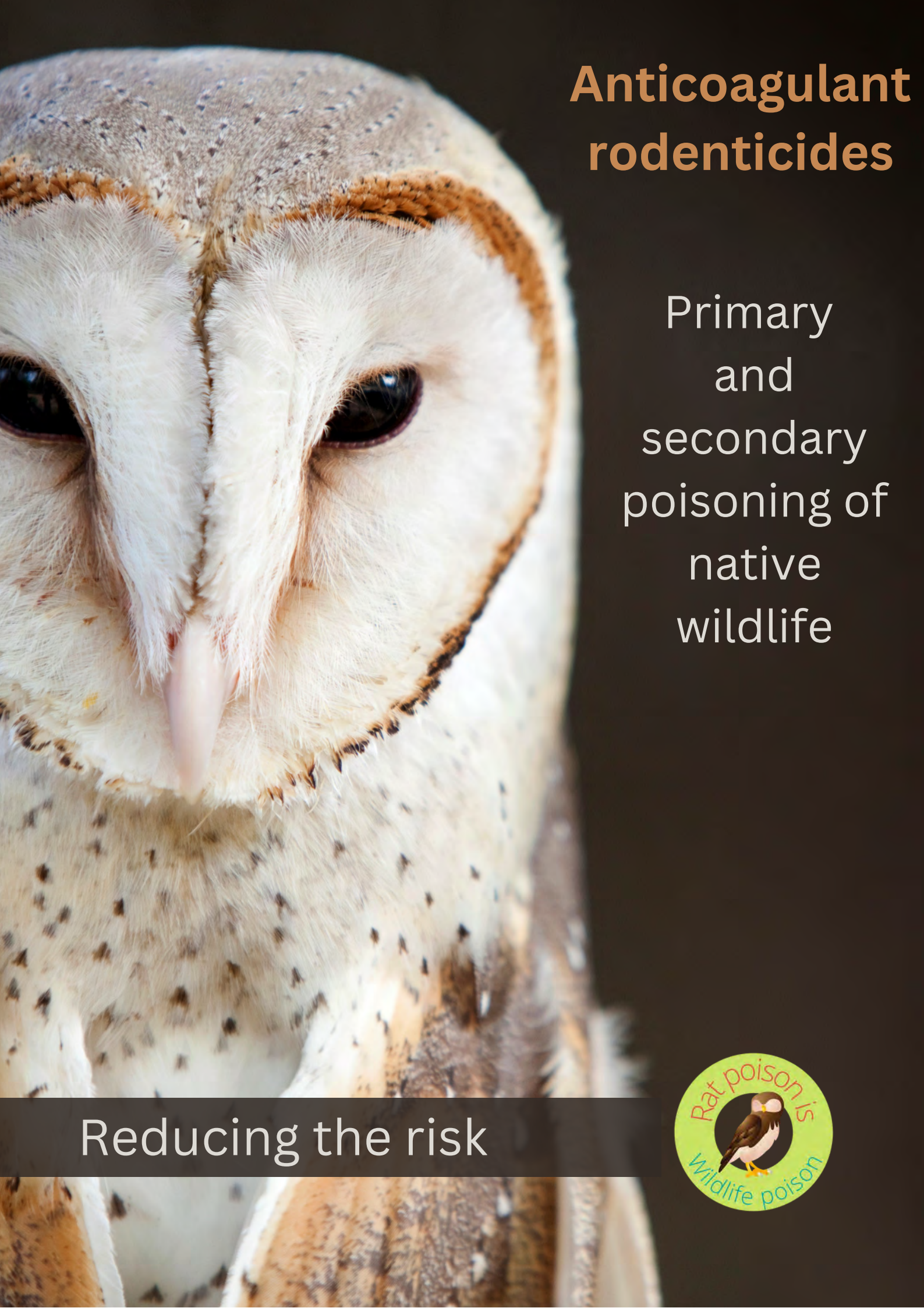


Anticoagulant rodenticides

Primary and secondary poisoning of native wildlife

Reducing the risk

Rat poison is Wildlife poison

The intent of this document is to highlight the significant threats posed to non-target native wildlife (including threatened and endangered species), pets, and humans through the use of anticoagulant rodenticides (ARs), and to seek the support of retailers to discontinue the sale of these products.

No rodenticide is safe, humane, or eco-friendly.

The only sure way to mitigate risk to humans, animals, and the environment from the toxic effects of poisons is to discontinue their use.

Defend Them All Foundation

- Executive summary
- Background
- ARs - how they work
- Challenges in treating wildlife
- ARs entering aquatic/marine ecosystems
- Prevention is better than poison
- Impacts upon raptors in Australia
- Additional Australian research
- Review of current practice in Australia
- Submissions to APVMA
- Regulation of ARs in other countries
- ARs in the news
- Conclusion

I thank the large number of dedicated people who have been (and are continuing to be) active in raising awareness and dealing with the consequences of anticoagulant rodenticide use across Australia and internationally. I hereby wish to offer my special acknowledgement of, and appreciation for the support and contributions received from:

- Dr Mike Lohr, Edith Cowan University
- Dr Holly Parsons and Erin Farley, BirdLife Australia
- Stefan Hattingh, Bulimba Creek Catchment Co-ordinating Committee
- Karen Scott and Rachel Hunt, Wildcare Australia Inc.
- Dr Luke Leung, The University of Queensland
- Dr Boyd Wykes, Rodenticide Action Group Margaret River Region
- Lisa Owens Viani, Director and Co-founder, Raptors are the Solution (USA)
- Lindsey Zehel, Founder and Director, Defend Them All Foundation (USA)

Leonard Fitzpatrick, *author*

The author appreciates the endorsements received from stakeholders around Australia for the contents of this document:

"As a for-purpose organisation focused on outcomes for wildlife, we regularly see wildlife that are affected by poisons. We welcome industry participation to try and help address this issue for the long-term benefit of our environment, wildlife and biodiversity."

