	Moderate and almost certain	Major and almost certain	Extreme and almost certain	
	Insignificant and likely	Minor and likely	Moderate and likely	Major and likely	Extreme and likely	
	Insignificant and possible	Minor and possible	Moderate and possible	Major and possible	Extreme and possible	
	Insignificant and unlikely	Minor and unlikely	Moderate and unlikely	Major and unlikely	Extreme and unlikely	
	Insignificant and rare	Minor and rare	Moderate and rare	Major and rare	Extreme and rare	

Answers to the questions						
Pest potential – consequence and likelihood	Insignificant and almost certain	Minor and almost certain	Moderate and almost certain	Major and almost certain	Extreme and almost certain	
	Insignificant and likely	Minor and likely	Moderate and likely	Major and likely	Extreme and likely	
	Insignificant and possible	Minor and possible	Moderate and possible	Major and possible	Extreme and possible	
	Insignificant and unlikely	Minor and unlikely	Moderate and unlikely	Major and unlikely	Extreme and unlikely	
	Insignificant and rare	Minor and rare	Moderate and rare	Major and rare	Extreme and rare	
Human health and disease risk (zoonosis) – consequence and likelihood	Insignificant and almost certain	Minor and almost certain	Moderate and almost certain	Major and almost certain	Extreme and almost certain	
	Insignificant and likely	Minor and likely	Moderate and likely	Major and likely	Extreme and likely	
	Insignificant and possible	Minor and possible	Moderate and possible	Major and possible	Extreme and possible	
	Insignificant and unlikely	Minor and unlikely	Moderate and unlikely	Major and unlikely	Extreme and unlikely	
	Insignificant and rare	Minor and rare	Moderate and rare	Major and rare	Extreme and rare	

Step 2: Responses compiled by National Parks and Wildlife Service

- NPWS receives the completed proponent risk-based questionnaire and, where appropriate, provides data of relevance (such as animal keeping e-book records) to accompany the outcome of the RBT and shares these with the SLAC for their review.

Step 3: Species List Advisory Committee review

- All SLAC members will be asked to review the proponent risk-based questionnaire submitted, as well as any additional accompanying information provided by NPWS, if appropriate.
- Participating members will complete a SLAC review assessment, which asks if they agree or disagree on all individual responses submitted by the proponent.
- If a SLAC member disagrees with a proponent's response, they must then provide evidence to support their alternate response. If the SLAC member supports the proponent's assessment, providing additional supporting evidence is optional.
- All SLAC reviews are compiled and shared with all members. Where agreement is not achieved through the assessment process to determine the regulatory category for a species, when required, there will be an opportunity to discuss opposing responses during a SLAC meeting before NPWS makes a final determination.

Species risk assessment results

Out of a total of 12 results (lowest possible score = 0 and highest possible score = 48), the score must not reach 4 points for species proposed to move regulatory category from licence to a code of practice. Having a score of 4 or above results in the RBT recommending that the species not be included in the code of practice. The assessment criteria for categorisation within licence class types (i.e., basic, advanced) is being developed in a future iteration of the RBT.

Table 3 shows potential result combinations where a code of practice regulatory category is not recommended.

Table 3 Code of practice assessment criteria

4 Yellow = Not code	
or	
1 Tan + 2 Yellow = Not code	
or	
2 Tan = Not code	
or	
1 Red = Not code	

Step 4: NPWS internal assessment and determination

NPWS will consider the proponent's risk-based questionnaire and SLAC review assessments to make a final determination. In this assessment, NPWS will consider community support, government policies, reputational risks, political, environmental, and economic implications.

In its determination, NPWS can decide to:

- accept the level of risk without condition
- accept the level of risk with condition
- decline the level of risk.

Accepting the level of risk with condition may require that a risk treatment control be added or improved, or other mechanisms implemented as risk mitigation. Declining the risk will result in the species not moving to a code of practice. Once the final decision is made, NPWS will notify the proponent and the SLAC of the outcome.

3. References

Australian/New Zealand standard on risk management (ISO 31000:2018 Risk management – Principles and guidelines).

Office of Environment and Heritage (2019) *NSW Native Animal Keepers' Species List,* DPE (Department of Planning and Environment), accessed July 2023.

Massam M, Kirkpatrick W and Page A (2010) Assessment and prioritisation of risk for forty introduced animal species. Invasive Animals Cooperative Research Centre, Canberra.

