

16th March 2026

Chemical Review
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Dear Chemical Review Team,

WILDLIFE HEALTH AUSTRALIA SUBMISSION: APVMA SPECIAL GAZETTE, 16TH DECEMBER 2025

Please find attached a submission in response to the APVMA Special Gazette, 16th December 2025 and APVMA Gazette No. 5, 10th March 2026.

Wildlife Health Australia welcomes the APVMA's reconsideration of anticoagulant rodenticide regulation in Australia.

Non-target poisoning of native wildlife with anticoagulant rodenticides is a significant global concern. Exposure to anticoagulant rodenticides has been reported in a broad range of species and geographic areas of Australia, and toxicity has been confirmed in multiple events and via multiple exposure pathways. While further research is needed to understand the impact of anticoagulant rodenticides on native wildlife populations, the evidence suggests that some species, particularly endangered raptors and marsupials, are likely to be experiencing population-level effects.

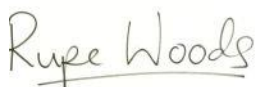
Suspension of the registrations of second-generation anticoagulant rodenticides, as per Gazette No. 5, and certification that they should be made restricted chemical products, are important first steps towards mitigating risks to wildlife. However, scientific evidence and overseas experience show that meaningful prevention of negative impacts necessitates a suite of measures that effectively address all exposure pathways and reflect accurate assessment of the risks to wildlife.

As such, in relation to the exposure and associated harmful impacts of anticoagulant rodenticides on non-target terrestrial vertebrates, and both commercial and domestic products, this submission:

- Highlights issues regarding use of scientific information in the APVMA Special Gazette, 16th December 2025, and the Anticoagulant Rodenticides Review Technical Report.
- Presents arguments pertaining to the assessment methodologies employed.
- Discusses proposed risk mitigation measures from an evidence-based wildlife health perspective.
- Provides recommendations to protect native wildlife from ongoing harm, building on the proposals in the Special Gazette and Gazette No.5, and informed by the WHA analysis and international best practice.

Wildlife Health Australia hope this submission is of assistance and would be happy to discuss it further should you require additional information or clarification.

Yours sincerely,



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ABOUT WILDLIFE HEALTH AUSTRALIA

Wildlife Health Australia (WHA) is a national body that advances wildlife health for a healthier future for all. Built on strong, trusted partnerships across Australia and beyond, WHA brings together experts, governments and communities to understand and respond to wildlife health issues.

WHA coordinates national wildlife health systems and networks, integrating intelligence and expertise from over 120 government and non-government partners across environment, health and agriculture sectors. We provide expert advice and credible data to support prevention, preparedness and response strategies for wildlife health threats, aligned with Australia's federated system.

We are trusted advisors on national and international wildlife health issues, informing policies, programs and strategies to integrate wildlife objectives and implement One Health solutions. Our expertise, experience and foresight contribute to advancing wildlife health both in Australia and globally.

We are strongly committed to listening to and elevating Indigenous voices in our work and at all levels of the wildlife health system.

WHA administers the National Wildlife Health Information System (eWHIS) which enables intelligence reports to be provided to members of Animal Health Committee, and the Australian Government Department of Agriculture, Fisheries and Forestry, Department of Climate Change, Energy, the Environment and Water and Department of Health, Disability and Ageing and other government agencies such as the APVMA, on issues of potential national interest, potential emerging issues and significant disease outbreaks in wildlife. The information is provided in line with the agreed policy for data security. WHA also supports the National Animal Health Information System (NAHIS) and Australia's Chief Veterinary Officer by hosting the World Organisation for Animal Health (WOAH) Focal Point for Wildlife.

More information is available at: <https://wildlifehealthaustralia.com.au>

Executive summary

Exposure of non-target native wildlife to anticoagulant rodenticide (AR) chemical products is ubiquitous among taxonomic groups and ecosystems in Australia. There is strong evidence to demonstrate a spectrum of harmful effects in exposed individuals, and to suggest a high likelihood of population and landscape scale consequences in some cases. The APVMA's reconsideration of the active constituent approvals and chemical product registrations and label approvals of anticoagulant rodenticides therefore **represents a significant and timely opportunity to implement robust measures that protect Australian native wildlife from undue harm, particularly endangered species.**

WHA have reviewed the APVMA Special Gazette, 16th December 2025, Anticoagulant Rodenticides Review Technical Report, and Gazette No. 5, 10th March 2026. We have conducted a detailed examination of the scientific information, assumptions, and assessment methodology. Given the urgent imperative of effective mitigatory action for wildlife, we have also considered how identified limitations have influenced proposed decisions.

The principal conclusions of WHA's analysis are:

- **The scale of the threat posed by anticoagulant rodenticides to Australian wildlife is under-represented in the APVMA review.** Specifically, the review does not sufficiently recognise the significantly higher risk profile of second-generation anticoagulant rodenticides (SGARs) compared with first-generation products, or the risks of primary exposure and trophic level and ecosystem accumulations of ARs.
- Due to under-estimation of the risks to wildlife, **the proposed decisions do not amount to sufficient mitigation of the risks of AR exposure and undue harm to wildlife and ecosystems.**

WHA therefore respectfully urges the APVMA to reconsider the proposed decisions in favour of strengthened measures that align with contemporary global standards. We provide a suite of recommendations, including to:

- Remove registration and label approvals from all domestic SGARs, and place additional restrictions on commercial SGARs, in alignment with trends in regulatory standards globally.
- Implement a national AR stewardship program to support compliance, auditing and ongoing evaluation of AR impacts on wildlife and ecosystems.
- Implement and resource a national monitoring and reporting framework for AR toxicity in non-target species, critical for evaluating mitigation strategies and facilitating ongoing surveillance for wildlife exposure and impacts.

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Foreword

As a national body that advances wildlife health for a healthier future for all, Wildlife Health Australia (WHA) welcomes the APVMA's decision to reconsider the registrations of certain anticoagulant rodenticides (ARs) and associated label approvals under Part 2, Division 4 of the Agricultural and Veterinary Chemicals Code (Agvet Code), as presently described in the APVMA Special Gazette, 16 December 2025 (hereafter, Special Gazette). WHA recognise the scale of the task and thank the APVMA for proposing regulatory reform with a view to mitigating the risks of AR exposure in non-target native Australian wildlife.

WHA welcomes the formal acknowledgement that **widespread and harmful exposure of Australian native wildlife to first- and second-generation anticoagulant rodenticides is occurring throughout Australia, and across taxonomic groups, trophic levels, and habitat types**. Crucially, this acknowledgement opens a pathway to change that can improve health outcomes for Australian wildlife and ecosystems, alongside people and pets.

On this basis, WHA supports the APVMA's proposed decisions to vary and affirm certain active constituent approvals and chemical product registrations and label approvals. In particular, WHA strongly supports Finding 31. in 'Attachment B: Draft statement of reasons for the proposed decision to vary and affirm certain anticoagulant rodenticide products and labels' of the Special Gazette, which states that:

31. In relation to the anticoagulant rodenticide chemical products listed in Attachment A of this notice:

31.1. Under section 34A(1)(a) of the Agvet Code, ***I am not satisfied*** that the chemical products meet the safety criteria, as ***I am not satisfied*** that the use of chemical products in accordance with current instructions:

a. would not be likely to have an unintended effect that is harmful to animals, including non-target terrestrial vertebrates and aquatic species.

Moreover, WHA supports the 10th March 2026 APVMA notice of suspension of registrations and certification that it is in the public interest for chemical products containing any second-generation anticoagulant rodenticides (SGARS) to be declared restricted chemical products.