"Secondary rodenticide poisoning is very difficult to diagnose, and usually it's a case of trial treating and hoping for a positive outcome. This can be a lengthy process, with no guarantee of success."

"Anticoagulant rodenticides are lethal to more than introduced rodents such as rats and mice. They are lethal also to small ground-dwelling native species such as antechinus and other marsupials such as possums. The use of these poisons not only harms our native wildlife through primary poisoning, but it also poses a significant risk of secondary poisoning to native wildlife predators such as owls, eagles, quolls and tawny frogmouths who may feed on poisoned rodents. Each year Wildlife Victoria receives numerous calls about native species suffering from secondary rodenticide poisoning and sadly the most common outcome is euthanasia. Death from rodenticide poisoning is a slow and painful death, and Wildlife Victoria does not support its use."

"BirdLife Australia acknowledges the significant impact that rodenticides, particularly second-generation rodenticides, have on wildlife in Australia. We advocate for stronger restrictions on rodenticide availability and encourage the adoption of alternative methods to protect both wildlife and public health."

"Rodenticides kill by stopping blood clotting - basically, animals bleed to death. If raptors and other carnivores consume prey that has ingested rodenticides, they too can succumb to the same fate."

Dr. Tania Bishop, BVSc (Hons 1A) MANZCVS (Avian Health), FACSCI (Industry Fellow UQ)
Wildlife Veterinarian. WIRES

RSPCA Australia

Wildcare Australia Inc.

Executive summary

Scientific and empirical evidence has been drawn upon to illustrate the significant threats from anticoagulant rodenticides (ARs) to biodiversity, food webs, ecological function, and the health of wildlife, domestic pets, and humans. I have included links to relevant research which exists in the public domain, reports and material sourced from a range of incorporated community, environmental and wildlife rescue / rehabilitation groups, and peak bodies.

As the body of evidence accumulates, awareness of the hazards posed by ARs continues to grow. Researchers, professionals, community members, and advocacy groups are voicing their concerns with policy makers and elected representatives. As a result, regulations are being introduced (or strengthened) internationally to restrict access to (and use of) these dangerous products. Prevention is key. Short-term 'solutions' are ultimately ineffective. The time is now for retailers to play their part to reduce the toll upon wildlife whilst making the environment and community safer, by discontinuing the sale of these poisons to the general community.

Poisoning risk to children, pets, and wildlife

ARs are not pest species specific. 'Rat' poison does not discriminate.

Animal welfare

Acute and chronic impacts on non-target and target species: haemorrhage, compromised immune function, higher susceptibility to disease/infection, and mortality.

Endangered species

ARs are impacting many endangered and other threatened species, with cascading impacts through the food web.

Alternative, humane controls and proactive measures

Remove pest refuges, secure food / remove attractants, choose humane traps.

International evidence and regulation

Significant restrictions / bans on ARs are already in place in the EU, Canada, and the US.

Background

The use of ARs in Australia is a significant risk to our native wildlife and pets through the direct consumption of the poison or by secondary poisoning, which occurs when non-target species consume rodents (or other species) that have been poisoned. (1)

A wide range of predatory and non-predatory wildlife species* are impacted, including (but not limited to):

- Boobook Owl
- Eastern Grass Owl
- Eastern Barn Owl
- **Masked Owl**
- Powerful Owl
- Barking Owl
- Lesser Sooty Owl
- Kites
- **Norfolk Island Boobook**
- Australian Magpie
- Australian Raven
- Little Raven
- Australian Magpie-Lark
- Galah
- Laughing Kookaburra
- **Wedge-tailed Eagle**
- Hawks
- Kestrels
- **Grey Goshawk**
- **Brown Skua**
- **Little Eagle**
- Torresian Crow
- Pied Currawong
- Gulls
- Little Corella
- Tawny Frogmouth
- Common Koel
- Australian White Ibis
- Blue-tongued Skink
- King's Skink
- Squirrel Glider
- Melomys and other Native Rodents*
- **Bandicoots**
- Common Brushtail Possum
- **Western Ringtail Possum**
- **Quolls**
- **Tasmanian Devil**
- Brush-tailed phascogale
- **Antechinus**
- **Mountain Brushtail Possum**
- Pademelon
- Peron's Tree Frog
- Carpet Python
- Eastern Brown Snake

** Species (or a subspecies) in bold are* ***endangered*** *either Federally or in one or more Australian States / Territories.*

*Native rodents are a favoured prey species for many native raptors including endangered owls. Inadvertent poisoning of native rodents which belong in our environment impacts the natural balance." *WIRES Northern Rivers*

In addition to killing wildlife directly, AR causes illness which increases the chances that an animal will be preyed upon (by native or feral species) and that they will fall victim to other risks e.g. road trauma. Owls suffering from AR poisoning have been maimed and killed as they ventured to prey upon roadkill, as they were ill and too weak to catch prey or move quickly to avoid vehicles. (2)

"The exact effect of both primary and secondary pesticide poisoning on wildlife depends on the species, and on the type and amount of poison consumed … Any use of poison indoors presents a **grave risk to children and pets**." (3)

Rodenticides are one of the main types of poisons ingested by children under 5 years of age. (4).