World Organisation for Animal Health (OIE) and International Union for Conservation of Nature (IUCN) (2014). – Guidelines for Wildlife Disease Risk Analysis. OIE, Paris, 24 pp. Published in association with the IUCN and the Species Survival Commission. https://portals.iucn.org/library/node/49101

Appendix A

Risk-based questionnaire

Attribute	Ease of husbandry
Question	**The housing requirements (size, design, etc.) for the species to be kept at optimum conditions are?**
Options for response	Simple, Complex, Highly specialised, No information
Question	**The dietary requirements for the species to be kept at optimum conditions are?**
Options for response	Simple, Complex, Highly specialised, No information

Attribute	Ease of handling
Question	**What level of experience is required to keep this species at optimum conditions?**
Options for response	Basic, Specialist, Expert, No information
Question	**What are the behaviour requirements for the species to kept in a positive emotional state?**
Options for response	Simple, Complex, Highly specialised, No information

Attribute	Ease of breeding
Question	**Successful breeding of the species in captivity is?**
Options for response	Simple, Complex, Highly specialised, No information

Attribute	Unwanted animals
Question	**What is the consequence if the species, if surrendered/abandoned by its owner, will be unable to be rehomed appropriately?**
Options for response	Insignificant, Minor, Moderate, Major, Extreme
Question	**What is the likelihood the species if surrendered/abandoned by its owner will be unable to be rehomed appropriately?**
Options for response	Rare, Unlikely, Possible, Likely, Almost certain

Attribute	Conservation status
Question	**What is the conservation status of this species nationally?**
Options for response	Least concern, Vulnerable, Endangered, Critically endangered
Question	**What is the conservation status of this species is New South Wales?**
Options for response	Not found in New South Wales, Least concern, Vulnerable, Endangered, Critically endangered, Extinct

Attribute	Poaching risk
Question	**If individuals were sourced (illegally) from the wild, what impact would this have on wild population of the species?**
Options for response	Insignificant, Minor, Moderate, Major, Extreme
Question	**If the proposed species is added to the species list or changes regulation type, what do you believe is the likelihood of an incentive to take species from the wild?**
Options for response	Rare, Unlikely, Possible, Likely, Almost certain

Attribute	Commonly available
Question	**To mitigate concerns about taking from the wild, what is the supply of species available from captive legal sources?**
Options for response	Very High, High, Moderate, Low, Extremely low, No information
Question	**What is the cost of the species to purchase?**
Options for response	Extremely low, Low, Moderate, High, Very high, No information

Attribute	Spread of disease (wildlife)
Question	**What would be the consequence if disease spread from captive individuals to wild populations?**
Options for response	Insignificant, Minor, Moderate, Major, Extreme
Question	**What is the likelihood of disease spreading to wildlife if this species is released from captivity?**
Options for response	Rare, Unlikely, Possible, Likely, Almost certain

Attribute	Pest potential
Question	**What is the consequence of the species establishing in the wild from a captive source?**
Options for response	Insignificant, Minor, Moderate, Major, Extreme
Question	**What is the likelihood of contamination (breeding, hybridising, out-competing) of wild populations if the species was released from captivity?**
Options for response	Rare, Unlikely, Possible, Likely, Almost certain

Attribute	Human health/disease risk (zoonosis)
Question	**What is the consequence of the species causing injury or infecting humans with disease?**
Options for response	Insignificant, Minor, Moderate, Major, Extreme
Question	**What is the likelihood of the species causing injury or infecting humans with disease?**
Options for response	Rare, Unlikely, Possible, Likely, Almost certain

Attribute	Other comments in support of proposed change
Question	**Please provide any additional information here to support your assessment.**
Options for response	Blank field

Supporting guidelines and schemas for birds only

Housing requirements (size, design, etc.) for the species to be kept at optimum conditions

Husbandry rating	Description
Simple	The environmental conditions required to meet the species' physical needs are not difficult to provide. Including: optimal thermal, light, noise conditions and shelter. The size and dimension of enclosure to allow for free movement and appropriate social housing is not difficult or expensive to obtain and maintain. Typical enclosures commonly available from pet suppliers with adequate space and requiring only features that are easily sourced, for example, a sand substrate bottom, perches, and roosting sites accessible for novice keepers allows animal to exhibit natural behaviours.
Complex	The environmental conditions required to meet the species' physical needs are more difficult to provide. Including: optimal thermal, light, noise conditions. The size of enclosure to allow for free movement and appropriate social housing may be considerable. Specialised aviary is required with adequate space and specific features such as complex substrate material foliage, complex roosting or hiding areas so the animal can exhibit natural behaviours and activity levels.
Highly specialised	Highly specialised structures/aviary design and/or plantings/or water bodies are required to encourage natural behaviours. Not typical for novice keepers to access or design without prior experience. The environmental conditions required to meet the species' physical needs are challenging to provide. Including: optimal thermal, light, noise conditions. The size of enclosure to allow for free movement and appropriate social housing may be prohibitive for most keepers.
No information	There is no information on the housing requirements for this species in a captive setting.