These outcomes are supported by 23 years of general surveillance data, gathered by WHA via the national electronic Wildlife Health Information System (eWHIS), and expansive scientific evidence from Australia and overseas that **demonstrate the pervasive presence of primary, secondary, tertiary or combined exposure, and resultant unintended effects of ARs that are harmful to non-target terrestrial vertebrates** (as defined by Section 5A(1)(c) of the Agvet Code).

While WHA supports the introduction of all measures that reduce the exposure of non-target wildlife to ARs (including those outlined in the Special Gazette), we are concerned that the **risk mitigation measures presently proposed fall short of current global gold standards**.

This departure from growing international consensus runs contrary to scientific evidence and exposes Australian wildlife, ecosystems, people and pets to ongoing unnecessary harm from the continued broad availability and approved use of ARs, in particular second-generation ARs. As such, WHA has undertaken a detailed examination of the scientific information, assumptions, and risk assessment methodology employed by the APVMA in the development of the proposed risk mitigation measures.

In consideration of WHA's submission, please note:

WHA are committed to working collaboratively and bringing extensive expertise and insight to advancing wildlife health in Australia.

This submission is intended to contribute a wildlife health perspective founded on the best available scientific evidence and informed by expert veterinary opinion. To aid review, comments are grouped thematically within listed topics, but some necessary overlap occurs. Generally representative examples are provided and discussed for illustrative purposes but, for brevity, are not intended to be exhaustive.

This submission is provided following comprehensive review of:

- The APVMA Special Gazette, 16 December 2025, in particular:
 - Attachment B: Draft statement of reasons for the proposed decision to vary and affirm certain anticoagulant rodenticide products and labels.
 - Attachment B: Draft statement of reasons for the proposed decision to cancel certain anticoagulant rodenticide products and labels.
- The Anticoagulant Rodenticides Review Technical Report, in particular:
 - Section '3. Environment'.
 - Appendix A.

1. Scope, presentation and interpretation of scientific information

The APVMA review considers a large number of peer-reviewed studies that represent a significant body of evidence for:

- The globally ubiquitous exposure of non-target terrestrial vertebrates to ARs.
- The frequent occurrence and wide range of unintended harmful effects that can result from exposure of non-target terrestrial vertebrates to ARs.

Unintended harmful effects can arise following primary, secondary, tertiary or combined exposures of wild animals to ARs, with clinical outcomes manifesting on acute to chronic timeframes and ranging from sub-clinical disease to severe illness and death. However, the unintended harmful effects of AR exposure also extend beyond individual animal health impacts. Throughout Australia, and across a range of non-target taxa (including birds, mammals, reptiles and amphibians), the documented effects of AR exposure include:

- Morbidity and (direct or indirect) mortality of exposed animals.
- Negative impacts on animal welfare, in association with morbidity and behavioural changes (Fisher et al., 2019).
- Reduced host fitness, including increased stress levels, and reproductive and immunological dysfunction (Herring et al., 2023; Rattner et al., 2014; Serieys et al., 2018).

While the magnitude of the problem is not fully understood at the population scale, many wildlife species exposed to ARs, such as raptors and marsupial mammals, are also widely considered to be at risk of:

- Population-scale impacts, particularly for endangered, at risk, and isolated populations (Lohr et al., 2025; Pay et al., 2021).
- Increased susceptibility to other causes of mortality, such as vehicle strike, predation, and disease (Lohr et al., 2025).

The Special Gazette, Technical Report and Gazette No.5 do acknowledge the potential for these impacts. However, limitations in the interpretation of the literature and supporting data have given rise to assumptions and conclusions that do not accurately reflect the broad scale and severity of impacts from a wildlife health and biodiversity conservation perspective.

1.1 Evidence availability and its interpretation

Summary

There are discrepancies between the evidence provided to support risks to non-target wildlife and the resultant conclusions on the need for adequate risk mitigation. In numerous instances, concluding remarks appear to downplay the likelihood and consequence of wildlife impacts that are clearly evidenced in the literature (Example 1).

WHA conclusion: The available evidence provides a strong basis to introduce robust mitigation measures commensurate with the threat to wildlife and in line with international reforms.

In the Special Gazette and Technical Report, the lack of definitively proven harmful effects on some non-target terrestrial vertebrate species has been interpreted to signify an absence of harmful

effects. However, WHA cautions that the available evidence likely under-represents the true threat posed by ARs to Australian wildlife.

The investigation of toxicosis issues in free-ranging wildlife, including origins, exposure pathways, and effects of exposure at individual and population scales, is notoriously challenging (Quinn, 2019). In relation to AR residues in wildlife, there are limitations that preclude quantitative research and its interpretation/extrapolation (Quinn, 2019), including:

- Limitations to ante-mortem diagnostics.
- Prohibitive costs of toxicological testing.
- Frequent absence of confirmatory testing in lieu of a high index of veterinary suspicion.
- Lack of spatially, temporally, or taxonomically representative monitoring.
- High intra- and inter- species variation in susceptibility to AR toxicosis (lethal and sub-lethal), and in knowledge of AR residue thresholds for lethal and sub-lethal effects.
- Limitations associated with extrapolating laboratory results to real-world exposures and effects on free-ranging animals.
- Limitations associated with establishing population effects of AR exposure in real-world scenarios (i.e., due to the likely presence of multiple stressors that may confound results).

This leads to gaps in the quantitative evidence-base for harmful individual- or population-level effects across a range of wild species. Nonetheless, it is notable that all studies that have investigated AR exposure in Australian wildlife have demonstrated confirmatory evidence (albeit to varying degrees), and the presence of AR residues in wildlife tissues at the landscape scale and across trophic levels has been conclusively established. Further, Australian endangered and endemic species, principally raptors and marsupial mammals, are frequently among those exposed to ARs at high levels (Clarke et al., 2025; Cooke et al., 2022; Lohr et al., 2025; Pay et al., 2021).

In line with a precautionary interpretation, this evidence should be considered indicative of unintended harmful effects on the same broad scale (acknowledging varying severity). Therefore, until evidence is produced to show otherwise, we should assume that widespread harm is occurring (i.e., across landscapes and multiple species). This interpretation is:

- **Supported by both national and international evidence**, including numerous reports in Australia's general wildlife health surveillance system (see 1.2.3) documenting the harmful effects of ARs on Australian native species, and a vast body of evidence globally that shows harmful effects of ARs exist wherever exposure exists.
- **Consistent with the APVMA's acknowledgement** of the high degree of toxicity of ARs to non-target terrestrial vertebrates, in particular for SGARs.
- **Made in the context of the precautionary principle**, whereby the presence of a threat, even where cause-and-effect is not fully established scientifically, necessitates the implementation of precautionary measures that are equal to negating that threat (see 2.3).
- **Aligned with international reforms in several countries**. In recognition of the need for strong risk mitigation for non-target wildlife, Canada, several countries in the European Union,

Switzerland, the United Kingdom (UK), and the United States of America (USA) are undertaking significant regulatory reform and developing standards to limit AR access and use (see 3.2).

On the same theme but from the converse viewpoint, there are instances where information with little or no evidential support is used to justify a diminished assessment of risks to wildlife (see Example 2). On many of these occasions, either no evidence is provided to support assumptions, or single studies are presented as adequate justification (see Excerpt* in Example 4). The result is that the mitigation measures currently being proposed are not proportionate to the risks to wildlife.

Example 1.

