Department of
Primary Industries and
Regional Development

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Pest Parrot and Cockatoo Management in Western Australia

Approved 5 December 2025

Cover photograph: Gary Tate.

Important Disclaimer

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Acknowledgements

This report has been developed by the Department of Primary Industries and Regional Development (DPIRD) with the assistance of Strickland Park Economics and Broderick and Associates as consultants, with guidance and input from representatives of the following:

- Industry associations: Grape Growers' Association, Spring Hill Orchard, Costa Group, Hills Orchard Improvement Group, Cooperative Bulk Handling (CBH), Australian Pest Management Services, Evicom
- Local government authorities: City of Swan, City of Greater Geraldton, City of Mandurah, City of Rockingham, City of Gosnells, City of Joondalup, City of Claremont, City of Cockburn, City of Armadale, City of Northam, Northern Agricultural Catchments Council, South West Catchments Council, Shire of Trayning, Shire of Dowerin, Shire of Chapman Valley, Shire of Carnamah, Shire of Capel, Shire of Toodyay, Shire of Kalamunda, as well as the Western Australian Local Government Association
- Not-for-profit conservation and community organisations: Chittering Landcare, Leschenault Biosecurity Group, BirdLife WA, Wheatbelt NRM
- Universities: Murdoch University, Edith Cowan University.
- Department of Biodiversity, Conservation and Attractions (DBCA)
- Landholders, in particular orchardists and grape growers
- Western Australia Field and Game Association

In particular, DPIRD would like to acknowledge and thank the members of the Declared Pest Parrot and Cockatoo Steering Committee, which provided guidance and advice during development of this report.

Many other groups and individuals also lent their expertise. The contribution of all who attended workshops, took part in phone interviews, and otherwise provided input is greatly appreciated.

The department notes that this report does not necessarily reflect the views or policies of the organisations or individuals who participated in the consultation process.

Glossary

Term	Definition
Australian Government	In the context of the strategy, refers only to those Australian or central government departments responsible for invasive species and biosecurity.
BAM Act	*Biosecurity and Agriculture Management Act 2007* which provides for the control of certain organisms; and the use of agvet chemicals; and the identification and attainment of standards of quality and safety for agricultural products, animal feeds, fertilisers and other substances; and the establishment of a Declared Pest Account, a Modified Penalties Revenue Account and accounts for industry funding schemes.
BAM Regs	Biosecurity and Agriculture Management Regulations 2013 which provide for the implementation and administration of the BAM Act.
BC Act	*Biodiversity Conservation Act 2016* which provides for the conservation and protection of biodiversity and biodiversity components in WA; and the ecologically sustainable use of biodiversity components in WA.
BC Regs	Biodiversity Conservation Regulations 2018 which provide for the implementation and administration of the BC Act.
Biosecurity	Has the meaning assigned under the BAM Act, namely 'protection from the adverse effect an organism has or may have on: • another organism • a human being • the environment, or part of the environment • agricultural activities, fishing or pearling activities, or related commercial activities carried on, or intended to be carried on, in the State or part of the State'.
CALM Act	*Conservation and Land Management Act 1984* which provides for the use protection and management of certain public lands and waters and the flora and fauna they contain.
Containment	The application of measures in and around an infested area to stop or prevent the spread of a species, which may include reduction of the density in the area of infestation, or eradication of satellite infestations.
Control	In relation to a declared pest or other organism, includes eradicate, destroy, prevent the presence, or spread of, manage, examine or test for, survey for or monitor the presence or spread of, and treat.

Term	Definition
Control category	Declared pests can be assigned a control category for reason(s) stated in relation to that category: Category 1 (C1) – Exclusion: if introduction of the declared pest into an area or part of an area for which it is declared should be prevented; Category 2 (C2) – Eradication: if the declared pest from an area or part of an area for which it is declared is feasible; Category 3 (C3) – Management: if eradication of the declared pest from an area or part of an area for which it is declared is not feasible but that it is necessary to – i. Alleviate the harmful impact of the declared pest in the area; or ii. Reduce the number or distribution of the declared pest in the area; or iii. Prevent or contain the spread of the declared pest in the area. Declared pests may also have no assigned control category, i.e. unassigned.
Declaration, declare	The relevant Minister may assign a legal status to an organism under the BAM Act by way of a declaration, classifying it as a prohibited organism under section 12, declared pest under section 22(2), a permitted organism under section 11, or otherwise remain unlisted (section 14).
Declared pest	A species declared by the relevant Minister to be prohibited under section 12 of the BAM Act, or a pest under section 22(2) of the BAM Act.
Declared Pest Parrot and Cockatoo Steering Committee	A committee set up to provide advice on the development of the Pest parrot and cockatoo management report
Declared Pest Rate (DPR)	The Declared Pest Rate (DPR) and matched State funding are used to help landholders to manage established declared pests in specific areas. The combined funds are made available to Recognised Biosecurity Groups (RBGs) who provide support to landholders in managing established declared pests.
Disturb (in relation to fauna)	To chase, drive, follow, harass, herd or hunt fauna by any means; to apply an identifier to fauna by any means; or to engage in an activity that has the effect, whether directly or indirectly, of altering the natural behaviour of fauna to its detriment.

Term	Definition
Eradication	Removal of an entire population of an invasive species, including reproductive propagules.
Extirpation	To cause to go extinct locally within a population, but not within a species or subspecies.
Impact	The (usually) negative economic, environmental, social and/or cultural effects of pest species.
Incursion	A newly established population of an organism detected outside of its natural range or area (e.g. country, jurisdiction, region, or site). Re-invasion of a previously eradicated species is considered a new incursion.
Invasive	The characteristic(s) of particular animals, plants, parasites or disease-causing organisms that enable them to establish outside of their natural range.
Keeping category or permit	For the purposes of regulating organisms under the BAM Act, the administrative tool used to assign specific conditions to the keeping of an organism: Prohibited keeping – can only be kept under a permit for public display and education purposes, and/or genuine scientific research, by entities approve by the state authority. Restricted keeping – organisms which, relative to other species, have a low risk of becoming a problem for the environment, primary industry or public safety and can be kept under a permit by private individuals. Exempt keeping – no permit or conditions are required for keeping. There may be other requirements under the BAM Act such as those required for entry of livestock, pigeons and doves, or waybill requirements for stock movement. An organism in the exempt keeping category may also be regulated by other legislation such as the BC Act.
Landholder	Individuals, companies, organisations and governments that own, lease or manage private, commercial or government land.
Managed fauna	Under the BC Act and related regulations, ‘managed fauna’ refers to native species that have been identified as potentially causing environmental or agricultural damage in specific areas. These species can be taken or disturbed in those areas without needing a specific BC Act lawful authority.

Term	Definition
Management	Action(s) that aim to keep pest populations and/or their associated impacts below economically or ecologically damaging levels in a given area.
Natural Resource Management (NRM) grants	State funding/grants targeting not-for-profit community groups including Aboriginal community organisations and local governments to deliver on-ground environmental outcomes and build local capacity. NRM grants support activities such as integrated invasive species control, vegetation protection and expansion, biodiversity conservation, and improving farm resilience through better practices and technology.
Pest species	An animal, plant, parasite or disease-causing organism that has actual or potential undesirable impact(s) on economic, environmental or social values, and/or causes either direct or indirect, harm to human, animal, or plant health; or the environment.
Prevention	Management strategies including regulatory and physical measures to ensure that entry or establishment of pest species are prevented or their impacts mitigated.
Recognised Biosecurity Group	An organisation formally recognised by the Minister of Agriculture and Food under section 169 of the BAM Act for the purpose of declared pest control in their area of operation.
Reporting mechanism	Any tool, application, or communication channel through which pest species reports can be made.
Take (in relation to fauna)	To kill, injure, harvest or capture fauna by any means.

List of acronyms

Acronym	Definition
APAS	Australian Pest Animal Strategy
APVMA	Australian Pesticides and Veterinary Medicines Authority
AROC	Avon Regional Organisation of Councils
AW Act	*Animal Welfare Act 2002*
BAM Act	*Biosecurity and Agriculture Management Act 2007*
BC Act	*Biodiversity Conservation Act 2016*
CBH	Cooperative Bulk Handling
COP	Code of Practice
DBCA	Department of Biodiversity, Conservation and Attractions
DPIRD	Department of Primary Industries and Regional Development
ECU	Edith Cowan University
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
IGAB	Intergovernmental Agreement on Biosecurity
LGA	Local government area
NRM	Natural resource management
RBG	Recognised Biosecurity Group
RSPCA	Royal Society for the Prevention of Cruelty to Animals
SOP	Standard operating procedure
WA	Western Australia
WALGA	Western Australian Local Government Association
WAOL	Western Australian Organism List
WEROC	Wheatbelt East Regional Organisation of Councils

Executive summary

All landholders and land managers have the responsibility under both the *Biosecurity and Agriculture Management Act 2007* and the *Biodiversity Conservation Act 2016* to manage declared pest parrots and cockatoos on land under their management to mitigate their impacts. This can be achieved whilst providing for the conservation of native bird biodiversity.