Dietary requirements for the species to be kept at optimum conditions

Husbandry rating	Description
Simple	Commonly available bird feed and/or live feed, fresh fruits and vegetables provides this species with complete nutritional requirements. Feeding required once or twice per day. Dietary related illness is rare.
Complex	Requires certain foods with varied diet to meet dietary requirements and supplementary feeding, feeding might be required multiple times per day. May require stricter hygiene control.

Husbandry rating	Description
Highly specialised	Commercial feed usually unsuitable for the species complete nutritional requirements. Complex foraging/feeding requirements specific to life-stage, for example, regurgitation, access to live prey, social management (e.g., food competition).
No information	There is no information on the dietary requirements for this species in a captive setting.

What level of experience is required to keep this species at optimum conditions?

Husbandry rating	Description
Basic	There is a lot of reliable information on the behaviour and needs of the species, the needs are not complex, and the animal presents no significant safety risk to the handler. Suited for beginners with no prior experience keeping similar species.
Specialist	Requires highly competent keeper with previous experience keeping similar species (within the same group). The needs of the species are sufficiently complex that a higher degree of knowledge and experience is required to meet these needs in captivity. Animal presents no significant safety risk to the handler. The species in captivity lives a long time.
Expert	The species is venomous. Requires specialist handling, training and or experience prerequisites with the similar species (within the same group). The behaviour and needs of the species are incompletely understood or difficult to meet in captivity. The risk of morbidity of this species is significant (illness, behavioural abnormality, death).
No information	There is no information about the behaviour, husbandry, and handling requirements of this species in a captive setting.

What are the behaviour requirements for the species to kept in a positive emotional state?

Husbandry rating	Description
Simple	Opportunities to engage in a normal repertoire of behaviour are easy to provide including, an environment where typical behaviours of the species are easily expressed, such as space for free movement, activity, as well as rest and retreat, and appropriate socialisation. No significant reports of husbandry related medical and behavioural disorders in captive species.

Husbandry rating	Description
Complex	Adequate opportunity to engage in a normal repertoire of behaviour are difficult to provide in captivity including, an environment where typical behaviours of the species is easily expressed, such as space for free movement, activity, as well as rest and retreat, appropriate socialisation. Some reports of husbandry related medical and behavioural disorders in captive species. The species is known to, in general, be more sensitive to sensory impositions and human proximity.
Highly specialised	Adequate opportunity to engage in a normal repertoire of behaviour cannot be reliably provided in private keeping including, an environment where typical behaviours of the species is easily expressed, such as space for free movement, activity, as well as rest and retreat, appropriate socialisation. Reports of serious or common husbandry related medical and behavioural disorders in captive species. The species is known to, in general, be less resilient and more sensitive to sensory impositions and human proximity.
No information	There is no information regarding the needs of this species in a captive setting.

Successful breeding of the species in captivity

Husbandry rating	Description
Simple	Very easily breeds captivity, high hatch rates and typically produce one or more clutches per year. The species is well-established and very secure in Australian aviculture.
Complex	Some challenges and considerations required, such as minimal human intervention, certain environmental conditions, for example, complex type of nest or privacy, artificial nests. Suited to experienced breeders.
Highly specialised	Difficult to breed in captivity and commonly requires human intervention to ensure successful breeding. Complex breeding behaviours (for example, mate-choice, nest-building) difficult to accommodate in captivity. The species might abandon young due to only minor disturbances, requires artificial incubation, hand rearing or fostering and or other techniques not common in aviculture.
No information	There is no information regarding the breeding requirements for this species in a captive setting.

Animal welfare – unwanted animals

In the event of the animal requiring a new home, what will be the welfare impacts on the animal.

Considerations include:

- animal unable to be rehomed appropriately due to there being low demand/over-supply of the species
- how complex the husbandry needs are for the species
- how long lived the species is in captivity (for example, species might out-live its owner).