Excerpt from '3.1.2 Fate and behaviour in biota' from Anticoagulant Rodenticides Review Technical Report: Among potential rodent-eating species in Australia, snakes, lizards, quolls, Tasmanian devils, and many raptors show evidence of secondary exposure to anticoagulant rodenticides in urban and agricultural areas. Detections of SGAR liver residues were relatively frequent with concentrations up to 655 µg/kg (brodifacoum) in quolls; 162 µg/kg (brodifacoum) in Tasmanian devils; 8114 µg/kg (bromadiolone) in raptors; and 700 µg/kg (bromadiolone) in reptiles. The proportion of animals containing anticoagulant residues correlates positively with usage (e.g., Newton et al. 1997). Given these detections were from individuals collected opportunistically (e.g., as roadkill or in tissues donated by park rangers/wildlife care centres), it is **evident that some wildlife** carry a residue burden of anticoagulant rodenticides **that could accumulate** to levels sufficient to cause morbidity or directly contribute to mortality, either alone or in combination with other factors.

The conclusion that “some wildlife” “could accumulate” burdens that cause morbidity or mortality understates the significance of the data. These data provide evidence of high concentrations of SGAR residues in the livers of non-target Australian wildlife, including the Tasmanian devil (*Sarcophilus harrisii*), an endangered species. The data presented for raptors alone represents a bromadiolone concentration of *circa* 700 times the expected toxicity threshold at 20% probability of coagulopathy for this group (as reported on p.60 of the Technical Report).

Rather, the most reasonable interpretation for the finding of such concerning results via an opportunistic sample is this: across taxa and including endangered species, Australian wildlife are being exposed to unacceptably high levels of SGARs, inevitably with harmful effects.

Excerpt from '3.1.2 Fate and behaviour in biota' from Anticoagulant Rodenticides Review Technical Report: Scavenging birds such as ravens, crows and magpies, or bandicoots in sugarcane also show evidence of anticoagulant rodenticide exposure, however, the exposure pathways are not certain (may be primary or secondary pathways or a combination of these). There are a few confirmed cases of primary exposure of birds via approved use of anticoagulant rodenticides globally; **however, these appear to be relatively infrequent incidents.**

In the absence of comprehensive monitoring, reports that result in confirmation of primary exposures (in birds or other taxa) are *ad hoc* in nature. Further, whether wildlife exposures are associated with use in accordance with approved label instructions or otherwise is frequently unknown (as reported in the 'Field studies and adverse incidents involving terrestrial vertebrates from approved or unspecified use' Tables, Appendix A, Technical Report) and very difficult to establish. Nonetheless, the evidence base increasingly suggests that the primary exposure of birds may be a more significant issue that previously appreciated, and that effective mitigation measures are required alongside further research (see 1.3)

Example 2.

Excerpt from '3.1.2 Fate and behaviour in biota' from Anticoagulant Rodenticides Review Technical Report: Use patterns and bait concentrations are broadly similar worldwide, and several overseas studies have examined the effectiveness of protective measures designed to reduce exposure in non-target species. **Misuse of anticoagulant rodenticides is commonly suspected** (see consideration of adverse incidents in section 3.2.1), **making it difficult to determine whether residues detected in non-target species arise from use in accordance with the approved label directions or otherwise.**

Excerpt from '3.2.1 Effects on terrestrial vertebrates' from Anticoagulant Rodenticides Review Technical Report: **While most of the primary poisoning events with birds are likely attributed to misuse** (e.g., corellas, gulls, starlings, galahs).

Noting that the 'Field studies and adverse incidents' Tables, Appendix A, Technical Report omits cases of confirmed misuse, it is unclear how it was concluded that a significant proportion of non-target species exposures are likely the result of misuse. It should also be recognised that wildlife impacts associated with misuse may be subject to reporting bias when compared to impacts arising from approved usages. WHA is

concerned that this conclusion, which is not adequately supported, may have influenced the evaluation of the “weight-of-evidence” and APVMA’s subsequent decision-making processes.

Based on global evidence, widespread wildlife exposure to ARs is highly likely to result from use in accordance with approved label directions, following the legal sale of products to consumers.

Evidence that supports this conclusion includes:

- Exposure of southern boobook (*Ninox boobook*) from Western Australia to SGAR products that are only used by licensed pesticide applicators is indicative of secondary exposure in association with professional, and presumably correct, use (Lohr, 2018).
- Proportionally, more reported wildlife exposures in France were found to be associated with normal use or accidents (e.g., when a bait box was chewed through) than misuse or abuse (Berny et al., 2010).
- While it is difficult to determine use-status in association with secondary, tertiary or combined exposures, there is a growing body of evidence demonstrating primary poisoning of birds and other non-target terrestrial vertebrates through approved use, including via tamper proof bait stations (see 1.3).

If misuse under current approved label directions is indeed a major driver of non-target terrestrial vertebrate exposure, it follows that changes to the label provisions alone will be insufficient to achieve meaningful mitigation (see 3.1).

1.2 Presentation of data and its interpretation

Summary

Where data on wildlife are presented in the Special Gazette and Technical Report, information necessary for accurate interpretation are frequently missing. This absence limits the capability for subject matter experts to provide nuanced interpretation and may have resulted in inaccurate conclusions as to the risks posed to wildlife by ARs.

WHA conclusion: Concerns arise regarding the interpretation and application of available data, and the extent to which this limitation informed the proposed decisions regarding mitigatory measures.

As noted in 1.1, studying AR exposure and consequences in wildlife is fraught with challenges in terms of feasibility and resourcing. The available data spans multiple taxonomic groups and investigative methodologies, resulting in data outputs that are challenging to interpret, compare, and extrapolate from. The synthesis of scientifically accurate conclusions from such a large and varied body of work, therefore, requires nuanced clinical judgement and input from subject matter experts.

1.2.1 Residues monitoring data

The Technical Report refers to a “weight-of-evidence” assessment on monitoring data on AR residues in non-target terrestrial vertebrates (see p.57, Anticoagulant Rodenticides Review Technical Report) but does not provide further information regarding its methodology or report its findings. Given the incompleteness of the residues monitoring data presented in the Technical Report, it is unclear if the complexities inherent to wildlife health information were effectively incorporated in this assessment (Example 3).

Example 3.

Residues monitoring data for 'Non-target mammals' from Australia, extracted from Table 109: Brodifacoum - Residues Monitoring Data, Appendix A, Anticoagulant Rodenticides Review Technical Report

- Mean liver residues 655 µg/kg in 3/9 western quolls, 16 µg/kg in 1/3 northern quolls, 137 µg/kg in 2/5 tiger quolls, 520 µg/kg in 8/15 eastern quolls, and 162 µg/kg in 7/20 Tasmanian devils in Tasmania, Western Australia, NSW, and ACT (Lohr 2022).
- Max liver residues 770 µg/kg brushtail possum in rural & urban areas across Australia between 2006 and 2021 (WHA 2022).
- Max liver residues 1708 µg/kg in 47/53 (89%) brushtail possums, 45 µg/kg in 29/82 (35%) ringtail possums in Victoria in 2022 (Scammell et al. 2024).

From a wildlife health research perspective, there are important considerations and caveats to these data as presented that influence and limit interpretation:

- 'Monitoring' implies the systematic and ongoing collection, analysis, and interpretation of data. None of these data, nor indeed any data pertaining to wildlife AR exposure in Australia, are likely to meet this definition and case-by-case, context specific interpretation is necessary.
- Without further information on sampling methodology, inferences cannot be made regarding proportions/percentages of animals exposed.
- The dose/s received and the timing of dose/s relative to the time of sampling are unknown. Extreme caution is therefore required in interpreting the µg/kg values presented. For example, where mean or max values are low, how was this interpreted?
- There are limitations associated with comparing data derived from different methodologies. For example: How were maximum liver residues considered in the weight-of-evidence assessment in comparison to mean liver residues? Were µg/kg values compared to species-specific toxicity thresholds or the best-available equivalent, or were inter-species comparisons made? Were potential differences in toxicology testing methodologies considered and accounted for?