In the US, more than 12 000 children per year are accidentally poisoned by ARs. (5, 6). Heightened risk to young children (7) for multiple reasons, some of which include:

- an infant's brain, organs, and nervous system are still in a developmental stage;
- the immature kidneys and liver and kidney of a baby has greater difficulty in removing pesticides from their system;
- they spend more time closer to the ground, touching areas where ARs may have been applied, and are more likely to put their fingers, toys, and other objects into their mouths which may have AR traces.

Health Canada reports comparable AR poisoning incidents of children. (8)

"**The main cause for accidental poisoning of domestic animals is direct consumption of anticoagulant baits**." World Health Organisation Environmental health Criteria 175, Anticoagulant Rodenticides (section 7.8.1.1 Poisoning incidents). (9)

Anticoagulant rodenticides - how they work

These rodenticides function by indirectly blocking the recycling of vitamin K, which is a critical component in normal blood clotting in vertebrates. ARs are often divided into *first* and *second generation* classifications, based on when they were first synthesised and differences in chemical structure.

ARs can compromise immune function, leading to higher disease/infection/parasite susceptibility and debilitation that increases mortality risk e.g. road trauma and predation. Hemorrhaging in the wings of owls due to AR poisoning inhibits flight capability owls ability to fly. (10)

Second generation anticoagulant rodenticides (SGARs) generally have higher acute toxicities than first generation anticoagulant rodenticides (FGARs).

- SGARS are also lethal after a single feed, unlike FGARs which require rodents to feed on them for multiple consecutive days in order to achieve a lethal effect. During this time, rodents can continue to feed and accumulate higher concentrations of ARs. (11)

First generation (FGARs)

- Active ingredients: Warfarin (Ratsak Double Strength), Coumatetralyl (e.g. in Racumin), and Diphacinone
- FGARs work more slowly and break down more quickly.
- **FGARs can cause significant and chronic impacts (and ultimately fatal consequences) for non-target species.**

Second generation (SGARs)

Active ingredients: Brodifacoum (most Ratsak brands), Bromadialone (some Ratsak products) and Difenacoum (Talon, Mortein, Ratsak Fast Action, Pestoff Rodent Bait 20R, Klerat).

> The key differences between earlier, first generation anticoagulant rodenticides (FGARs) and SGARs is how long the toxins remain in the body. SGARs can stay in body tissues for months or even years. *BirdLife Australia*

In birds, the United States Environmental Protection Agency estimates liver retention times of 35 days for the FGAR warfarin and liver retention times of 248 days and 217 days for the SGARs bromodiolone and brodifacoum, respectively. This long duration of SGAR persistence in liver tissues allows **bioaccumulation** and **biomagnification** in predatory species that naturally consume mice, rats, and other small mammals. (11)

Australian availability
SGAR brands such as Talon, Fast Action Ratsak and The Big Cheese Fast Action mice and rat bait have already been banned from public sale in the US, Canada, and the EU, yet these products are still readily available for purchase from major Australian retailers (hardware and supermarket chains).

Challenges in treating wildlife with known or suspected AR poisoning

“Treatment of AR poisoning in wildlife with an unknown history of exposure can be substantially more complicated than treatment of companion animals and humans where the type and quantity of the poison are often known. Unlike companion animals and humans, wildlife exposed through secondary poisoning are frequently exposed to multiple rodenticides.” (12)

"Susceptibility to ARs varies dramatically both between and within species" (12)

"Animals with residual SGARs in their livers will be vulnerable to future exposure at lower doses relative to animals with no ARs accumulated in liver tissue. At present, no practical solution to this problem exists." (12)

Clinical presentation suggestive of AR poisoning may include*:

- Decreased appetite / anorexia
- Increased thirst
- Vomiting or diarrhoea
- Dark, tarry (bloody) stool
- Pale gums
- Bruising, red splotches on skin
- Bleeding from the nose
- Weakness
- Ataxia and/or loss of ability to walk
- Swollen belly (from blood accumulation)
- Muscle tremors
- Shaking/seizures

**Reproduced with permission of the Defend Them All Foundation.*

“Rodenticides are the most common and harmful pesticides to Australian wildlife.”
WIRES