Under the *Biodiversity Conservation Act 2016* (BC Act), the Department of Biodiversity, Conservation and Attractions' (DBCA) primary role is to protect and manage biodiversity in WA, including flora, fauna, and ecological communities. In performing these management responsibilities, DBCA regulates the protection of biodiversity through the granting of licences, permits and other authorities for a range of activities.

Under the *Biosecurity and Agriculture Management Act 2007* (BAM Act), the Department of Primary Industries and Regional Development (DPIRD) has a primary role in mitigating the risk of invasive species impacts in WA. This statutory role is delivered through a variety of functions including policy development, risk assessment, research and development, provision of technical advice and information, implementation of regulation, emergency response, property inspections, industry liaison, and the planning and coordination of priority species control/eradication programs.

DPIRD works with partners and stakeholders to detect and eradicate occurrences of new pest species infestations in WA, and where appropriate, reduce the impact of established pest populations. DPIRD supports industry and local community stakeholders managing the impact of widespread and established pests through provision of technical advice and promotion of best practice management.

Overall, the management of organisms, including pest birds, in WA is predominantly governed by both the BC Act and the BAM Act.

The BAM Act and its associated Regulations provide for the control of certain organisms that have or may have adverse impacts on WA's biosecurity or agricultural industries/activities, whilst the BC Act focuses on the conservation of WA's biodiversity, including the protection of native species and their habitats. It is important to note that under the BAM Act, all Australian native flora and fauna not indigenous or native to WA are prohibited organisms, unless they have been assessed and declared permitted under the BAM Act. As such, these 2 acts have different roles but specifically interact with each other when dealing with pest birds indigenous or native to Australia.

This report recognises that effective pest parrot and cockatoo management faces two key challenges. First, the populations of birds, their movement and damage caused are not confined to a single property and potentially encompass many properties (cross tenure) across large geographic areas. Second, the capacity and willingness of individual landholders or organisations to undertake control activities varies.

It is important to acknowledge that there is no quick or easy fix to address the negative impacts of pest parrots and cockatoos. Considerable time and effort is typically required before reductions in impacts are achieved or observable. Prevention and early intervention are considered the most cost-effective strategies for pest parrots and cockatoos not already present in WA or present in very low numbers.

For pest parrot and cockatoo populations already established in WA, but not widespread, effective management or containment aims to reduce the impacts of those populations in their current locations and detect occurrences of new populations outside the currently identified locations, preventing further harm to the State's agriculture, economy, biodiversity and community assets.

Where pest species are already well established and widespread, management should primarily be focused on reducing the damage or impacts they cause and the associated costs rather than reducing bird numbers per se.

Effective management of these highly mobile pests with fluid geographic boundaries is best conducted with a regional scale 'shared responsibility' or 'collective action' approach that coordinates the activities of relevant stakeholders at regional, sub-regional and local levels. This will facilitate the sharing of resources, information and experience between affected organisations and individuals, reducing the demand for scarce financial and physical resources. It will also enable a coordinated approach to raising funds for management programs.

The report identifies measures that will enable a coordinated, effective, safe, humane approach to ongoing pest parrot and cockatoo management. It informs, but does not prescribe, specific local on-ground actions. These must be planned and undertaken by those with expertise and knowledge of local issues.

Raising public awareness of the economic, environmental, social and cultural impacts of pest parrots and cockatoos, and the benefits of sustained, effective, and humane management are also essential to ensuring the control of these pests is accepted by the public.

Purpose of the report

The Pest Parrot and Cockatoo Management Report (report) details community views on the approach to the management of declared pest parrots and cockatoos in WA. The report identifies a range of measures that could facilitate effective control of these pests, ultimately leading to a reduction in associated economic, environmental and sociocultural costs.

Development of the report has been informed by a detailed literature review and extensive stakeholder consultation, plus a survey of public attitudes towards pest parrots and cockatoos in WA and was guided by a Declared Pest Parrot and Cockatoo Steering Committee.

Along with the report there is a companion Stakeholder Consultation Report prepared by Strickland Park Economics and Broderick and Associates

To support the information and findings in the report, DPIRD has produced the "Guidelines for the Management of Pest Parrots and Cockatoos in Western Australia".

Development of the pest parrot and cockatoo management report

The development of this report was informed by the findings of a literature review, stakeholder consultation and online survey that assessed public attitudes towards pest parrots and cockatoos in WA. Report development was guided by a Pest Parrot and Cockatoo Steering Committee.

Stakeholder consultation took the form of an expert workshop, 5 stakeholder workshops conducted across the south-west of the State, and several telephone and one-on-one interviews with key stakeholders who were not able to attend the workshops. This process sought to gather the opinions of business owners, pest bird experts, research organisations, government agencies, non-government organisations and interested individuals about the current position, opportunities, and directions for the management of pest parrots and cockatoos in WA.

Workshop attendees varied in both expertise and experience in dealing with pest parrots and cockatoos. The workshops and interviews provided valuable insights and context about what is currently being achieved, as well as the constraints, barriers, actions, and priorities to enhance pest parrot and cockatoo management over the short, medium, and long-term. Further detail on the outputs of this consultation process can be found in the Pest parrot and cockatoo stakeholder consultation report prepared by Strickland Park Economics and Broderick & Associates.

Obtaining an insight into the attitudes of the public to pest parrots and cockatoos, both as birds in the environment and as declared pests, was considered an important input for this report. For this reason, an online survey was conducted to assess the understanding of the WA public towards pest parrots and cockatoos. No prior knowledge of these pest birds was assumed, and 2 distribution channels were adopted.

The first channel was an established consumer panel representative of the WA community designed to collect a random sample of WA public opinion about pest parrots and cockatoos and their management. This channel generated 457 responses, which were primarily metro-based, reflecting the distribution of the WA population. The second channel generated 325 responses via the ‘YourSay’ online engagement platform published through the DPIRD webpage and promoted on DPIRD social media. It is generally assumed that those choosing to participate via the ‘YourSay’ platform were already interested in, or engaged with, pest parrot and cockatoo management in WA (**Appendices 1** and **2**).

Guiding principles for pest parrot and cockatoo management

Pest parrot and cockatoo management should be guided by the following eight principles of effective pest animal management embodied in the Australian Pest Animal Strategy 2017-2027 (p 5). These principles apply to all vertebrate pests, including pest birds.

1. Prevention and early intervention to avoid the establishment of new pest animal species is generally more cost-effective than ongoing management of established populations.
2. Pest animal management is a shared responsibility between landholders, community, industry and government.
3. Management of mobile pest animals requires a coordinated approach across a range of spatial scales and land tenures.
4. Management of established pest animals should focus on protecting priority assets but also usually requires a 'buffer' management area around the asset to account for pest animal mobility.
5. Pest animal management should be based on actual, rather than perceived, impacts and should be supported by monitoring to measure whether impact reduction targets are being achieved.
6. Best practice pest animal management balances efficacy, target specificity, safety, humaneness, community perceptions, efficiency, logistics and emergency needs.
7. Best practice pest animal management integrates a range of control techniques, considers interactions between species and accounts for seasonal conditions and animal welfare.
8. The cost of pest animal management should be borne by those who create the risk and those who benefit from its management. Governments may co-invest where there is a net public benefit from any such intervention.

These principles should be incorporated into pest parrot and cockatoo prevention, eradication, containment and management strategies, plans, and actions across all management levels.

The national and state policy framework for pest management

Intergovernmental agreement on biosecurity

WA is a signatory to the Intergovernmental Agreement on Biosecurity (IGAB), which came into effect in January 2019. The IGAB was established to enhance Australia's biosecurity system and strengthen the collaborative approach between the Australian and state and territory governments to address Australia's broad range of biosecurity issues. The agreement recognises that biosecurity is a responsibility shared by all Australians and that cooperation, investment and action with industry and the community are essential for a strong national biosecurity system.

Governments contribute to the cost of biosecurity risk management measures in proportion to the public good accruing from them. Investment in biosecurity activities by state and territory governments prioritises the allocation of resources to the areas of greatest return – in terms of biosecurity risk mitigation and return on investment.

Australian pest animal strategy

The Australian pest animal strategy (2017) is a vital part of Australia's integrated approach to national biosecurity under the IGAB. The strategy sets the direction for 2017–27 for national pest animal management and encourages collaboration between stakeholders. The strategy includes priorities to improve early detection, diagnostics, and response for priority pest animals.

Western Australian biosecurity strategy

The WA biosecurity strategy 2016–25 sets the strategic direction for partnership arrangements to manage biosecurity issues affecting agriculture, fisheries, forestry, and biodiversity in terrestrial and aquatic environments. The strategy covers pest animals and plants, and diseases. It acknowledges that an effective biosecurity system needs to manage risks across the entire biosecurity continuum and emphasises the importance of preventing incursions and detecting them early.