1.2.2 Effects on non-target species data

Two sources of data of relevance to non-target terrestrial vertebrates are considered in the effects on non-target species data: 'Poisoning studies' and 'Field studies and adverse incidents'. As for 'residues monitoring' data, the level of detail and types of information in both these datasets are scant and variable, hindering informed comparison or extrapolation.

As presently reported, the i. 'study details and result' listed for poisoning studies, and ii. the 'effects' listed for field studies and adverse incidents, are limited to reports of haemorrhage, mortality, or "poisoning", and do not consider other harmful effects that may have occurred (such as weakness, anaemia, immunocompromise, etc.) (Low et al., 2024). It requires noting that where haemorrhage was not reported, it cannot be assumed that animals did not suffer other clinical effects, and it is unclear whether other signs of illness were incorporated into assessments of these data. Further, evidence suggests that haemorrhage does not always correlate with reported toxicity thresholds (Moriceau et al., 2022; Sánchez-Barbudo et al., 2012).

AR exposure levels reported for wildlife in the 'Residues monitoring' tables also constitute important sources of evidence derived from field studies and adverse incidents. Yet, it does not appear that these highly relevant data were considered in the assessment of effects on non-target species. The limitations expressed in Example 3 notwithstanding, much of the 'Residues monitoring' data provide evidence of wildlife being exposed to undoubtedly harmful AR levels, including instances of mortality.

1.2.3 Data from the national electronic Wildlife Health Information System

WHA appreciate the use of data from the national electronic Wildlife Health Information System (eWHIS) to inform the APVMA's AR review process. We are particularly pleased to see acknowledgement of the strength of these data in support of regulatory reform:

Excerpt from the Anticoagulant Rodenticides Technical Review Report, p.66: While a definitive causal link between anticoagulant rodenticides and population-level effects in non-target wildlife has not been established, (Rattner et al. 2014), the weight of evidence supports the need for risk mitigation measures to reduce exposure to non-target wildlife. *For example, of 696 animal adverse incidents recorded by the Australian national electronic Wildlife Health Information System (eWHIS) between 2006 to 2021, 77 (11%) involved suspected anticoagulant poisonings.* Further, appreciable mortality even without population level consequences can be unacceptable."

However, it is necessary to highlight that eWHIS data are not spatially, taxonomically or temporally representative, and reported cases represent a very small proportion of the overall cases occurring in native wildlife in Australia. Regrettably, there are numerous instances where case numbers represented in the eWHIS dataset have been taken out of context, including:

- *"A **small number** of suspected anticoagulant rodenticide poisonings have been reported in snakes (carpet python and brown snake) and shingleback lizard in Australia".*
- *"Anticoagulant poisoning was suspected **in one amphibian in Australia; however, this appears to be an uncommon occurrence**".*

WHA notes that these data do not reflect the prevalence or occurrence of AR exposure in reptiles and amphibians. The small numbers reported are most likely reflective of the difficulties detecting AR exposure in reptile and amphibian species via general wildlife health surveillance activities, and the infrequency of AR testing in these groups.

1.3 Consideration of primary exposure pathways

Summary

There is an increasing body of evidence demonstrating the occurrence of primary AR exposure in a wide range of wildlife taxa, which appears to be under-represented in the present documents.

WHA conclusion: Greater consideration should be given to the risks and impacts of the primary exposure of non-target terrestrial vertebrates, alongside effective mitigation measures for this risk pathway.

The Special Gazette and Technical Report support the outdated narrative that primary exposure pathways for non-target terrestrial vertebrates are limited and of lesser importance than secondary exposure through predation/scavenging. While secondary exposure of predatory and scavenging species has undoubtedly received more research attention, and is therefore better represented in the evidence base, WHA recommends further consideration of the following concerns:

- Primary exposure of non-target terrestrial vertebrates, including through approved AR use.
- The range of taxonomic groups affected, including birds, reptiles, and mammals, and how this leads to the infiltration of ARs into food-webs throughout Australian ecosystems.
- Under-reporting of primary exposure in small, less iconic species, such as passerine birds and reptiles, which are less likely to be detected by general surveillance and opportunistic reports than secondarily exposed apex predators.

Assessment of the evidence base reveals that primary exposure of non-target terrestrial vertebrates is occurring and poses risks that extend from the impacted animals, across ecosystems, and up trophic levels (Example 4). Effective risk mitigation measures that specifically target this pathway and all affected taxa are therefore warranted.

Example 4.

Excerpt from ‘3.1.2 Fate and behaviour in biota’ from Anticoagulant Rodenticides Review Technical Report: There are a few confirmed cases of primary exposure of birds via approved use of anticoagulant rodenticides globally; however, these appear to be relatively infrequent incidents.

Excerpt from ‘3.2.1 Effects on terrestrial vertebrates’ from Anticoagulant Rodenticides Review Technical Report: While most of the primary poisoning events with birds are likely attributed to misuse (e.g., corellas, gulls, starlings, galahs), given the use restrictions currently in place to mitigate primary poisoning risks to birds, secondary poisoning events from on-label uses of anticoagulant rodenticides cannot be ruled out. In all cases, brodifacoum was the most common anticoagulant detected when liver samples were analysed.

Briefly, evidence demonstrating the primary exposure of birds, and therefore that restrictions currently in place do not effectively mitigate primary poisoning risks to birds, include:

- Primary exposure of passerine birds, including ready access to bait stations by granivores and insectivores (Chansiripornchai et al., 2025; Elliott et al., 2014; Sánchez-Barbudo et al., 2012; Walther, Geduhn, Schenke, & Jacob, 2021), consumption of bait that has been removed from the bait station, and learned bait station-seeking behaviours (Schoelitz & Brooks, 2016).
- High AR exposure levels in raptor species that feed on birds (Broughton et al., 2022; Elliott et al., 2022; Hughes et al., 2013; Martín Cruz et al., 2025; Ruiz-Suárez et al., 2014).
- A key recommendation from a UK report by the Centre for Hydrology and Ecology was that “Time trend of exposure to SGARs might be feeding type- or species-specific, which means that some particular species would be used to focus on a specific hypothesis. For instance, bird feeding predators, like sparrowhawk, would be pertinent species to assess ‘whether and how SGARs are spread in non-target species other than rodents, such as small birds’ populations.” (Ozaki et al., 2025)
- The above excerpts appear to differ from the evidence of primary avian exposure presented later in the Technical Report (see below excerpt), creating uncertainty as to which interpretation informed the assessment of the need for and design of risk-mitigation measures.

Excerpt from ‘3.3.2 Risks to terrestrial vertebrates’ from Anticoagulant Rodenticides Review Technical Report: In literature reviews of the toxicity and impacts of brodifacoum on non-target wildlife in New Zealand, authors have noted that birds most at risk from eating cereal-based baits are herbivorous and omnivorous species (e.g., weka, pukeko and saddleback) (Eason & Spurr 1995a, Eason et al. 2002). Emerald doves, currawongs, silvereyes and a magpie-lark showed no signs of exposure in non-toxic baiting trials (Wilkinson & Priddel 2007). In contrast, buff-banded rails, blackbirds, mallards, and woodhens showed signs of exposure. Several observations were made of wild birds accessing bait from bait stations during a rodent eradication program on Lord Howe Island (O’Dwyer et al. 2024). Buff-banded rails and some of the few remaining free-living woodhens were observed accessing bait by inserting their head into the access tunnel and removing bait from internal bait trays. These two species were also seen eating bait off the ground outside bait stations.