Environmental risks of ARs in freshwater and marine food webs

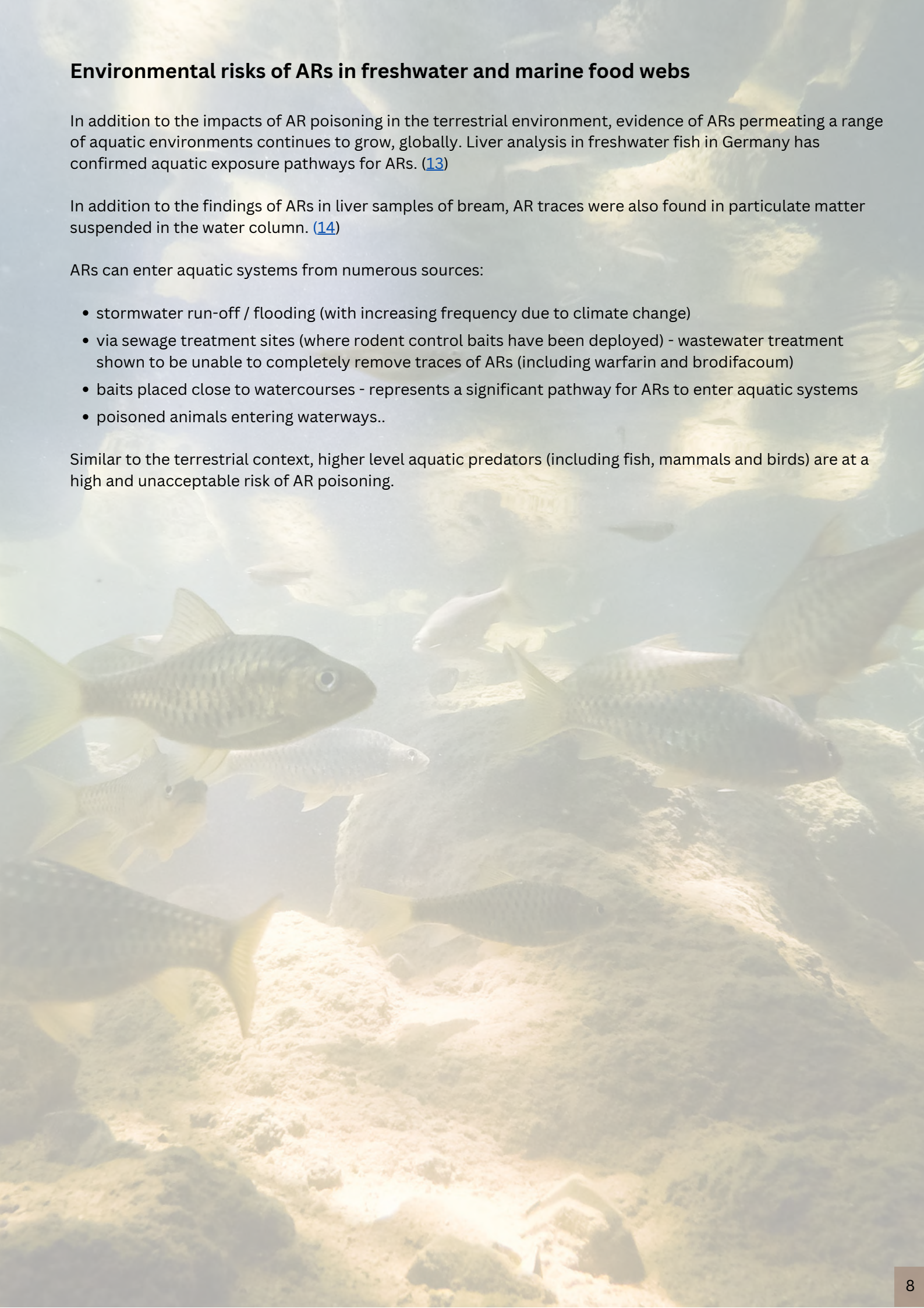
In addition to the impacts of AR poisoning in the terrestrial environment, evidence of ARs permeating a range of aquatic environments continues to grow, globally. Liver analysis in freshwater fish in Germany has confirmed aquatic exposure pathways for ARs. (13)

In addition to the findings of ARs in liver samples of bream, AR traces were also found in particulate matter suspended in the water column. (14)

ARs can enter aquatic systems from numerous sources:

- stormwater run-off / flooding (with increasing frequency due to climate change)
- via sewage treatment sites (where rodent control baits have been deployed) - wastewater treatment shown to be unable to completely remove traces of ARs (including warfarin and brodifacoum)
- baits placed close to watercourses - represents a significant pathway for ARs to enter aquatic systems
- poisoned animals entering waterways..

Similar to the terrestrial context, higher level aquatic predators (including fish, mammals and birds) are at a high and unacceptable risk of AR poisoning.



Prevention is better than poison

Proactive measures, alternative controls

> "**The use of rodenticides presents the greatest risk to people, non-target animals and the environment.** There is evidence that they may cause the deaths of non-target animals and, in Australia, they have been found at "small, but significant, percentages" in the bodies of predatory birds. As such, *rodenticides should be used only after other methods of achieving rodent management have been considered*." © AEPMA
>
> Australian Environmental Pest Managers' Association Limited (AEPMA) (15)

Prevention
General principles

- keep the garden or property clean and tidy
- clean up brush piles and rubbish
- secure compost heaps
- keep pet food indoors
- seal holes / other potential entry points in buildings and enclosures
- use chicken feeders which prevent spillage
- pick up fallen fruits from beneath your fruit trees
- encourage natural predators (erect owl nesting boxes).

AEPMA© recommendations (exclusion / mitigation) include:

- Physical barriers, such as mortar replacement, capping, wire mesh, door sweeps and weather seals to exclude pests from area of ingress
- Waste water traps and gate valves to deter subterranean ingress
- Clearing areas which will expose pests to predation or destroying their food, shelter and breeding environment.
- Containment and good storage practices of all food and water sources that are an attractant to the area of activity. (e.g. food bowls, BBQ's, rubbish bins, bird-feeders etc.)
- Regularly clearing or flushing drains, gutters, sewers and septic tanks

Alternative controls
https://www.actforbirds.org/what-to-buy-and-avoid

Ideally, we should be using traps rather than baits to control rats and mice. A wide variety of traps, including electronic traps, is available. Careful positioning is necessary to be effective and reduce harm to non-target species. Old fashioned snap traps baited with peanut butter are also effective if placed along edges of walls and corners where rodents travel. *Nature Conservation Margaret River Region, Western Australia*

Rodenticide Action Group Margaret River Region https://owlfriendly.org.au/rodent-control/

Improving the community's understanding of the benefits of carpet pythons to manage pest species is also important, discouraging the removal of carpet pythons from sheds.

"Where either primary or secondary toxicity is a concern, non-toxic eradication strategies must be considered first. With an increasing focus on integrated pest management and a trend to minimise the use of rodenticides, non-chemical tools for rodent management are becoming more important."