Animal welfare

Management techniques used to control declared pest animals, including pest birds, must comply with the *Animal Welfare Act 2002* (AW Act) and relevant codes of practice (COPs) and standard operating procedures (SOPs) that support the Act.

State regulatory framework for pest bird management

Management of pest birds in WA is primarily governed by the *Biosecurity and Agriculture Management Act 2007* (BAM Act) and the *Biosecurity and Agriculture Management Regulations 2013* (BAM Regs). The legal status of pests, as assigned under the BAM Act, dictates how the pest can be managed, imported, or kept in WA (Table 1). If pest birds are Australian fauna, then the *Biodiversity Conservation Act 2016* (BC Act) and the *Biodiversity Conservation Regulations 2018* (BC Regs) also apply. The roles of these two Acts are:

- The BAM Act and its associated regulations provide for the control of species that have or may have adverse impacts on WA's biosecurity or agricultural industries/activities.
- The BC Act and its associated regulations provide for the conservation of WA's biodiversity, including the protection of native species and their habitats. It also provides for the keeping and take (control) of native birds.

Whilst these two Acts and their associated regulations have distinct purposes, they interact closely when dealing with native species, particularly in the following scenarios:

- Birds native to the eastern states and territories (but not WA) – always prohibited under BAM Act unless assessed and declared a permitted organism or a declared pest. Prohibited under BAM Act means that an import permit is required for these species to enter WA.
- Birds native to WA (as recorded by WA Museum) – always a permitted organism under the BAM Act but can be declared a pest. However, they remain a permitted organism under the BAM Act so are a declared pest under s22(2), not a s12 prohibited declared pest.

In addition to the declaration status assigned to a species under the BAM Act, the BAM Regs specify control categories (Table 2) and keeping categories (Table 3) for declared pests, to enable the regulation of their management and keeping. Control categories help prioritise and guide management strategies to protect economic, environmental, and social or cultural values. Keeping categories regulate the purposes for which a species can be kept, and the entities permitted to keep them. A keeping permit is the administrative tool used to assign specific conditions for keeping a bird species.

Individuals who keep birds without the required permit or who fail to comply with the conditions of a permit can be prosecuted and may be required to forfeit their birds.

Table 1: Legal declarations for species under the BAM Act

Declaration status	Definition	Key features
Permitted	Permitted under section 11 of BAM Act; no restrictions on entry to WA (unless declared as requiring a permit to import).	• Considered low biosecurity risk • No restrictions beyond general conditions
Prohibited	Prohibited under section 12 of BAM Act; entry to WA prohibited unless authorised under permit.	• Considered high biosecurity risk • Illegal to import, keep, or release without appropriate permit • Prohibited organisms are declared pests by virtue of section 22(1)
Declared Pest	Declared a pest under section 22(2) of BAM Act; due to biosecurity risk requiring control	• May already be present in WA • Subject to control/management obligations in all or part of the state
Unlisted	Under section 14 of BAM Act; any species not listed on WAOL is an unlisted organism.	• Automatically considered a Prohibited organism until assessed and assigned a legal declaration under BAM Act

Table 2: Control categories for declared pests* under the BAM Regs

Control Category	Definition
C1 Exclusion	Organisms which should be excluded from part or all of WA.
C2 Eradication	Organisms which should be eradicated from part or all of WA.
C3 Management	Organisms that should have some form of management applied to alleviate harmful impact(s), reduce numbers or distribution, or prevent or contain the spread of the organism.
Unassigned	Declared pests that may have a harmful impact under certain circumstances, and where their subsequent control is determined by a Plan or other legislative arrangements under the BAM Act.

* Declared pests s22(2) can be assigned to a C1, C2 or C3 control category, Prohibited s12 declared pests can be assigned to a C1 or C2 control category.

The Western Australian Organism List (WAOL) is the online database of organisms (animals, plants, pathogens) declared by the Minister for Agriculture and Food, WA as either declared pests or permitted organisms under the BAM Act. WAOL allows users to search for organisms declared under the BAM Act and provides information about their regulation (legal/declaration status) and management (control and keeping categories) in WA.

Table 3: Keeping categories for declared pests under the BAM Regs

Keeping Category	Definition
Prohibited	Can only be kept under a permit for public display and education purposes, and/or genuine scientific research, by entities approved by the state authority.
Restricted	Species regulated as restricted keeping have been assessed as posing a lower biosecurity risk to WA and can be kept with a permit by private individuals.
Exempt*	No permit or conditions are required for keeping. There may be other requirements under BAMA such as those required for entry of livestock, pigeons and doves, or waybill requirements for stock movement.

* A species in the exempt keeping category may also be regulated by other legislation such as the Biodiversity Conservation Act 2016 (BC Act), administered by DBCA.

The following considerations apply to the keeping or control of bird species in WA:

Birds native to WA:

- Permitted or can be declared pests under s22(2) of the BAM Act.
- May require a restricted keeping permit.
- Regulated by DBCA and protected under the BC Act.
- Require a fauna possessing (pet keeper's) license from DBCA.
- DBCA Fauna Licence may be required to take/disturb birds indigenous or native to WA.

Birds native to Australia but not native to WA:

- Prohibited under the BAM Act unless assessed and declared as permitted or as a declared pest.
- Prohibited bird species require an import permit from DPIRD to enter WA.
- Prohibited bird species can only be kept with an authorised BAM Act permit.
- Remain protected under the BC Act and regulated by DBCA.
- Require a fauna possessing (pet keeper's) licence from DBCA.
- DBCA Fauna Licence may be required to take/disturb birds indigenous or native to WA.

Birds not native to Australia:

- Always prohibited under the BAM Act unless assessed and declared permitted or a declared pest.
- Prohibited bird species require an import permit from DPIRD to enter WA.
- Import and keeping is regulated and managed under the BAM Act.

Further details and information on importing and keeping birds in WA is available on DPIRD's Importing animals in Western Australia webpage.

Further information on the management (take/disturb) and keeping of native birds in WA is available on DBCA's Fauna Licences webpage.

Pest parrot and cockatoo species

In this report, the term pest parrots and cockatoos encompasses a suite of birds: those native to WA; those not native to WA but native to Australia; and those not native to Australia. The consideration of these birds as pests is typically associated with an overabundance of the birds and/or their impact(s), or the risk of this occurring should a species become established. Rather than attempt to deal with an exhaustive list of pest birds, this report focuses on the commonly encountered species of pest parrots and cockatoos in WA (Table 4).

Table 4: Species and sub-species of pest parrots and cockatoos within scope

Species and sub-species	Exotic to Australia	Native to Australia		Keep, take or disturb legislated under	
		WA native	WA exotic	BAM Act	BC Act
Rainbow lorikeet (*Trichoglossus haematodus*)	No	No	Yes	Yes	Yes
Sulphur crested cockatoo (*Cacatua galerita*)	No	Yes	No	Yes	Yes
Indian ringneck parakeet (*Psittacula krameri*)	Yes	No	No	Yes	No
Alexandrine parakeet (*Psittacula eupatria*)	Yes	No	No	Yes	No
Western long-billed corella – Butler subspecies (*Cacatua pastinator butleri*)	No	Yes	No	Yes	Yes
Western long-billed corella – Muir subspecies (*Cacatua pastinator pastinator*)	No	Yes	No	Yes	Yes
Eastern long-billed corella (*Cacatua tenuirostris*)	No	No	Yes	No	Yes
Little corella – Eastern states subspecies (*Cacatua sanguinea gymnopis*)	No	No	Yes	No	Yes
Little corella – Kimberley subspecies (*Cacatua sanguinea sanguinea*)	No	Yes	No	Yes	Yes
Little corella – Pilbara-Murchison & northern Wheatbelt subspecies (*Cacatua sanguinea westralensis*)	No	Yes	No	Yes	Yes
Pink and grey galah (*Eolophus roseicapilla*)	No	Yes	No	Yes	Yes

Pest parrot and cockatoo impacts

The range of impacts of pest parrots and cockatoos is broadly understood. However, raising public awareness of the extent of the economic, environmental, and sociocultural damage caused by these birds and consequently the benefits of sustained, effective, and humane management, is essential to ensuring public support for the control of pest parrots and cockatoos.

Pest birds have a range of impacts (Table 5). A more detailed understanding of the extent and occurrence of these impacts is required to enable informed decision-making and prioritisation of management activities on a cost-benefit basis, and for the public to appreciate the need for effective management of these pest birds.