Overall, there appears to be a general under-recognition of the magnitude and species range of primary exposure as a risk to non-target terrestrial vertebrates, as illustrated by the following:

Excerpt* from ‘3.3.2 Risks to terrestrial vertebrates’ from Anticoagulant Rodenticides Review Technical Report: Anticoagulant residues were detected in several ground feeding songbird species when bait was used in and around farm buildings (Walther et al. 2021b); however, exposure of songbirds appeared spatially-focused and mostly restricted to the immediate surroundings where the bait was used (less than 20 m distance to the closest bait station), which might limit the transfer to the wider environment (Walther et al. 2021b).

1.4 Consideration of food-web infiltration and trophic and temporal burdens

Summary

The review lacks comprehensive consideration of pathways and ecological drivers for infiltration and accumulation of AR in food-webs, and across trophic levels over prolonged periods.

WHA conclusion: Consideration should be given to all mechanisms of AR infiltration and accumulation in the food-webs of Australian ecosystems, as these both contribute to the burden of AR residues in non-target terrestrial vertebrates, and add further weight to the need for more rigorous mitigatory action.

In addition to threats posed by primary exposure pathways, there appears to be only limited significance attached to wildlife health implications of: invertebrate exposure (Example 5); exposed species' bioaccumulative potential (Example 6); tertiary and combination exposures; and, the impacts of recurrent and chronic exposures. Without adequate consideration of the full spectrum of wildlife exposures and impacts, proposed mitigatory actions are likely to be insufficient.

For example, the Technical Report only considers the risks to non-target terrestrial vertebrates via limited primary and secondary 'exposure scenarios'. This approach overlooks some potential pathways of wildlife exposure, notably for AR use 'in buildings' (see Table 49, Technical Report):

- Scenarios for non-target primary poisonings are deemed "Not relevant", which omits the potential exposure of granivorous or omnivorous species following rodent-mediated movement of bait to areas accessible to wildlife, which is known to occur (see 1.3).
- Scenarios for non-target secondary poisonings deemed "Relevant only to rodent-eating species" omits consideration of the potential exposure of insectivorous species following invertebrate access to indoor baits, which is also known to occur.
- There is no consideration of the potential for tertiary or combination exposures.

Example 5.

Excerpts from '3.3.2 Risks to terrestrial vertebrates' from Anticoagulant Rodenticides Review Technical Report: In literature reviews of the toxicity and impacts of brodifacoum on non-target wildlife in New Zealand, authors have noted that insectivorous mammal species such as bats were probably least at risk of secondary poisoning relative to predatory and scavenging birds (Eason & Spurr 1995a, Eason et al. 2002).

In literature reviews of the toxicity and impacts of brodifacoum on non-target wildlife in New Zealand, authors have noted that birds most at risk from secondary poisoning are predatory and scavenging species such as wekas, harriers, gulls and morepork (Eason & Spurr 1995a, Eason et al. 2002). Insectivorous species were considered least at risk.

In literature reviews of the toxicity and impacts of brodifacoum on non-target wildlife in New Zealand, authors have noted that insectivorous reptile species such as lizards were least at risk of secondary poisoning relative to predatory and scavenging birds, for example (Eason & Spurr 1995a, Eason et al. 2002).

A secondary exposure pathway to amphibians has also been demonstrated by the available monitoring data (see section 3.1.2 Fate and behaviour in biota). In literature reviews of the toxicity and impacts of brodifacoum on non-target wildlife in New Zealand, authors have noted that amphibian species were probably least at risk of secondary poisoning relative to predatory and scavenging birds (Eason & Spurr 1995a, Eason et al. 2002).

There is increasing global evidence demonstrating that, whether through in building or outdoor use, insectivorous species are highly exposed to ARs globally, including at lethal levels and in endangered species (Dowding et al., 2010; Johnston et al., 2005; Masuda et al., 2014). Nonetheless, these excerpts demonstrate insufficient consideration of the scientific evidence of exposure and health risks to insectivorous species, and the subsequent implications for animals exposed at higher trophic levels. It should also be noted that:

- Insectivorous mammals, birds, reptiles and amphibians cannot all be "least at risk of secondary poisoning relative to predatory and scavenging birds".

- Being “least at risk” does not equate to an absence of impacts.
- Whether at least or greatest risk, full consideration of the unintended harmful effects of ARs on all non-target taxa is needed.

More broadly, there is evidence for tertiary and combination exposures, and the occurrence of repeated and chronic exposures, which are not addressed in the review (Cooke et al., 2022; Hong et al., 2019; Lohr et al., 2025). This is particularly surprising as ample evidence exists for tertiary exposure, with apex predators, including Australian endangered species, being (by nature) disproportionately affected. Although confirmatory evidence is lacking, experts agree that some species, particularly opportunistic or generalist predators and scavengers, are at risk of exposure via more than one pathway (López-Perea & Mateo, 2017; Oliva-Vidal et al., 2022; Quinn, 2019). Additionally, the risks associated with tertiary and combination exposures are likely to be exacerbated for those that prey on species with a high level of tolerance to ARs, such as reptiles (Example 6).

Example 6.

Excerpt from ‘3.2.1 Effects on terrestrial vertebrates’ from Anticoagulant Rodenticides Review Technical Report: Reptiles are generally thought to have a high tolerance to anticoagulant rodenticides (Lohr & Davis 2018, Mauldin et al. 2020). Geckos were found to contain brodifacoum residues after rat control operations and several anecdotal reports have reported lethal poisoning of geckos from use of anticoagulant rodenticides (Lohr & Davis 2018). Turtles and boas exhibited a relative insensitivity to diphacinone and brodifacoum, while lizards appeared to be somewhat more sensitive to these compounds (Mauldin et al. 2020). Coumatetralyl, diphacinone, and brodifacoum had low toxicity to fence lizards (Weir et al. 2016). The lowest lethal doses of diphacinone and warfarin to the brown tree snake were 10 and 40 mg/kg bw, respectively (Brookes et al. 1998). A secondary poisoning study on rattlesnakes suggests that mortality is unlikely if they consume poisoned animals.

In this example, while it is important to acknowledge evidence suggesting that reptiles may be less at risk of secondary AR toxicosis than e.g., predatory birds, it does not appear that the associated transfer of risk to species that consume such reptiles and become exposed at a tertiary level has been appropriately considered (Hong et al., 2019). Further, it should be noted that this risk can become compounded if a predatory animal consumes >1 exposed reptile, each of which may have accumulated very high AR burdens. This excerpt is indicative of missed opportunities to consider i. the broader implications of AR accumulation, and the transfer and compounding of risks to non-target terrestrial vertebrates, and ii. appropriate mitigatory action.

Lastly, considering the myriad complexities associated with AR infiltration and diffusion through food-webs, it is simplifying to view exposure scenarios as single events. While extremely difficult to demonstrate definitively in free-ranging wildlife (i.e., via frequent longitudinal sampling of the same individuals) (Quinn, 2019), it is important to note that repeated exposures are likely to occur and will be contributing to the overall burden AR effects experienced by non-target terrestrial vertebrates at individual and landscape levels.

Further, because repeated exposure is possible via primary, secondary, tertiary, and combination pathways, the full spectrum of taxa and trophic levels that are known to have experienced AR exposure can be assumed to be at risk of harm. In all cases, the clinical outcome/s of repeated exposures will vary depending on dose size, timing and frequency (and active constituent/s involved), alongside individual and species-specific factors. Limited information, however, is available for the long-term effects of repeated or chronic exposure, warranting further research in addition to precautionary mitigatory action (Moriceau et al., 2022).

1.5 Consideration of population and ecosystem-scale effects

Summary

Inadequate consideration is given to the seriousness of potential population- and ecosystem-scale impacts, including the contribution of ARs to irreversible biodiversity loss.