"There are several cost-effective non-toxic approaches available to monitor and control rodents. Trapping has several advantages, in that rodents can be easily removed from the site without leaving chemical residues, success is immediately evident, counts of trapped rodents can be readily tracked, and in many instances may facilitate the eradication of an infestation without resorting to the use of rodenticides." © AEPMA

"A transition to chemical-free pest management solutions can be done with relative ease and has proven to be cost effective in the long run. Preventative resource management and exclusion (rodent-proofing) is the best long term strategy." *Defend Them All Foundation* (16)

Impacts upon raptors in Australia

Of Australia's 31 carnivorous birds (species and subspecies) that are known or likely to prey on rodents, 13 (all raptors) are currently listed as **threatened with extinction under state or federal legislation.** It is anticipated that the rate of new listings and up-listings (e.g. from Vulnerable to Endangered) will only increase (in volume and pace) over the next 10-50 years. In long-lived raptor populations with relatively slow reproduction rates, increases in adult mortality can increase extinction risk. Australia's threatened and declining carnivorous bird populations, specifically raptors, cannot afford the added risk of mortality from ARs. (17)

With urbanisation increasing, it is of particular concern the impact of ARs on Southern Boobooks and other raptors that have been shown to feed on rodents. The uncontrolled use of ARs is likely to be having a significant impact on populations of these and other raptor species in urban and rural landscapes. Raptors such as the Collared Sparrowhawk, which normally do not consume rodents, may be attracted by the erratic, disorientated movements of poisoned rodents that are exposed during the day. (18)

Powerful Owl

The Powerful Owl has 'Threatened' status at State levels. In addition to the lethal impact of ARs on Powerful Owls, ARs also have been shown to have sublethal impacts, including upon reproductive success, fitness, and on the immune system. ARs therefore have a direct and deleterious consequence upon the individual, mated pair, and the wider population of Powerful Owls, which therefore represents a '**significant conservation concern**'. As an apex predator, the Powerful Owls are 'critical to the health of ecosystems'.

In the study referenced below, at least one AR was found in 15 of the 18 necropsied Powerful Owls, with Brodifacoum found in all 15 AR-positive Owls. One Powerful Owl had three ARs present. Unlike other raptors that prey upon rodents, Powerful Owls primarily consume possums and gliders, hence the study's findings point to ARs being consumed by arboreal native mammals rather than invasive rodent species. Wildlife health surveillance data has definitive proof of SGAR consumption by Common Brushtail and Common Ringtail possums. (19)

> "The prevalence of toxicants and in particular SGARs in the food web of powerful owls therefore requires urgent attention and like other parts of the world, increased regulation of the sale of SGARs in Australia should be considered."
>
> "Given that SGARs (mostly brodifacoum) can be purchased for domestic, commercial, industrial and agricultural use in and around buildings from many hardware stores or supermarkets, the secondary effects on food webs cannot be ignored."
> *(19)*

An endangered top predator, the **Tasmanian Wedge-tailed Eagle**, is also frequently exposed to ARs. (20)

Additional Australian research

A Western Australian study found AR compounds in over 70% of Southern Boobook Owls with lethal concentrations in 18% of the birds tested. The research was carried out in 2017 by PhD student Michael Lohr, who performed necropsies on over 70 dead Boobook owls, most of which were roadkill. He found that **70 per cent of the boobook owls he tested had measurable levels of rat poisoning in their blood**. "[The poison] may contribute to road death or being attacked by cats or dogs," Mr Lohr told ABC Perth in 2017. (21)

In Victoria, BirdLife Australia the the Department of Environment, Land, Water and Planning concluded that AR poisoning was the most likely root cause behind the significant surge (an 875% increase) of sick or injured barn owls reported from 2017 to 2018. (22)

Dr Michael Lohr has conducted or directly participated in most of the ecotoxicology research conducted on ARs in Australia in the last nine years. In reference to recent research into the impact of AR on wildlife (through liver tissue sample examination) undertaken by himself and a colleague, Dr Lohr reflected that:

> "Cumulatively, this body of research suggests that the current usage pattern of ARs in Australia is having a substantial detrimental impact on native wildlife, including iconic species which are protected under state and federal legislation. I am equally concerned about widespread impacts on all carnivorous and omnivorous species and the effects that apparently common and widespread exposure is having on food webs across the country." (July 2020)

ARs are frequently detected in urban reptiles across multiple trophic (food web) levels. (23)

Dr Lohr expressed his concern also about '... **the potential for human exposure** through consumption of contaminated wildlife.' This concern arose in the context of Western Australia, through conversations with staff at the W.A. Housing Authority, which revealed that:

"... public housing which makes up much of the housing in many remote Aboriginal communities is consistently baited with SGARs by pest control contractors. The use of SGARs in areas where goannas and other predatory wildlife are harvested for human consumption presents a **serious potential risk to human health.** Sublethal exposure to SGARs is not benign and has the potential to exacerbate existing health conditions prevalent in remote Aboriginal communities."