Table 5: Summary of the impacts of pest parrots and cockatoos

Species	Impacts							
	Economic			Environmental			Social and public amenity	
	Infrastructure	Agricultural		Threat to native species	Spread of disease	Damage to flora	Noise	Fouling
		Broadacre Crops	Fruit and nut crops					
Corella*[1]	Yes	Yes	n/a	Yes	Yes	Yes	Yes	Yes
Rainbow lorikeet[2]	n/a	n/a	Yes	Yes	Yes	n/a	Yes	Yes
Sulphur-crested cockatoo[3]	n/a	Yes	Yes	Yes	Yes***	n/a	Yes	n/a
Indian ringneck parakeet**[4]	Yes	n/a	Yes	Yes	Yes***	Yes	Yes	Yes
Alexandrine parakeet**[5]	n/a	Yes	Yes	Yes	Yes***	n/a	Yes	n/a
Galah[6]	Yes	Yes	Yes	Yes	Yes***	Yes	Yes	Yes

* Includes all sub-species.

** Potential impact as not currently present in WA.

*** All gregarious, flocking birds are potential vectors for disease.

[1] DBCA (2017). *Corellas and other Flocking Cockatoos*, Fauna Notes.
[2] Chapman T. (2005). The Status and Impact of the Rainbow Lorikeet in Western Australia.
[3] https://www.agric.wa.gov.au/birds/sulphur-crested-cockatoo, *Accessed 21/06/2023;* DBCA (2017). *Corellas and other Flocking Cockatoos*, Fauna Notes.
[4] DAFWA (2007). *Indian Ringneck Parakeet,* Animal Pest Alert No. 1.
[5] https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/animals/invasive/other/alexandrine-parakeet, Accessed 21/06/2023.
[6] DEC (2007). *Galah,* Fauna Notes No. 21.

Roles and responsibilities in pest parrot and cockatoo management in WA

All landholders, including Australian, state and local governments, traditional owners, farmers, pastoralists, and private landholders, have a responsibility under both the BAM Act and the BC Act to manage declared pest parrots and cockatoos on land under their management, to mitigate their impacts and to conserve and protect biodiversity.

How this management responsibility is shared between the government, industry and private landholders (whole of system approach) is illustrated by the generalised invasion curve (Figure 1). Declared pest parrots and cockatoos targeted for prevention or eradication (i.e. the left-hand side of the curve) are typically the responsibility of the government. The WA Government, through DPIRD, operates to prevent or mitigate high risk pest birds arriving in WA. The public good argument – all Western Australians benefit from the single preventative action – clearly justifies this approach.

When pest bird populations become established (i.e. the right-hand side of the curve), control objectives must change to reflect the feasibility and likelihood of management outcomes – i.e. ongoing mitigation activities to reduce impacts or damage. All landholders are responsible for controlling declared pests on their land, and community groups, including Recognised Biosecurity Groups (RBGs), can play a pivotal role in coordinating management efforts for established pests.

A whole of system approach is required for the management of declared pest parrots and cockatoos in WA (in relation to control, keeping and management) through the BAM and BC Acts. The WA Government works to the following principles to achieve desired pest bird outcomes:

1. Preventing the spread to new areas/new incursions of high-risk pests, including localised eradication/control of new populations.
2. Regulatory compliance of restricted keeping and importation of birds through issuing of permits and inspections of keeping facilities.
3. Community and stakeholder engagement as well as community group support through the Declared Pest Rate (DPR) and Natural Resource Management (NRM) funding processes.
4. Regulation of the safe use of registered pesticides; specifically, access to alphachloralose for pest bird management.
5. Delivering scientific research into high impact pest species to provide and maintain community and stakeholder access to best practice management tools.

Government remains involved in leading actions to contain pest bird incursions to well defined, small areas for containment or ideally eradication. However, should pest bird populations escape these defined areas and become established, responsibility for management progressively shifts to land managers to undertake control on their lands to minimise impacts. For example, in situations where established pest birds may experience localised population growth spikes or have seasonal incursions into an area or region with corresponding increases in impacts, it is expected that local communities or local government would lead the delivery of coordinated management activities.

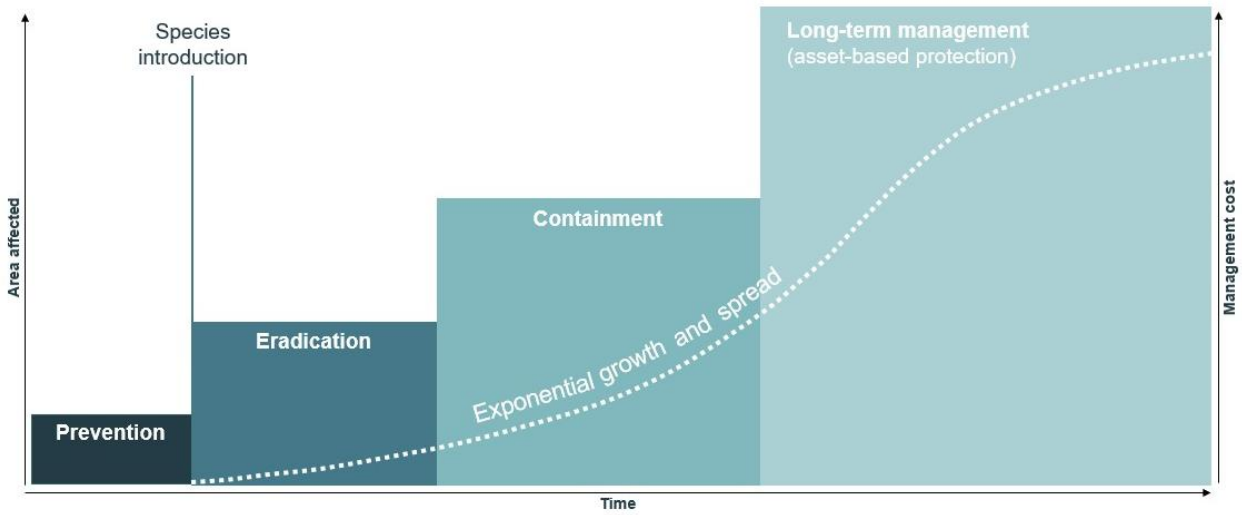

Figure 1: The generalised invasion curve

The generalised invasion curve describes, in 4 phases, how pests and diseases can invade an area and become established, and how the management objective change across these phases.

1. **Prevention**: The best return on investment is from preventing new pests and diseases from arriving, this includes monitoring entry pathways, testing imports and border controls.
2. **Eradication**: The eradication of a pest or disease can have a good return on investment when it is detected early and responded to rapidly. Surveillance and early detection are critical.
3. **Containment**: Some pests and diseases can be effectively contained to a specific area by removing any that are found outside that area. Although the returns in investment are lower, it can still be worthwhile.
4. **Long-term management**: Once pests and diseases become widespread and established the focus changes to protecting important assets from their impact. The returns on investment are generally lowest at this end of the invasion curve. However, returns can be significant when investing in protecting high-value state or national assets, such as a population of endangered native species. It is best to prevent pests from becoming established.

Key success factors for effective management of pest parrots and cockatoos

The key success factors detailed below are viewed as critical to the long-term success of a pest parrot and cockatoo management program.

1. Management must continue in perpetuity, even when population densities are low, to prevent rapid population recovery or growth when control activities are suspended.
2. Stakeholders must accept that resolving pest parrot and cockatoo issues will require considerable time and incur significant costs before any reduction in the damage and associated costs is achieved.
3. There must be strong ownership and commitment from all stakeholders and a willingness to actively share knowledge and resources, and to coordinate management activities.
4. Partnerships between landholders (both private and government), industry, and not-for-profit organisations must be developed to encourage identification and ownership of the problem, adoption of long-term planning and facilitation of effective communication.
5. All landholders must adopt approved control techniques and apply them using the highest animal welfare standards.
6. There must be a better understanding of the economic, environmental, social and cultural impacts of pest parrots and cockatoos to enable informed decision making and prioritisation of control activities on a benefit-cost basis along with evaluation of management activities.

Summary of stakeholder feedback

The consultation workshops delivered by Broderick and Associates, together with Strickland Park Economics, were attended by a cross section of stakeholders who provided a wide range of feedback concerning the management of pest parrots and cockatoos in WA. All effort has been taken to accurately summarise the key findings of this consultation process below. Further details of this consultation process can be found in the Stakeholder Consultation Report prepared by Strickland Park Economics and Broderick and Associates.

Apply regional scale collective approaches to effectively manage pest parrots and cockatoos

The challenges of pest parrot and cockatoo management in WA are twofold. First, the populations of birds, their movements, and the damage they cause are seldom confined to a single location and will encompass numerous properties across large geographic areas. Second, the capacity of individual landholders or organisations to undertake control on their own will likely vary, particularly for individual households in urban areas. Therefore, effective management of these highly mobile pests with fluid geographic boundaries is best conducted on a regional or sub-regional scale.

A shared responsibility, or 'collective action' approach that coordinates the activities of relevant stakeholder groups is necessary to facilitate the sharing of resources, information, and experience between affected areas, organisations, and individuals, thereby reducing the demand for scarce financial and physical resources. Coordinated action across multiple stakeholder groups may also help to attract funding for management programs (**Appendix 3**).