WHA conclusion: There is sufficient scientific evidence to support a high likelihood of unintended harmful effects at population and ecosystem scales in some situations. The baseline intention of mitigatory measures should therefore be to prevent such impacts.

The current scientific evidence base for AR impacts in wildlife is mostly limited to isolated studies of individual-level impacts and demonstrations of exposure (with unquantified impact) in populations and ecosystems. Globally, the elucidation of harmful effects of ARs beyond exposure or individual mortality is hindered by:

- Difficulties in quantifying AR dose/residue levels in individual animals that correlate to survival or reproductive fitness impacts.
- Study system complexity, including the presence of all confounding factors intrinsic to the inter-dependencies of biological systems.
- Absent or limited longitudinal monitoring datasets, in terms of representative sample availability and complimentary population monitoring data.
- Limited funding for research, and a prerequisite need to establish AR exposure (which is both costly and time consuming) prior to investigating broader impacts.

Nonetheless, recent overseas studies have offered preliminary evidence of broader AR impacts at the population and ecosystem level. For example, negative associations have been found between species' abundance data and ARs (Roos et al., 2021), and predictive modelling has suggested ARs can limit population growth (Sanchez-Paredes et al., 2025). Until there is capacity to address knowledge gaps in Australia, it must be considered that AR-induced mortalities, whether direct or indirect, have the potential to exert primary or cumulative impacts at population-levels.

Further, a high likelihood of population impacts can be inferred from the available evidence in certain scenarios, particularly for endangered species (Example 7). Based on such evidence, mitigatory measures must be robust enough to ensure that all species, but especially those at risk of extinction or endangerment, are protected from AR exposure.

Example 7.

Excerpt from '3.3.2 Risks to terrestrial vertebrates' from Anticoagulant Rodenticides Review Technical Report: *A secondary exposure pathway to quolls and Tasmanian devils is clearly demonstrated by available monitoring data.*

The Tasmanian devil is an endangered marsupial mammal, which is under significant threat of extinction as a result of devil facial tumour disease (DFTD).

Of an opportunistic sample of Tasmanian devils, most of which were found dead, that were tested, 15% had liver concentrations sufficient to result in individuals being "very likely to succumb to AR poisoning or a secondary proximate cause of death resulting from the sublethal effects of AR toxicity" (Lohr et al., 2025). This evidence suggests that additive mortality from AR toxicity is occurring, and at such a level that may affect the population trajectory of this species. There is also further concern for the potential synergistic effects of AR exposure with DFTD, whereby AR exposure may result in immune dysfunction and i. lead to increased mortality in association with DFTD and ii. interfere with the evolution of resistance to DFTD.

2. Assessment methodology

2.1 Anticoagulant rodenticide risk profiles

Methodological limitation: Consideration of both first- and second-generation anticoagulant rodenticides (FGARs and SGARs, respectively) as a single AR entity in assessments introduces bias by conflating their differing risk profiles.

Basis: As stated in the Technical Report, Special Gazette, and Gazette No.5, SGARs have significantly higher acute toxicity levels and longer half-lives in comparison to FGARs. Therefore, the risks of unintended harmful effects in non-target terrestrial vertebrates, including poisoning, bioaccumulation and biomagnification, are significantly higher with SGARs than FGARs (Biocidal Products Committee, 2023; California Department of Pesticide Regulation, 2018; Government of British Columbia, 2021). This produces fundamentally distinct risk profiles, cannot be accurately accounted for if FGARs and SGARs are assessed together.

Recommendation: Separate assessments should be conducted for FGARs and SGARs to i. ensure full and accurate representation of the risks posed to wildlife, and ii. enable informed decisions regarding proportionate mitigatory measures for each group.

2.2 Temporal and ecological risk framework

Methodological limitation: Framing the risk of harmful effects of AR exposure on non-target terrestrial vertebrates and the environment as an event involving a single timepoint/individual introduces error by omitting consideration of temporal and ecological risk dimensions.

Basis: Each AR exposure event, whether in a target or non-target species, represents the start of a cumulative risk pathway that endures for the chemical's lifespan (i.e., >300 days for some SGARs). Thus, each exposure event creates a spatiotemporally persistent risk of harmful effects to >1 non-target animal through potential for transfer, bioaccumulation, and compounding of risks up trophic levels (Quinn, 2019).

Recommendation: A temporal and ecological risk framework should be built into assessments conducted for non-target terrestrial vertebrates and their environments. Additionally, as risk assessment incorporates the consideration of risk consequences, a framework that captures the ecosystem-wide consequences of AR exposure is necessary to comprehensively understand all potential ramifications of each exposure event.

2.3 The precautionary principle

Methodological limitation: Insufficient adoption of the precautionary principle, resulting in mitigatory measures that i. are not proportionate to the risks of harmful effects on non-target species and the environment, and ii. do not meet community expectations for wildlife and environmental protection

Basis: Invocation of the precautionary principle is advised in situations of evidential uncertainty by both the scientific literature and international environmental law (European Commission, 2000; Kriebel et al., 2001). In the case of AR exposure in wildlife, objective scientific evaluation of the evidence indicates that there are reasonable grounds for concern of potentially dangerous effects on animal and environmental health, which meets the threshold for the principle's application

(European Commission, 2000). In the absence of a quantitative risk assessment and under the precautionary principle, there is credible evidence that anticoagulant rodenticides cause environmental harm and mitigatory action that protects against harmful effects is therefore essential.

Recommendation: Invocation of the precautionary principle in assessments to a degree commensurate with the full spectrum of potential harm, and to ensure that the level of protection proposed for Australian wildlife and the environment is:

- Proportionate to the scale and potential irreversibility of harm, which includes AR-associated mortality of endangered species (Clarke et al., 2025; Lohr et al., 2025; Pay et al., 2021).
- Proportionate to or exceeding community expectations regarding protection of ecosystems and wildlife.

Comments: While we acknowledge that elements of precautionary thinking are evident and that this may have contributed to the proposed changes, particularly the recent suspension of registration for SGARs, the overall approach appears reactionary. This is evidenced by: the onus on establishing a burden-of-proof, rather than an evidence-based decision that ARs are dangerous *a priori*; the onus remaining on the regulator to establish harm, rather than shared responsibility with the product manufacturers to establish/ensure safety; and, risk minimisation being prioritised above risk prevention (Kriebel et al., 2001), despite the high stakes for endangered species.

Also, the presently proposed changes are less extensive than the regulatory reforms being introduced internationally, particularly in comparison to significant restrictions on SGAR access and use (the future terms of which remain unclear, here). Given that assessment methods have been broadly similar between regulatory bodies overseas, this further suggests that the APVMA have interpreted the risks and consequences of AR exposure in wildlife less conservatively when compared to international regulators (see 3.2).

3. Evidence-based risk mitigation

Based on assessment of the evidence base, the risk mitigation measures proposed in the Special Gazette do not appear to be firmly grounded in science or proportionate to the severity of the risks associated with AR exposure in wildlife. Further, they are not aligned with the strong evidence-based regulatory action that has resulted from risk assessments undertaken internationally, particularly in relation to SGARs.

3.1 Scientific basis for proposed risk mitigation measures

Summary

There is concern regarding the suitability of information sources on which proposed mitigatory actions are based, and questions regarding their scientific basis and likely efficacy.

WHA conclusion: To effectively prevent harm to native Australian wildlife, risk mitigation measures should be evidence-based, relevant to the current scale of wildlife exposure, and proportionate to the most significant risks and consequences (e.g., exposure and mortality of endangered species).