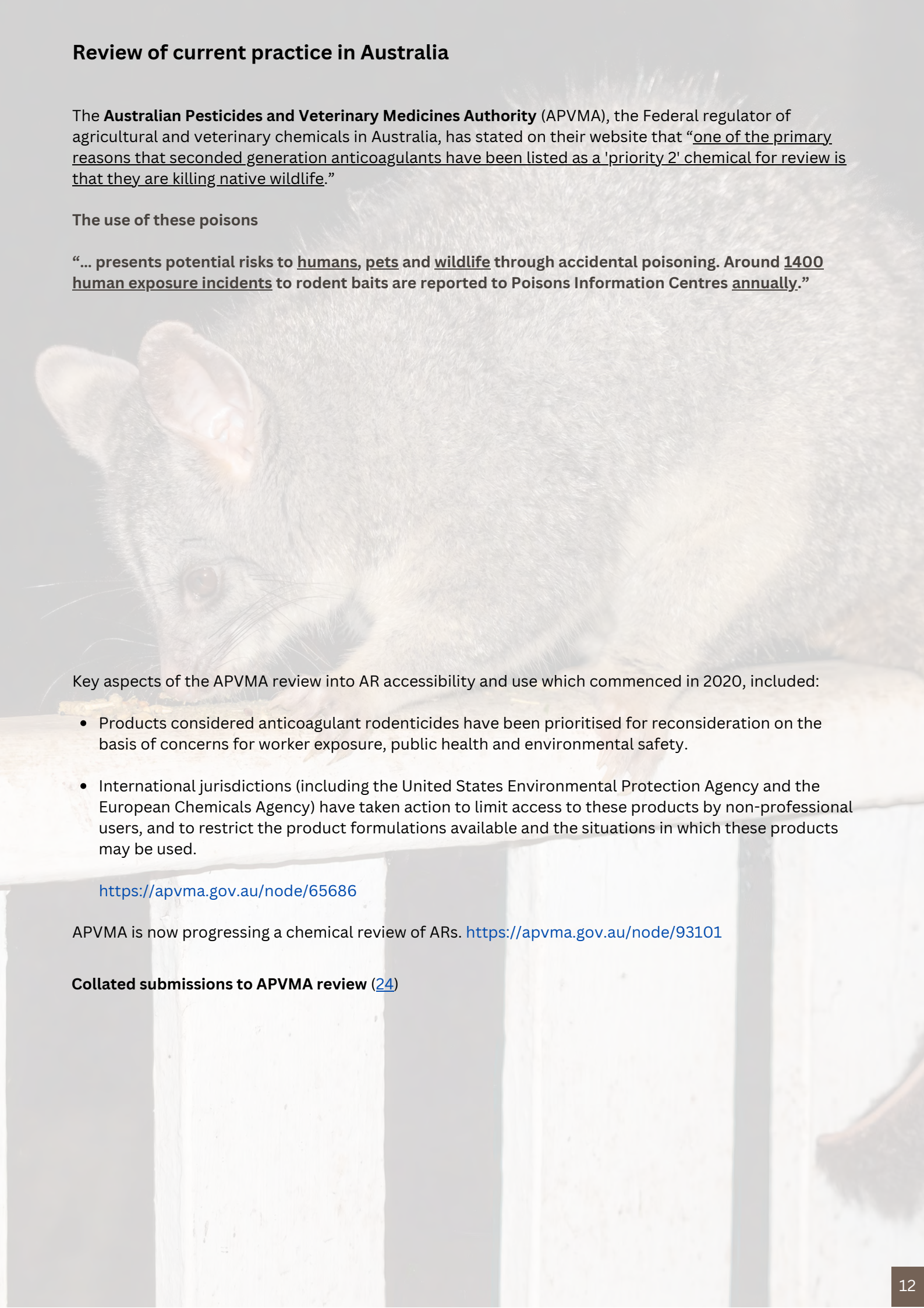
Notwithstanding that this came to light in W.A., this risk may also present in some remote Indigenous communities in other States and Territories.

Review of current practice in Australia

The **Australian Pesticides and Veterinary Medicines Authority** (APVMA), the Federal regulator of agricultural and veterinary chemicals in Australia, has stated on their website that "one of the primary reasons that seconded generation anticoagulants have been listed as a 'priority 2' chemical for review is that they are killing native wildlife."

The use of these poisons

"... presents potential risks to humans, pets and wildlife through accidental poisoning. Around 1400 human exposure incidents to rodent baits are reported to Poisons Information Centres annually."



Key aspects of the APVMA review into AR accessibility and use which commenced in 2020, included:

- Products considered anticoagulant rodenticides have been prioritised for reconsideration on the basis of concerns for worker exposure, public health and environmental safety.
- International jurisdictions (including the United States Environmental Protection Agency and the European Chemicals Agency) have taken action to limit access to these products by non-professional users, and to restrict the product formulations available and the situations in which these products may be used.

  https://apvma.gov.au/node/65686

APVMA is now progressing a chemical review of ARs. https://apvma.gov.au/node/93101

Collated submissions to APVMA review (24)

Wildllife Health Australia's recommendations to APVMA

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Wildlife Health Australia (WHA) is the national co-ordinating body for wildlife health in Australia. WHA presented the following recommendations to the APVMA to reduce the exposure of Australian native wildlife to ARs (25):

- Increase the oversight and regulation of AR usage in Australia, **including the removal of SGARs from retail outlets.**

- Adopt the approaches of other countries or regions, such as the US Environmental Protection Agency, the United Kingdom Health and Safety Executive, the European Chemicals Agency, and the Government of British Columbia including, for example, the restriction of use of:

    - First generation AR products by consumers to tamper-proof bait stations, and
    - Second generation AR products to certified professionals only.

- Implement a stewardship program (e.g. the UK's Rodenticide Stewardship Regime co-ordinated by the 'Campaign for Responsible Rodenticide Use'/CRRU) including:

    - a code of best practice developed in consultation with stakeholders and experts
    - a training and certification scheme for users
    - SGARs used only as part of an Integrated Pest Management (IPM) program
    - appropriate record keeping for the sale, use and disposal of SGARs
    - appropriate monitoring and reporting of toxicity in non-target species.