Recognised biosecurity groups (RBGs) are the primary mechanism under the BAM Act by which pests classified as C3 are managed. However, RBGs are typically rural and are formed in response to community prioritisation of established pests, and none have pest parrot or cockatoo management as focus pest species. There is no RBG for the Perth metropolitan area and no ongoing coordination of pest parrot and cockatoo management (or any other declared pest) in the greater city area. This is an area of concern for those observing and experiencing pest bird impacts, those that are being impacted, and those wishing to undertake local action but are not resourced to coordinate across the metropolitan area. A system for supporting and/or incentivising coordination in the Perth metropolitan and Peel regions is needed.

Review legal and regulatory framework

The current regulatory framework for the control of declared pest parrots and cockatoos under the BAM Act, the BC Act and national legislation (e.g. *Biosecurity Act 2015)* are not clearly understood. Stakeholders require greater clarity regarding roles and responsibilities between agencies, in particular, the identification of which agency has the lead responsibility in the management of particular pest bird species. The regulatory responsibilities of DPIRD and DBCA must be better defined so they can be clearly understood by all stakeholders.

For example, there are differences in understanding how legislation applies to pest parrot and cockatoo species in different locations throughout WA. For example, the difference in control category assigned to rainbow lorikeets is dependent on which local government area (LGA) they occur in (see rainbow lorikeet species profile, page 12).

Licence requirements for the keeping of pest birds in captivity also need to be clarified.

For example, bird hobbyists can import species that are identified as pest birds into WA and are required to hold a licence to keep them. However, compliance inspections of aviaries often reveal the keeping conditions do not meet the expected security level, and there are examples of birds escaping and/or being released from captivity.

In addition to established pest birds, emerging pest birds are also of concern to WA stakeholders. There should be greater prevention and preparedness planning conducted to protect WA from emerging pest species. Adjustment of policy settings and institutional arrangements is needed to enable rapid and effective response to emerging species, especially those most likely to cause impacts.

Need for secure funding

The mobility of pest parrots and cockatoos presents a significant challenge for assigning responsibility and financial obligation for their control. Moreover, the vulnerability of pest control programs to a lack of secure funding support has created gaps in pest parrot and cockatoo management efforts, particularly on public lands in the metropolitan area.

Despite these challenges, there is a notable willingness within the volunteer community to actively participate in pest surveillance activities, such as through Birdlife WA. However, the organisations supporting these public/community initiatives often rely on grant programs for funding, which is inconsistent and uncertain. The lack of continuous and sufficient resourcing limits these organisations' ability to provide long-term pest bird management.

Quantify impacts

Damage caused by pest parrots and cockatoos is not well documented in WA. Negative impacts include, but are not limited to, damage to fruit orchards, table and wine grape crops, backyard fruit crops, competition with native bird species for food and nest sites, noise pollution at roost and feeding sites, and damage to human infrastructure. In some instances, impacts of control measures (e.g. noise from gas guns) are also a significant consideration. Impacts caused by pest parrots and cockatoos have adverse effects on the lives of growers and community members alike, which can lead to hypersensitivity, anxiety, and depression.

The tendency to describe environmental assets qualitatively rather than quantitatively makes it difficult to assess the full extent of damage caused by pest parrots and cockatoos. The lack of consistent, long-term monitoring programs across different regions and ecosystems makes it challenging to obtain comprehensive data on pest bird impacts which can lead to gaps in the understanding of the true extent of their impacts. This can be also exacerbated by limited available funding for research and population monitoring, which often leads to the collection of sporadic or incomplete data on pest birds.

Estimates of social, economic, environmental and cultural costs are required to enable prioritisation of management activities on a benefit-cost basis that will be accepted by the public. Furthermore, the role of declared pest parrot and cockatoo management needs to be considered as part of broader comprehensive ecosystem management and/or agricultural system management.

Establish uniform population monitoring methods

Effective management of pest parrots and cockatoos requires monitoring of the abundance and distribution of populations to define their boundaries and to help determine the effectiveness of control programs. Improved understanding of pest density and distribution would enable better planning and evaluation of control programs.

There is significant expertise in managing pest birds in WA, but much of the experience with past control methods and outcomes is not well documented, or not readily available. The structuring of future monitoring programs should allow for sufficient data to be gathered to ensure that the effectiveness of management activities can be evaluated systematically.

Consultation with local and regional groups is important to raise awareness of the need to record emerging pest bird species. Detection of new incursions, including escaped aviary species, may be reliant on dedicated, or interest, groups at the local scale.

A range of pest bird data is gathered, held and managed through localised surveys (e.g. local ornithological groups), coordinated bird watching activities (e.g. 'Operation Rainbow Roost' by BirdLife Australia), and control activities (e.g. control of emerging and not established species by DPIRD). Bird datasets are recorded in various formats and may be periodically reported, but the frequency and extent of reporting, and to whom, is not well understood.

Development of a central point for recording and reporting pest bird data (e.g. bird sightings, roost surveys, conducting genetic testing) to assess changes in species distribution and abundance should be pursued. The system should allow for the reporting of new species (including aviary escapees) detected in the wild by local communities and facilitate communication with local authorities for any necessary control or eradication efforts.

Increase public awareness and engagement

In general, birds are widely recognised by the public as a vital component of the local ecosystem. Their presence contributes to biodiversity and enhances the beauty of natural landscapes.

The public is generally aware that some parrots and cockatoos are declared pests in WA. However, despite this recognition, the public does not seem overly concerned about the presence of these pest birds in their neighbourhoods. Among those who acknowledge the potential problems posed by pest parrots and cockatoos, the majority consider that these pest birds pose a significant conservation risk.

While there is consensus that investing in pest bird control measures is essential for the wellbeing of future generations, there is relatively little awareness among the public regarding the specific actions being taken to manage and reduce pest parrot and cockatoo populations in WA (**Appendices 1** and **2**).

This gap in knowledge suggests an opportunity for increased communication and education about the efforts being made to protect the environment and communities from the impacts of pest birds. Moreover, it will contribute to gaining public acceptance for the adoption of required control methods.

Facilitate effective collaborations

Effective collaboration on pest parrot and cockatoo management requires a multifaceted approach that engages multiple stakeholders and addresses both public awareness and behaviour (**Appendix 3**). A key consideration of this approach is the development of appropriately pitched information campaigns. These campaigns should aim to educate the public about pest bird impacts and the importance of management efforts, while being sensitive towards general affection of the public for birds.

Consideration also needs to be given to working closely with sales agents for aviary birds to help ensure that potential bird owners are well-informed about the responsibilities and potential risks associated with keeping certain bird species. This proactive approach can help prevent the accidental release of pest birds into the environment.

Engaging the public through citizen science initiatives (e.g. pest bird observation and data collection) offers a powerful way to increase public awareness of local pest bird populations and the challenges associated with their presence. These programs would not only provide valuable data for wildlife managers but would also foster a sense of stewardship among the public.

Understanding community motivations for feeding pest parrots and cockatoos is another critical area for collaboration. Many people derive pleasure from feeding birds, often unaware of the potential negative consequences of supporting pest species. By understanding these motivations and developing approaches to reduce problematic feeding behaviours, stakeholders can work together to find alternative ways to engage with the public.

Understanding the extent of community acceptance of control techniques is essential for successful and effective pest parrot and cockatoo management. By involving the community in discussions about management strategies, particularly within urban and peri-urban areas, and being transparent about the methods used is crucial to build trust and foster shared commitment.

Prioritise short, medium, and long-term management goals

The management of pest parrots and cockatoos presents a complex challenge for land managers. It requires them to address pest birds that cause immediate nuisance often at the expense of developing comprehensive, long-term management strategies. This focus on short-term solutions can lead to a reactive approach rather than prioritising medium and long-term management strategies effectively.

Emerging pest birds are typically given high priority for control, as they represent new threats to ecosystems and agricultural productivity, and early intervention is justified because it prevents these species from becoming established in WA. However, control tools that are available at the time may not always be adequate to prevent those pest birds from becoming an established species. This approach can lead to inefficient use of resources which may only temporarily suppress pest bird populations which rapidly

recover or persist and cause damage between control efforts, potentially negating previous management successes.

Management and control methods and their efficacy

Land managers employ a diverse range of control methods including lethal and non-lethal deterrent tactics. However, the success of these approaches varies considerably, and there is often a limited understanding of the true outcomes achieved.

When reporting on the outcomes of control activities, there is a tendency to focus on the number of pest birds controlled. While this metric can provide some insight into the scale of the control effort, it fails to capture the measure of an actual population reduction as well as a reduction in pest bird related damages. This in turn reduces opportunities to learn more about the efficacy of management and control techniques. This narrow focus on recording the number of birds controlled may lead to an incomplete understanding of the true effectiveness of control efforts.