Insignificant	• Unwanted animals are readily rehomed due to a high demand and ease of care. • Animals may experience insignificant diet, housing, behavioural or health consequences.
Minor	• Lower demand animal must be held for a short period (< 1 week) while a home is found. • Animals may experience minor diet, housing, behavioural or health consequences.
Moderate	• Limited demand animal must be held for a medium period (1 week to 2 months) while a home is found. • Animals may experience moderate diet, housing, behavioural or health consequences.
Major	• Very limited demand animal must be held long-term (2 - 6 months) while a home is found. • Animals may experience major diet, housing, behavioural or health consequences.
Extreme	• No demand animal held for > 6 months. No home found. • Animals experience major diet, housing, behavioural or health consequences. • Euthanasia due to unable to rehouse unwanted animals.

Conservation risk – poaching animals from the wild

Impacts to the status of species populations, habitats, and ecosystems from poaching impacts. Considerations include:

- conservation status of species and populations, its distribution, mobility, and ability to avoid impacts and effects on its breeding cycle
- availability of the species from private keepers
- if the species is known to be susceptible to poaching, trapping, illegal collection of eggs
- CITES listing should also be reviewed
- population declines, including of other species in the ecosystem.

Insignificant	• Little or no impact to species, biodiversity, or ecosystems. • Overall, the long-term conservation of wild populations and their habitats and ecosystems will not be affected. • Wild population is abundant and stable (No listing/NSW Status/IUCN Species Criteria).
Minor	• Minor impacts on species, biodiversity, and ecosystems. • Local populations disrupted, breeding cycles impacted, minor disturbance to habitats and ecosystems, with recovery occurring relatively quickly and with little or no intervention. • Wild population may be declining (Vulnerable or no listing for NSW Status/ IUCN Species Criteria – Near Threatened).
Moderate	• Significant, medium to long-term impacts. • Small or isolated populations may decline or disappear. Reduction in habitat quality or ecosystem function occurs and will require medium to long time frames for recovery. • Wild population is declining (Conservation status in New South Wales, IUCN Species Criteria – Vulnerable or Data Deficient).
Major	• Major long-term impacts including permanent loss of species populations. • Significant declines in species abundance and range (i.e., several localised extinctions). Impacts to habitats and ecosystems will take an extended period to recover and will require significant intervention/management to achieve. • Conservation status of species changes to higher threat category (NSW Conservation status; IUCN Criteria).
Extreme	• Extinction in the wild of species. • High conservation entities (for example, threatened species, EECs, critical habitat) are permanently, negatively impacted. • Habitat no longer able to support wild populations, ecosystem recovery not possible/feasible. • Conservation status of species is extinct.

Species holding – birds only	Numbers in private keeping (NSW)
Extremely low	< 24
Low	25 to 49
Medium	50 to 99
High	100 to 499
Very high	> 500

*Based on e-Book data

Cost to purchase – birds only	Price per pair ($)
Extremely low	< $100
Low	$101 to 250
Medium	$251 to 500
High	$501 to 1,999
Very high	>$2,000

Biosecurity risk – disease (wildlife)

Impacts to the status of species populations, habitats and ecosystems from introduction or proliferation of disease in the wild. Considerations include:

- potential for disease to be spread from captive animals and impact wild populations of the same and/or other species
- capacity for a released species to establish itself in the wild, its potential to be a reservoir for disease
- potential for the introduction of novel pathogens to naïve wildlife populations.

Insignificant	• Little or no impact to other species, biodiversity or ecosystems if comes into contact with free-ranging wildlife (for example, low pathogenicity, low transmission rates). • Disease does not persist or threaten wild populations (for example, existing immunity or disease already prevalent in wild populations).
Minor	• Minor impact to other species, biodiversity or ecosystems if comes into contact. • Disease has the potential to establish in wild and causes some minor localised suppression of populations of the same or other species.
Moderate	• Moderate impact to other species, biodiversity or ecosystems if comes into contact. • Disease has the potential to establish in wild and causes significant localised suppression of populations of the same or other species.
Major	• Major impact to other species, biodiversity or ecosystems if comes into contact. • Disease establishes in wild, causing ongoing regional reduction of populations of the same or other species. Causing declines of the same or other species resulting in change in conservation status to higher threat category.
Extreme	• Extreme impact to other species, biodiversity or ecosystems if comes into contact (for example, potential to become a disease listed as a key threatening or process notifiable disease). • Disease readily establishes in wild (high transmission), spreads broadly, potentially to other jurisdictions. Causes significant declines of the same or other species and/or extinction of a species from the wild.