Most of the risk mitigation measures proposed in the Special Gazette are derived from a European Commission report on 'Risk mitigation measures for anticoagulant rodenticides as biocidal products' published in 2014.

It is important that measures intended to minimise the risk of AR exposure and harmful effects in non-target wildlife are put in place, including the proposed variations in labelling, instructions for use, conditions of registration, and product formulation requirements. However, over-reliance on a report on mitigatory measures published over a decade ago raises concerns because most scientific evidence detailing the scale of AR exposure and harm globally, including in Australia, has been published in the years since 2014. For example, a brief literature search using Google Scholar and the search terms ("anticoagulant rodenticide toxicity" and "wildlife") reveals 19 results between 2000 – 2014, compared to 123 results between 2015 – 2026.

Implementation of up to date, evidence-based mitigation measures must be informed by current knowledge of risk and risk consequences. This necessitates the equal (as a minimum) consideration of more recent reports detailing mitigation measures. Sources of such information include:

- The USA Environmental Protection Agency (EPA) 2022 '[Pesticide Registration Review: Proposed Interim Decisions for the Rodenticides](#)'.
- The USA EPA 2022 '[Endangered Species Act Workplan Update: Nontarget Species Mitigation for Registration Review and Other FIRFA Actions](#)'.

Further, consideration of the views expressed within contemporary scientific literature is warranted, noting these consistently call for significant reforms to protect Australian wildlife and ecosystems (see 4).

In the interim, WHA wish to raise some specific questions regarding the scientific evidence and assumptions that have informed the present set of regulatory proposals.

- i. Did the APVMA undertake any assessment of the evidence in terms of how the proposed changes are expected to reduce the burden of AR exposure in Australian wildlife, either in relation to primary or secondary poisoning? For example, was any formal method comparison or

predictive modelling undertaken to determine which mitigation methods were most likely to be effective?

- ii. Was any scientific evidence found to support the use of instructional and label changes as an effective environmental risk mitigation strategy, including the likelihood of compliance without obvious mechanisms for enforcement?

This question is prompted by an excerpt from section '3.3.2 Risks to terrestrial vertebrates' of the Technical Report, which raises concerns regarding the effectiveness on measures that rely on consumer compliance:

Berny et al. (2014) provide recommendations on risk mitigation measures addressing secondary poisoning: (1) limit treatment application to 35 days in a first step; (2) provide indicative recommendations for regular visits – to be adapted with local risk assessment; (3) search for and remove dead bodies based on local risk assessment; (4) and remove uneaten baits at the end of the baiting period. However, a number of these risk mitigation measures had been implemented in Finland since 2011 without success in reducing wide scale secondary exposure of wildlife (Koivisto et al. 2018).

- iii. What is the scientific basis for a label instruction to use tamper resistant bait boxes being an effective method for the prevention or reduction of primary or secondary poisoning of non-target terrestrial vertebrates?

Evidence suggests that tamper resistant bait boxes are ineffective at excluding non-target wildlife and invertebrates, or preventing animals from removing bait:

- King's skinks were observed consuming baits during a rat eradication program on Penguin Island in Western Australia, despite use of bait containers specially designed to exclude skinks (Bettink, 2015).
- Bobtails have been observed inside bait boxes in urban areas (Lohr & Davis, 2018).
- Evidence of bait box visitation and access by numerous species of birds and amphibians, including apparent evidence of bait box-seeking behaviour in birds (Elliott et al., 2014; Schoelitsz & Brooks, 2016).
- Other evidence of bait box visitation and access by insects and reptiles (Wedding et al., 2010).
- To reduce the risk of bait removal, the USA EPA requires consumer products to “be sold with bait stations that securely contain the poison” (Environmental Protection Agency, 2025b).
- Regulations in the European Union regarding use of tamper resistant bait boxes for indoor and outdoor AR use was not found to reduce SGAR exposure in predatory birds in France (Moriceau et al., 2022).

While tamper resistant bait boxes should indeed be a baseline requirement for AR use, the scientific literature shows that this method does not effectively mitigate wildlife exposure in association with placement of ARs outdoors:

- Even in association with appropriate bait boxes, “chemical rodent control results in widespread exposure of non-target small mammals and that AR poisoned small mammals disperse away from baiting sites to become available to predators and scavengers in large areas of the landscape”, with results suggesting that “the unintentional secondary exposure of predators and scavengers is an unavoidable consequence of chemical rodent control outside buildings and infrastructures” (Elmeros et al., 2019).

- When deploying an SGAR in bait boxes, indoor only use resulted in ~50% less exposures in trapped small mammals than with use in and around buildings (Walther, Geduhn, Schenke, Schlotelburg, et al., 2021).
- Further, a modelling study in Denmark found that “there are few if any predators moving around the Danish landscape that do not have the potential to be exposed to rodenticide even if rodenticides are only used for rat control in and around buildings” (Topping & Elmeros, 2016).
- iv. How does the APVMA propose that an instruction to “Search for and dispose of dead rodents and slugs/snails in the infected area at each visit to prevent secondary poisoning. In case slugs/snails are present, move bait station to another location within the rodent infested site, away from slugs and snails.” will effectively prevent secondary poisoning of wildlife?

As noted above, a wide range of non-target terrestrial vertebrates and invertebrates can access tamper resistant bait stations. As such, dead rodents and slugs/snails do not represent the only dead animals that would need to be searched for and disposed of.

- v. What is the justification for the continued registration and label approvals of pellet and grain-based products when the registration of comparable formulations is proposed to be removed?

Whilst the proposal to cancel chemical product registrations and label approvals for liquid and powder-based formulations addresses documented risks, pellet and grain formulations pose an equivalent risk of exposure to non-target species and are of particular concern as a source of primary poisoning in granivorous and omnivorous species (see 1.3).

Again, for comparison, loose product formulations are not permitted for consumer use in the USA (Environmental Protection Agency, 2025a).

3.2 International consensus on SGAR risks and associated mitigation

Summary

The Special Gazette and Technical Report fall short in acknowledgement and consideration of the growing body of evidence for the disproportionate risks associated with SGAR exposure in wildlife. Gazette No.5 recognises the unacceptable harmful effects of SGAR exposure, but proposed measures to mitigate risks are insufficient in isolation. Contemporary international best practice for mitigating wildlife exposure and harm is not sufficiently considered in these documents.

WHA conclusion: Based on objective assessment of the scientific evidence and in line with world-leading regulatory decisions overseas, the proposed restricted chemical product certification in conjunction with decisions regarding registration and label approvals do not amount to sufficient risk mitigation for SGARs. WHA strongly recommend the consideration of expanded measures that will definitively prevent harm to native Australian wildlife (see 4).

SGAR exposure is known to result in high levels of acute toxicity, prolonged tissue persistence, and bioaccumulation in food-webs. As such, there is an inherent risk of harm to non-target wildlife as soon as SGARs enter the environment (Elmeros et al., 2019). International consensus on evidence-based best practice risk mitigation against the harmful effects of ARs in non-target terrestrial vertebrates is therefore that **use of SGARs should be significantly restricted**.

The extent of such restrictions varies globally but, broadly speaking: domestic use is banned or severely limited; commercial use is tied to professional certification and specific exempted uses; use

in open and, in some cases, outdoor areas is prohibited (again, noting certain exemptions); and, stewardship schemes have been introduced to promote and monitor compliance. Importantly, there is strong evidence to demonstrate that isolated measures are ineffective, and that a suite of synergistic regulations is necessary. For example:

- Implementation of stewardship in the absence of significant restrictions on SGAR use was not found to reduce wildlife exposure in the UK (Campbell et al., 2024; George et al., 2024).
- A change in regulations in the UK that extended use of all SGARs to outdoor settings in 2015 (following a previous ban for three SGARs) was associated with increasing trends of wildlife exposures in subsequent years (Ozaki et al., 2025).