There is a growing awareness among land managers about the public perception of various control methods, particularly when it comes to lethal control measures. Managers must balance the need for effective pest bird management with the potential for public backlash surrounding certain control techniques. This consideration adds another layer of complexity to pest parrot and cockatoo management

Priority actions identified by stakeholders during consultation

In addition to the summary feedback of the consultation process, stakeholders identified several priority actions that they felt were important to pursue in order to continue to improve pest parrot and cockatoo management in WA. The key findings led to development of several recommendations for effective management of pest parrots and cockatoos in WA. These have been grouped based on those actions that aim to: prevent the arrival and establishment of new species; deliver sustained reductions in impacts; and improve the understanding of pest parrots and cockatoos and their impacts.

The following actions capture stakeholder views, and do not indicate the WA Government's endorsement or commitment to any particular action.

1. Prevent the arrival and establishment of new pest bird species in WA

Action	Purpose
Improve community awareness and understanding of the threat posed by pest parrots and cockatoos not present in WA, or present only in small, isolated numbers.	To strengthen community acceptance and understanding of the need to regulate and manage pest parrots and cockatoos due to the risk they pose to WA.
Resourcing for strategic surveillance, detection, and control of pest parrots and cockatoos currently not present in WA, or present only in small, isolated numbers.	To provide for rapid response to a new pest parrot or cockatoo incursion when required and provide stakeholders with a clear understanding of the roles and responsibilities of key agencies in the surveillance, detection, and control of pest parrots and cockatoos currently not present in WA, or only present in small, isolated numbers.
Improve regulation of the purchase and keeping of pest parrots and cockatoos in private aviaries.	To reduce the likelihood of release or escapes.
Improve compliance for the purchase and keeping of pest parrots and cockatoos.	To reduce the likelihood of release or escapes.

2. Manage established pest parrot and cockatoo species to achieve a sustained reduction in their economic, environmental, social and cultural impacts

Action	Purpose
Develop, apply and evaluate control programs for pest parrots and cockatoos.	To ensure existing and potential new control measures are effective in achieving control of pest parrots and cockatoos, are an efficient use of resources, and compliant with animal welfare standards.
Encourage coordinated, broadscale approaches to support management of pest parrots and cockatoos.	To ensure the management of pest parrots and cockatoos is delivered at a relevant scale in a coordinated manner that avoids duplication and achieves efficient use of scarce resources.
Investigate ongoing and sustainable funding streams to support the delivery of effective pest parrot and cockatoo management.	To support the delivery of sustainable, long term pest parrot and cockatoo management.

3. Undertake research to inform the ecology, distribution and impact of pest parrots and cockatoos in WA

Action	Purpose
Enhance and promote the understanding of the nature and value of the economic, environmental social and cultural impacts caused by pest parrots and cockatoos in all regions.	To improve community acceptance and understanding of pest parrot and cockatoo control and guide investment in their management on a benefit-cost basis.
Improve knowledge of the distribution, abundance and genetics of pest parrots and cockatoos in WA.	To provide a baseline of information to guide pest parrot and cockatoo management programs. This information will also enable the identification, distribution and abundance of pest parrots and cockatoos to be updated.
Increase the knowledge and understanding of the ecology and population dynamics of certain pest parrots and cockatoos.	To provide improved scientific understanding of the breeding and feeding habits, and movements of pest parrots and cockatoos to inform the development of more effective control measures.

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Appendix 1:

Public attitudes towards pest parrots and cockatoos in WA – main findings from online survey

To effectively manage declared pest parrots and cockatoos in WA, it is imperative to understand the public's awareness and attitudes towards the species and their management. In 2023, Strickland Park Economics prepared a survey to assess the understanding of the WA public towards declared pest parrots and cockatoos. No prior knowledge of pest parrots and cockatoos was assumed, and 2 different distribution channels were adopted.

Channel 1

A consumer panel representative of the general WA public was accessed through a commercial provider. There was no presumption that respondents knew about pest parrots and cockatoos. Channel 1 generated 457 responses, which were primarily metro-based, reflecting the distribution of the WA population. The respondents were not selected based on any engagement with pest parrots and/or cockatoos. Sampling delivered the required spread of age and gender, and the majority of respondents indicated they had not previously been surveyed about pest parrots and cockatoos.

Channel 2

Using the 'Your Say' online engagement platform, the same survey was published through the DPIRD webpage and promoted on DPIRD social media. All respondents were required to register for access to the DPIRD YourSay webpage. Availability of the survey was advertised widely, but there was no specific sampling strategy involved. The survey was open from the 9 February until the 31 March 2023. All responses (325) received by the closing date were accepted. It is assumed that those choosing to participate had sufficient interest in pest parrots and cockatoos and their management to justify registering and taking the time to complete the survey.

Prior to each round of questioning, respondents were provided with informative supplementary text relevant to the topic, such as awareness towards declared pest parrots and cockatoos, and the role of the government in the management of declared pest parrots and cockatoos in WA (Appendix 3). Each question statement was assessed on an agree to disagree 5-point scale.

Socio-demographic differences of respondents

Ninety-eight per cent of Channel 1 respondents and 80% of Channel 2 respondents reported being surveyed for the first time in matters relating to pest parrots and cockatoos. Less than 5% of the Channel 1 respondents were members of a conservation organisation, and 11% had taken part in any conservation activities. These values were much higher for the Channel 2 respondents, with 26% membership, and 45% participation values.

The median age of Channel 1 demographics was considerably lower (35 to 45 years) than that of Channel 2 (55 to 64 years; **Figure 1**).

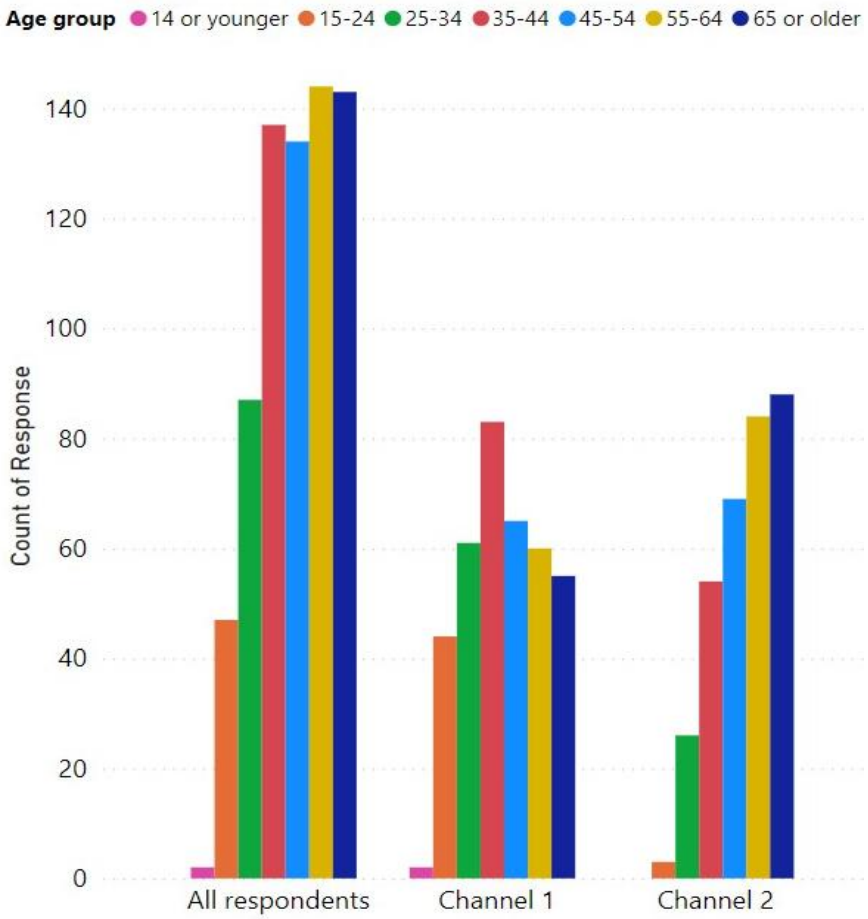

Figure 1: Number of responses by age group.

Most of the Channel 1 respondents were based in the metropolitan (urban and peri-urban) area, reflecting the locational distribution of the WA population. In contrast, the Channel 2 audience had a significantly smaller representation from the metropolitan area, and larger from rural areas, such as Wheatbelt and the South-West (**Figure 2**). The high response rate in rural regions may reflect the pest birds being an issue in these regions, which encouraged people to express a view about them.