Biosecurity/conservation risk – pest potential

Impacts to the status of species populations, habitats, and ecosystems from animal(s) release into the wild. Considerations include:

- capacity for a released species to establish itself in the wild as a pest species, its provenance (that is, endemic to New South Wales)
- ability to survive in the wild (that is, behaviour, genetic characteristics without human intervention)
- potential for genetic contamination (that is, hybridise with local populations)
- conservation status of species, its distribution, mobility, and ability to avoid impacts and effects on its breeding cycle.

Insignificant	• An insufficient number of animals are released, or they die or are recaptured before establishing breeding population in the wild. • No threat to local wild populations.
Minor	• Released animals remains localised and has minimal impact on the environment or other species. Minimal ecosystem remediation required.
Moderate	• Establishes in wild, remains localised but causes significant suppression of populations of other species. • High risk of collapse loss of ecosystem function. Considerable environmental remediation required.
Major	• Establishes in wild, distribution spreads broadly and leads to regional flora and/or fauna declines would take a long time to recover. • Very high risk of collapse loss of ecosystem function. Major long-term environmental remediation required.
Extreme	• Establishes in wild, distribution spreads broadly and leads to regional flora and/or fauna declines. • Extremely high risk of collapse loss of ecosystem function or permanent loss of definitive components from ecosystem, such as species extinction.

Human health/disease (zoonosis)

Human health considerations include:

- potential transmission of infectious disease (for example, viral, bacterial, protozoal from captive animals to humans [zoonosis])
- severity of the zoonosis on human health
- potential for harm/injury because of non-infectious diseases (for example, trauma, bites, scratches).

Insignificant	• None or very minor threat to human health or safety. • Will heal without treatment, incapacity <= 4 hours. • Low risk of human transmission.
Minor	• Minor threat that may cause temporary morbidity requiring treatment. Requires first-aid or medical intervention for resolution, incapacity > 4 hours, <= 1.5 days. • Minor opportunity for human transmission.
Moderate	• Moderate threat with potential to lead to permanent disability chronic morbidity. • Requiring medical attention/hospitalisation, incapacity > 1.5 days, <= 2 weeks. • Moderate opportunity for human transmission.
Major	• Major threat leading to single fatality or severe permanent disability and impairment. • Requiring medical attention/hospitalisation and/or incapacity > 2 weeks, <= 5 months. • Major opportunity for human transmission.
Extreme	• Unrecoverable threat leading to multiple fatalities or significant irreversible public health impacts. • Death, deformity, severe permanent disablement of the person, and/or requiring medical attention and hospitalisation and/or incapacity for > 5 months. • Extreme opportunity for human transmission.

Evidence table

Type of evidence	Definition	What you should provide
Professional experience	Individual employed in the relevant field of the subject for example vet or academic	Name, role and number of years
Subject matter expert	Skilled individual in the relevant field, for example aviculturist, herpetologist, cultural knowledge holder, or person previously employed/studied in the field	Name and area of expertise and number of years involved
Community knowledge	Knowledge of an individual or group	Name and area of expertise, project or process
Research	Systematic investigation of the relevant field, for example research papers or scientific studies	Date, link, title of research/reports
Data	Facts or statistics collected for reference or analysis, for example reports	Date and title of data link of report

Type of evidence	Definition	What you should provide
Other	Any other sources of evidence that cannot be categorised with the above criteria	Name and relevant information
Research is lacking	Have attempted to research, but minimal/no information can be found	Terms used in search engines and/or website links

Likelihood table

Likelihood rating	Description	Frequency	Probability
5 Almost Certain	Strong likelihood of occurring, with much opportunity and means to occur. Large number of known incidents (records/experience)	Could occur several times within one year	> 90%
4 Likely	Considerable opportunity and means to occur. Regular incidents known (records/experience)	Could occur once or twice within one year	> 50 to 90%
3 Possible	Some opportunity and means to occur. Few infrequent, random occurrences recorded/experienced	Could occur within one to 2 years	> 20 to 50%
2 Unlikely	Little opportunity or means to occur. No known incidents recorded or experienced	Could occur within the next 5 years	5 to 20%
1 Rare	Almost no opportunity to occur. Not known to have ever occurred	Could occur less than once every 10 years	< 5%