- Ensure labelling of AR products and associated compliance activities are adequate to minimise poisoning of non-target wildlife.

"The data ... demonstrates that impacted non-target species are not solely those that consume rodents, and therefore points to **widespread environmental exposure** and a **broader infiltration of ARs into the foodweb** of Australian wildlife."

RSPCA Australia's recommendations to APVMA

The following excerpts are derived from the RSPCA submission to the APVMA Review of anticoagulant rodenticides.

Clinical signs of AR poisoning in companion animals
Decreased appetite or, anorexia
Increased thirst
Vomiting or diarrhoea
Dark, tarry (bloody) stool
Pale gums
Bruising, red splotches on skin
Bleeding from the nose
Weakness
Ataxia and/or loss of ability to walk
Swollen belly (from blood accumulation)
Muscle tremors
Shaking/seizures

Animal welfare impacts

Poisoning with **anticoagulants do not result in a humane death** (Paparella 2006). Mason & Littin (2003), who have reviewed the humaneness of several rodent control methods, reported that **animals poisoned with anticoagulants experience distress, disability and/or pain, and take several days to die**. Bleeding per se is not considered to be painful but the accumulation of blood in confined areas in the body, particularly the joints and muscles, can cause pain and dysfunction.

- *The RSPCA has strongly advocated that animal welfare be included as a primary consideration for all applications and for reviews of currently registered products.*
- *There is an increasing community expectation that the welfare of 'pest' target species is considered to help ensure that the most humane methods are available and are used.*

Environmental safety, including off target and secondary poisoning

Several studies have been reported both in Australia and overseas of the impact of anticoagulant rodenticides on wildlife (Hughes et al 2013; Masuda et al 2014; Murray 2017; Lohr 2018; Lohr & Davis 2018; Cooke et al 2022).

Similarly, there have been several published reports of primary accidental poisoning of **companion animals** overseas and in Australia (Caloni et al 2016; Merola 2002; Robertson et al 1992).

Sources cited by RSPCA

Caloni F, Cortinovis C, Rivolta M et al (2016) *Suspected poisoning of domestic animals by pesticides*. Science of the Total Environment 539:331-336.

Cooke R, Whitely P, Jin Y et al (2022) W*idespread exposure of powerful owls to second-generation anticoagulant rodenticides in Australia spans an urban to agricultural and forest lands*. Science of the Total Environment, 819, 153024.

Hughes J, Sharp E, Taylor MJ et al (2013) *Monitoring agricultural rodenticide use and secondary exposure of raptors in Scotland*. Ecotoxicology 22:974-984.

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Masuda BM, Fisher P, Jamieson IG (2014) *Anticoagulant rodenticide brodifacoum detected in dead nestlings of an insectivorous passerine*. New Zealand Journal of Ecology 38(1):110-115.

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Robertson I, Leggoe M, Dorling P et al (1992) *A retrospective study of poisoning cases in dogs and cats: comparison between a rural and an urban practice*. Australian Veterinary Journal 69:194-195.

BirdLife Australia's recommendations to APVMA

Reproduced with permission of Dr Holly Parsons, BirdLife Australia Urban Bird Program Manager, BirdLife Australia

BirdLife Australia is a non-partisan, science based, grass roots, bird conservation organisation with over 185,000 supporters and is the peak body for native bird conservation and science in Australia. To reduce the potential significant impacts to non-target native wildlife, especially raptors, BirdLife Australia's submission puts forward the following recommended reforms on the use of first and second generation ARs in Australia, noting these reforms align with current regulations in the USA, Canada and the European Union:

Second generation (SGARs)

- ban the use by, and over the counter sales to, the general public
- only permit the sale and use to licenced professionals who are trained on the proper use, deployment and disposal of SGAR compounds and carcasses
- require licenced professionals to report on the amount and locations of SGARs deployed
- ban use of SGARs in residential or domestic areas and restrict to within 100m of non-residential buildings
- only permit application of SGARs in solid, non pellet form in tamper-resistant bait stations targeted to rodents only
- restrict permanent baiting and replace with pulsed baiting
- restrict the use of new SGAR formulations until potential impacts are understood.

First generation (FGARs)

- increase labelling on the risks of domestic use of FGARs on packaging for over-the-counter sales
- only permit application of FGARs in solid, non-pellet form in a tamper-resistant bait station
- require licenced professionals to report on the amount and locations of FGARs deployed
- restrict the use of new FGAR formulations until potential impacts are understood.

https://www.actforbirds.org/what-to-buy-and-avoid

Regulation of ARs in other countries

Precedents exist in relation to regulating the availability and deployment of ARs in North America and Europe.

USA

Over the past two decades, the United States Environment Protection Agency (EPA) has heavily regulated use and distribution of rodenticides, specifically SGARs. (26)

- In 2008, to reduce the potential impacts to children and non-target wildlife, the EPA's Risk Mitigation Decision for Ten Rodenticides required all rodenticide bait products marketed to general and residential consumers to be sold only with bait stations and limited the commercial sale and distribution of SGARs .
- In 2013, the EPA officially banned the sale and use of SGARs to residential consumers stating that "there are no benefits association with the residential consumer use of SGARs that justify the significant risks those products pose to non-target wildlife from secondary poisoning." The EPA concluded that bait stations, while effective for mitigating risks to primary exposure, will not protect non-target wildlife from secondary poisoning, by preying upon or scavenging poisoned rodents. Finally, to reduce the potential distribution of poisons the EPA banned all rodenticides containing pellets in 2017.
- Following California's moratorium on SGAR use in 2020, new Bills to ban SGARs have been introduced in Connecticut and New Hampshire in 2023.