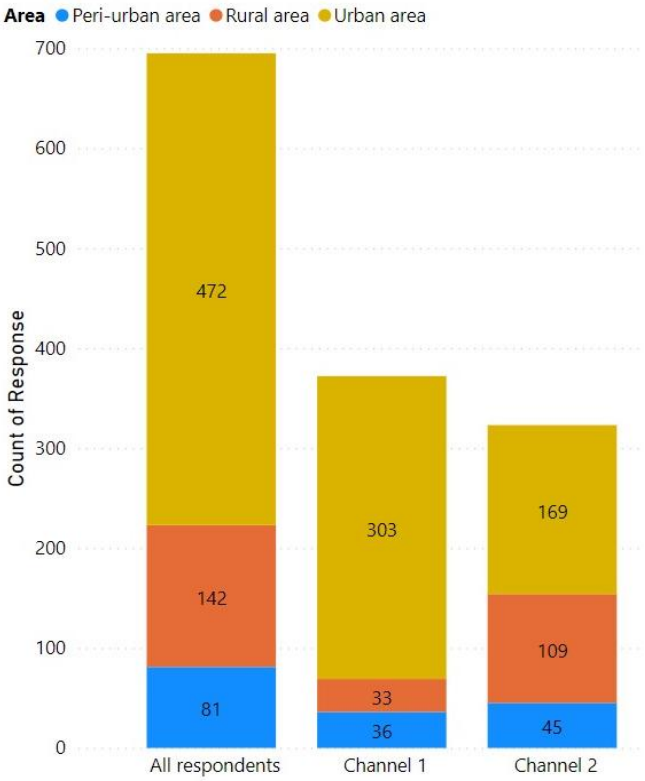

Figure 2: Number of responses by area.

Public attitudes towards birds and knowledge of parrots and cockatoo's pest status in WA

The survey highlighted that the public strongly cares about birds and values their presence. Birds are seen as an important part of local ecosystem, are enjoyable to watch, and provide opportunities to learn about nature. When asked about pest parrots and cockatoos, over 70% of respondents were aware that some parrots and cockatoos are declared pests in WA. Public awareness was significantly higher for the Channel 2 respondents (96%) than for the Channel 1 respondents (51%; **Figure 3b**).

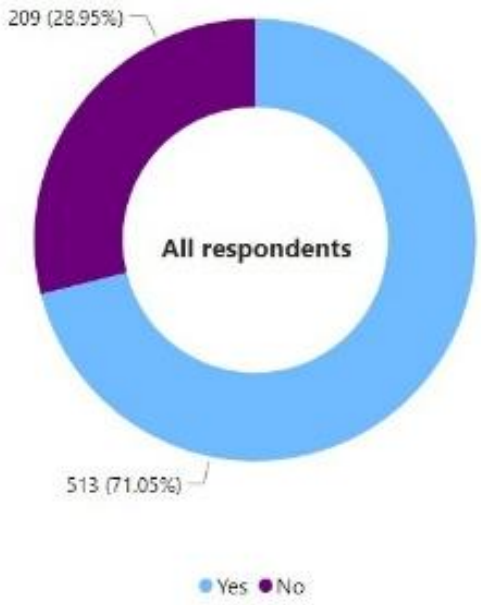

Figure 3a: Number of responses to question: 'Did you know that some introduced species of parrots and cockatoos are declared pests in Western Australia?' by all respondents combined.

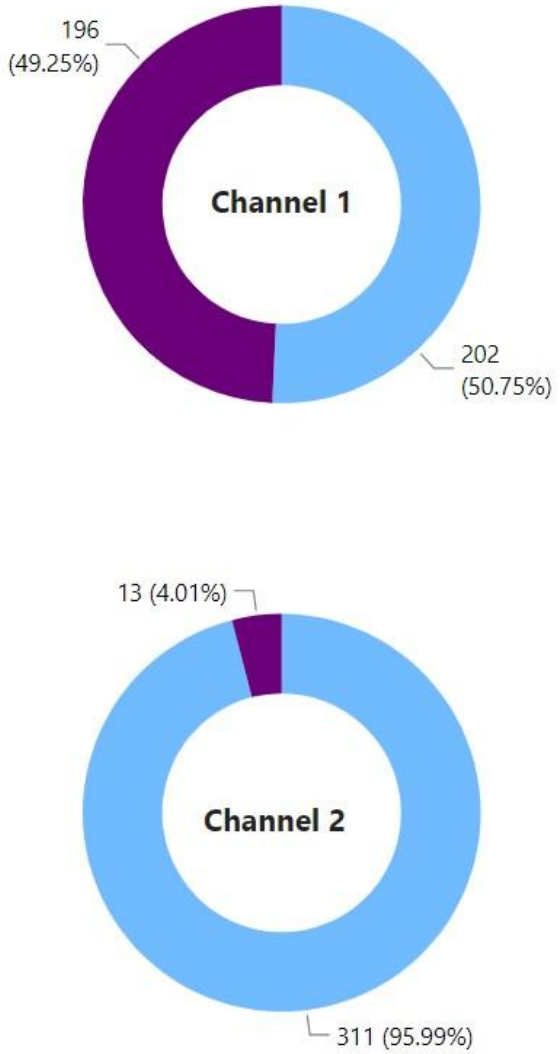

Figure 3b: Number of respondents by audience channel to question: 'Did you know that some introduced species of parrots and cockatoos are declared pests in WA?'.

Responses also varied from different areas. Survey participants living in urban areas were considerably less aware of the parrot and cockatoo's pest status (65%), in comparison to respondents from peri-urban (77%), and rural (90%) areas (**Figure 4**).

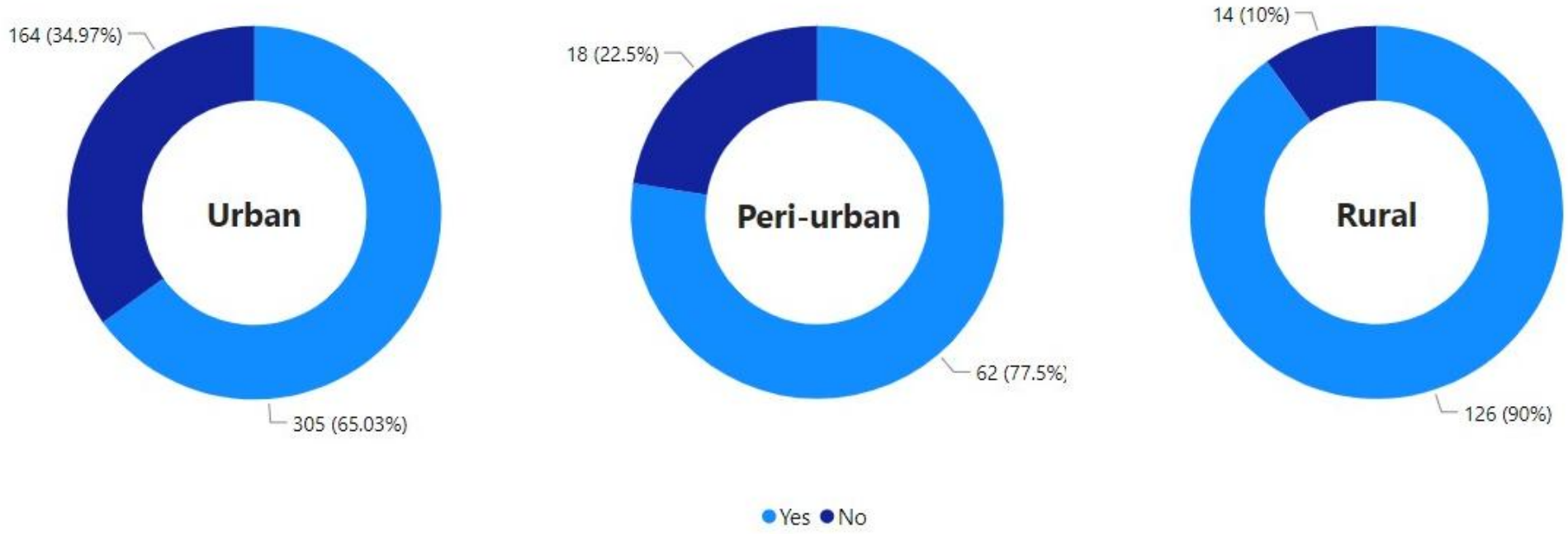

Figure 4: Number of responses by area to question: 'Did you know that some introduced species of parrots and cockatoos are declared pests in WA?'.

When analysed by the age group, public knowledge of pest parrots and cockatoos was very low in the 2 youngest age groups. Knowledge gradually increased in older members of the public, reaching the highest values in people being 55 years and older (**Figure 5**).