In the Australian context, it is pertinent to note that SGAR exposure has been documented at high rates in wildlife specifically in association with non-domestic use. For example:

- Agricultural use: recent research found that endangered Tasmanian wedge-tailed eagles (*Aquila audax fleayi*) “were exposed to flocoumafen, a toxicant only available from agricultural suppliers, at an exceptionally high rate (40% of birds tested)” (Pay et al., 2021); spatial exposure of powerful owls (*Ninox strenua*) includes agricultural habitats (Cooke et al., 2022).
- Commercial use: as previously noted, two SGARs used only by licensed professionals were detected in southern boobook in Western Australia (Lohr, 2018).

In combination with evidence from overseas, this suggests that the changes to SGAR use currently proposed do not reflect the risks evidenced by scientific research and fall short of international trends in best practice (Example 8). In particular, limiting SGAR use to certain groups in Australia, in the absence of additional mitigatory measures (beyond those currently proposed), is unlikely to prevent the exposure and harm of native wildlife, including endangered species.

The sequential changes in regulations on SGAR availability and use in California, USA, over the last >10 years provide an exemplary case study, demonstrating that meaningful protection of wildlife requires significantly limiting the circumstances under which SGAR use is permitted:

- In 2014, regulations were introduced that designated SGARs as restricted materials; restricted their sale to licensed pest control dealers only; restricted their use to certified users only; restricted their placement to within 6m of man-made structures; and, prohibited their use in designated wildlife habitat areas, exempting specific circumstances (California Department of Pesticide Regulation, 2014).
- A 2018 review by the California Department of Pesticide Regulations (DPR) showed that the regulations implemented in 2014 changed usage patterns but that exposure remained high, with population-level impacts among non-target wildlife (California Department of Pesticide Regulation, 2018).
 - “From 2014 through 2018, the Department of Fish and Wildlife found SGARs in more than 90% of tested mountain lions, 88% of tested bobcats, 85% of protected Pacific fishers tested, and 70% of northern spotted owls tested. **Such data indicates that a consumer sales and use ban of SGARs has been insufficient to reduce rodenticide exposure in nontarget animals and further steps must be taken**” (“California Ecosystems Protection Act of 2020,” 2020).
- This prompted a decision by the DPR in 2021 to introduce a statewide moratorium on SGAR use, excluding specific exempt circumstances, pending the results of revaluation (expected late 2026).

- In the meantime, ongoing surveillance by the California Department of Fish and Wildlife shows that exposure and harmful effects in numerous wildlife species have continued under the exempted circumstances:
 - “In 2024, AR exposure was detected ... in 68.7% (114/166) of non-target wildlife tested.... **exposures detected in 2024 were most likely related to use after AB1788¹ was implemented** (January 1, 2021)” (California Department of Fish and Wildlife, 2025).

Example 8.

Excerpt from ‘3.3.2 Risks to terrestrial vertebrates’ Anticoagulant Rodenticides Review Technical Report: Based on the **available information and overseas experiences**, it is expected that risks to Australian wildlife can be mitigated in most cases by implementing various **best practice strategies** to minimise primary (direct) exposure, as well as **limiting access to authorised persons or limiting pack sizes available to the general public** (see recommendations in section 3.4.2 Supported products and uses).

Exemplified by statements such as these, the Technical Report neglects to mention overseas regulatory decisions that limit or prohibit SGAR use (excluding specific circumstances), misrepresents current “best practice”, and instead focuses on discussion of weaker mitigatory methods, many of which have been shown to be ineffective.

Further concerns regarding the scientific or risk-based reasoning underlying the APVMA’s decision making are raised through pack size limitations being considered equivalent to limiting access to authorised persons: while the former has been proposed, there was no specific discussion or justification for the decision not to implement the latter.

¹ California Ecosystems Protection Act of 2020

4. Recommendations

As outlined in this submission and based on the available evidence, WHA do not find the APVMA's assessments and proposed decisions on AR regulation to be commensurate with the threat level to wildlife. The additional certification of SGARs as restricted chemical products would make an important contribution to protecting wildlife from harm, but evidence suggests (see 3.2) that significant restrictions should also be applied to the type of approved SGAR users and usages.

As such, **WHA recommend that the APVMA implement strong mitigation measures to definitively prevent the risk of AR exposure and harm to non-target Australian native wildlife.**

To achieve this, WHA suggest basing measures on best practice principles:

- The baseline level of protection should ensure that the most serious consequences of AR exposure (i.e., mortality of endangered species) are effectively mitigated.
- Measures should be justified by current scientific evidence, both in terms of their necessity and, wherever possible, likely efficacy.
- International regulations, such as those being set by the California Department of Pesticide Regulation, US Environmental Protection Agency, Government of British Columbia, United Kingdom Health and Safety Executive, and European Chemicals Agency, should be considered as minimum standards.
- Measures should be developed and implemented in consultation with stakeholders to ensure maximum compliance.

4.1 Registration and approvals

We recommend the following amendments and additions to the APVMA's proposals:

- Permanently remove registration and label approvals from all domestic SGARs.
- Restrict commercial SGAR use:
 - To certified professionals, under a national stewardship program and with proof of certification as a point-of-sale requirement.
 - Exempting usage as part of an Integrated Pest Management program, as defined by a code of best practice (see 4.2).
 - Restrict all outdoor/open use, except in specifically exempt circumstances.
- Ensure all AR use occurs in association with tamper proof bait stations, for example by ensuring bait is securely contained within the bait station at point-of-sale.
- Remove registration and label approvals from all loose AR product formulations (i.e., grain and pellet formulations).

4.2 National stewardship

To strengthen user compliance and enhance monitoring of i. the impacts of ARs on wildlife and ii. the efficacy of regulatory changes, we recommend implementing a national stewardship program, which includes:

- A code of best practice, developed in consultation with stakeholders and experts.
- A training and certification scheme for commercial SGAR users and/or review and approval of alternative certification routes.
- Appropriate record keeping frameworks for the sale, use (including data on incidents of non-target mortality) and disposal of SGARs.
- Funding or undertaking of studies to measure the impact of regulatory change on AR exposure in wildlife.
- An online tool for reporting non-compliance with point-of-sale controls and an appropriate monitoring, investigation, and reporting framework.
- Annual audits of:
 - Adverse incidents reported to the APVMA via the Adverse Experience Reporting Program.
 - Compliance with point-of-sale certification requirements for commercial ARs.
- Bespoke communication strategies that target different AR user groups, for example:
 - Public awareness campaigns that promote the visibility and importance of regulatory changes for wildlife and provide information on effective and humane alternatives (e.g., [BirdLife Australia](#)), including strategies that promote wildlife-mediated rodent control.
 - Dissemination of industry-specific information to commercial AR users regarding stewardship necessity, regulatory changes, and user-responsibilities.

4.3 National surveillance

Systematic and continuous AR monitoring, in combination with enhanced general surveillance, is necessary to improve understanding of the risks of AR exposure to wildlife and assess the effectiveness of regulatory changes.

We therefore recommend the implementation of an appropriate and resourced national monitoring and reporting framework for toxicity in non-target species, which targets both domestic and commercial ARs and includes funding mechanisms for toxicological testing.

This could be developed using established frameworks, such as the National Wildlife Health Surveillance Framework, in partnership and collaboration with key researchers and other stakeholders.

Examples of overseas monitoring schemes include: [UK Predatory Bird Monitoring Scheme](#), [European Raptor Biomonitoring Facility](#), [LIFE APEX Project](#).

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