"Rodenticides can be counterproductive to rodent control by poisoning, harming, and killing natural predators that help regulate rodent populations", California Ecosystems Protection Act of 2020. (27)

Canada

The Canadian Pest Management Regulatory Agency (PMRA) increased the protective measures for use and deployment of a number of ARs in 2010 to prevent exposure to children, pets and non-target animals. (28)

- All rodenticides for domestic use must be within a bait station in block or solid form that is reasonably expected to remain within the bait station. Dust, pellet and liquid baits are prohibited
- **SGARs are prohibited for domestic use**
- Rodenticides for commercial outdoor use must be placed in tamper-resistant bait stations.

British Columbia - SGAR ban (trial), from July 2021. (29). Moratorium made permanent from Janaury 2023.

Ministry of Environment and Climate Change Strategy (30):

- "The abundant use of SGARs to control rodents has led to an unacceptable level of non-target wildlife poisonings."
- "Proper knowledge and training is crucial when using SGARs to control rodents, and protect human health and the environment."

European Union

Similar conditions are in force in the European Union (EU) for the use and deployment of ARs containing: Warfarin, Chlorophacinone, Coumatetralyl, Difenacoum, Bromadiolone, Brodifacoum, Difethialone and Flocumafen. While SGARs are still approved for commercial use, users must consider and apply all appropriate and available risk mitigation measures including the proper disposal of carcasses and uneaten bait. Other conditions for use by the general public include:

- All rodenticides must be in tamper resistant bait stations
- All rodenticides must include information about the risks associated with ARs and appropriate precautionary steps to be taken
- Pellet and other loose bait forms can only be supplied in sachets.

ARs in the news

Global
https://www.raptorsarethesolution.org/science-on-ars/

Canada
The District of North Vancouver has ceased the use of rodenticides in response to the proven link to the poisoning of owls.
https://www.nsnews.com/local-news/district-of-north-vancouver-halts-use-of-owl-killing-rat-poisons-3123871

California, USA
Court orders state to re-evaluate widely used rat poison because of risks to other animals.
https://law.stanford.edu/press/court-orders-state-to-reevaluate-widely-used-rat-poison-because-of-risks-to-other-animals/

Israel
Barn owls valued as an effective biological pest control agent (in relation to rodents) and a preferred and proven alternative to chemical-based pesticides.
http://raptorpolitics.org.uk/2014/04/09/israel-leads-the-way-using-barn-owls-and-kestrels-to-replace-rodenticides/

Australia
Australia Concerns grow over owls eating rodents full of deadly household rat poison
https://www.abc.net.au/news/science/2021-08-22/owls-dying-from-household-rat-poison-concerns-grow/100365178

A.C.T.
Rise in use of toxic rat bait prompts ACT government to consider restricting some products to protect wildlife
https://www.abc.net.au/news/2022-08-22/concerns-for-wildlife-eating-rat-bait-prompts-investigation/101355146

Research reference list
https://www.actforbirds.org/ratpoison/references

Yellow-footed antechinus

Australian native

Conclusion

Through the information presented in the preceding pages, the author's intention is to provide a clear and compelling case (supported by scientific and empirical evidence) for the **discontinuation of sale, distribution, and use of first and second generation anticoagulant rodenticides**.

Some of submissions to the APVMA recommended better labelling of FGARs for over-the-counter sales and the use of bait stations. These measures however would not eliminate the poisoning risk to non-target wildlife, nor address the undeniable animal welfare considerations (including target species). Where a target rodent ingests a FGAR in a bait station, they will go back into the local environment, possibly returning to the bait station multiple times, all the while being a toxic time bomb. (31)

In addition to the risks of poisoning to young children and companion animals, ARs pose a further public health hazard. Pathogens associated with pest rodent species e.g. *Leptospira spp*. (a zoonotic risk to humans) have been found to be much more prevalent in rodents with AR traces in their system. As with non-target species, a rodent's susceptibility to pathogens is heightened when their immune system is compromised. In the context of AR usage in urban settings, pest rodents have displayed an ever-evolving disease ecology that has seen a degree of genetic resistence develop over time. The historical reliance upon ARs to 'solve' the rodent problem has inadvertently escalated unintended public health risks. To put it into context, *Leptospira spp.* has been estimated to cause up to 95 600 human deaths worldwide annually, with up to 1 750 000 cases of infection reported each year. (32)

The 'set-and-forget' approach to 'solving' pest infestation through the use of ARs is ineffective, with pest rodents rapidly filling the gap when resident pests are removed from a location. When the rat population starts to decline e.g. due to poisoning, the biological response from rats is to reproduce at a faster rate. (5)

Rigorous assessment of scientific evidence confirms AR poisoning is a *threatning process* to wildlife, with many of the AR-impacted species identified in this document already officially listed as vulnerable or endangered in Australia (33).

The sale and use of '**quick fixes**' as a convenient yet **ultimately ineffective** 'solution' is a *multidimensional*, *widespread*, and *unequivocal* danger. By discontinuing the sale of these dangerous products to the public, retailers would demonstrate their commitment and **shared social responsibility** to supporting a safer environment for our **children, companion animals, native wildlife.**

Animal welfare, human health, species diversity, and ecosystem health are all at stake.

***Humane* and *ecologically sensitive* alternatives to ARs exist.**

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