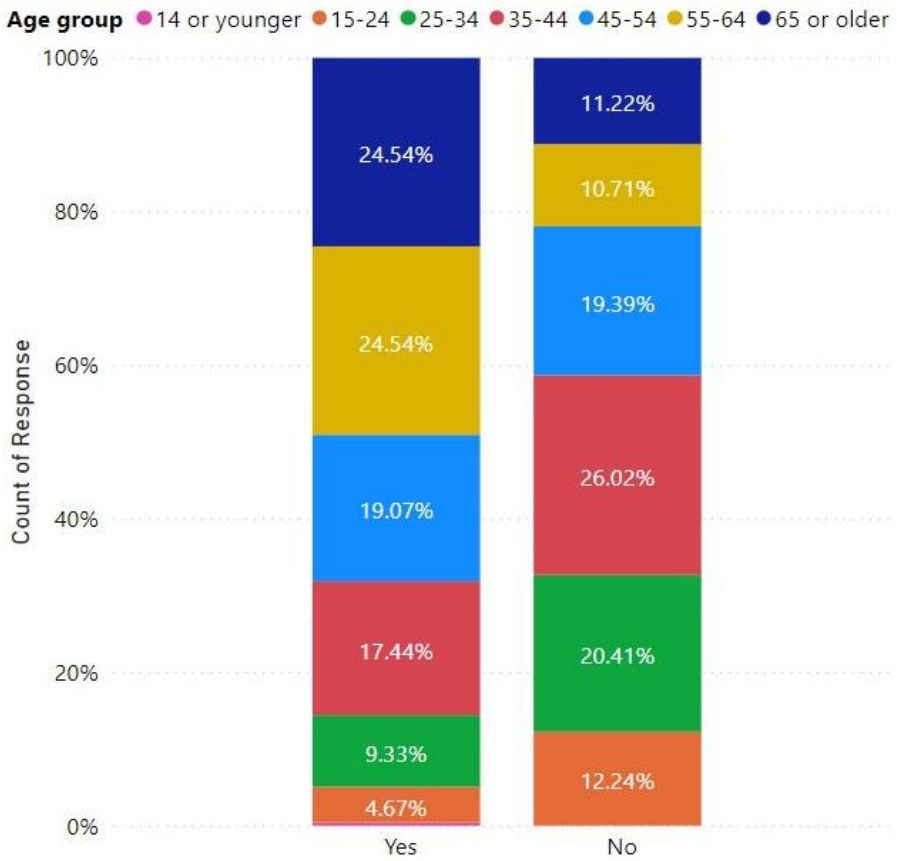

Figure 5: Number of responses by age group to question: 'Did you know that some introduced species of parrots and cockatoos are declared pests in WA?'.

Across the listed species, only a small proportion of the respondents rated the birds as major pests, and the majority regarded them as not pests, or only as minor pests. Knowledge of the pest status is particularly low for Alexandrine parakeet and Indian ringneck, which may be a result of lack of familiarity with these species (**Figure 6**).

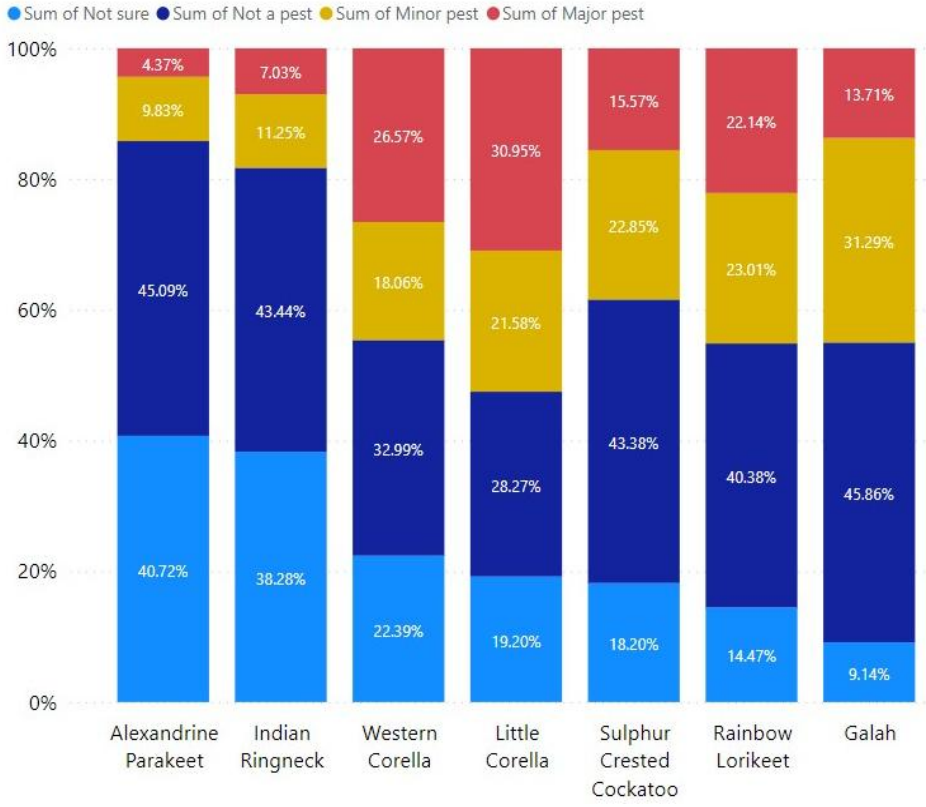

Figure 6: Perceived pest status of WA public towards selected pest parrots and cockatoos in WA.

Just over a half (57%) of respondents stated that pest parrots and cockatoos pose significant conservation issues, and 65% agreed that investment in pest bird control is beneficial for future generations. While there was relatively uniform agreement for more intensive control of birds in both urban and rural areas, respondents believed that intensive control in urban areas would deliver greater benefits to the regions (**Figure 7**).

Figure 7: Public attitude towards the control of pest parrots in WA.

Public concern about the presence of pest parrots and cockatoos in their area

The public is neither concerned nor unconcerned about declared pest parrots and cockatoos. Channel 2 respondents, who we assume to have a greater interest (and therefore knowledge) of pest birds, were significantly more concerned (72%) about the presence of pest parrots and cockatoos in their area than Channel 1 respondents (17%; **Figure 8**).

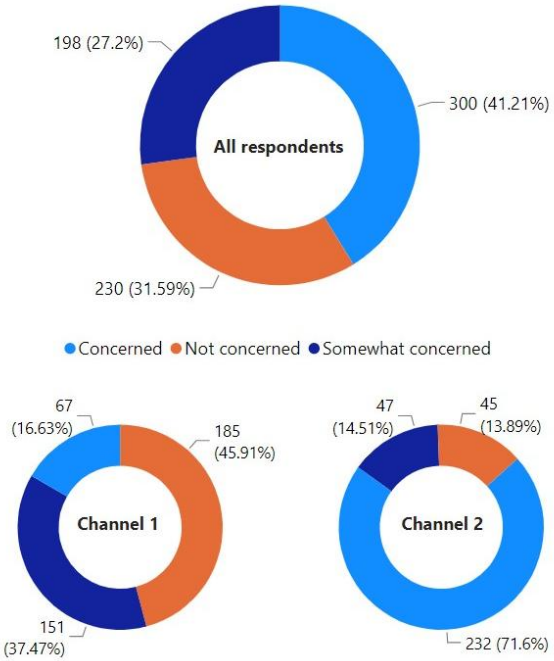

Figure 8: Number of responses to question: 'Are you concerned about the presence of pest parrots and cockatoos in your area?'.

Awareness of actions to reduce pest parrot and cockatoo populations

Only about 25% of respondents were aware of actions being taken to reduce pest parrot and cockatoo populations in their area. The knowledge was considerably higher in a more rural-based and older Channel 2 demographic (**Figure 9**).

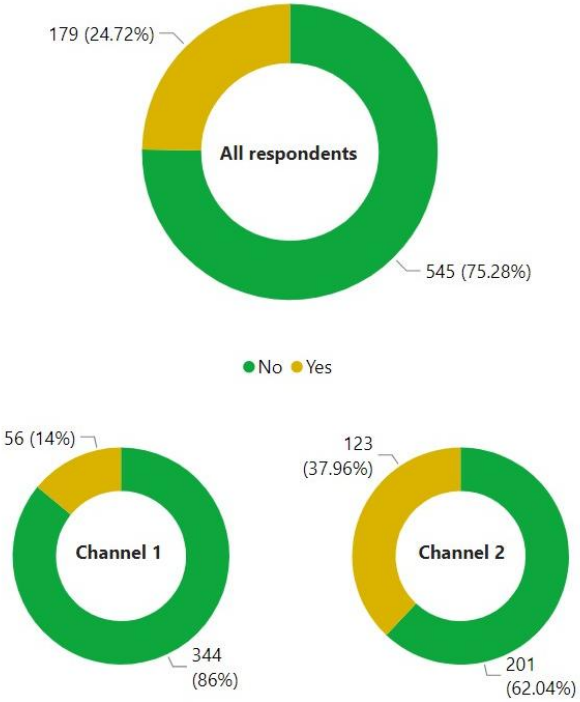

Figure 9: Number of responses to question: 'Are you aware of actions being taken to reduce pest parrot and cockatoo populations in your area?'.

Public views on control measures

Specific control measures available to manage pest parrots and cockatoos include shooting, trapping, dispersal or deterrence, and habitat modification. Respondents were asked which of these they would prefer. Overall, the respondents selected lethal techniques, such as shooting and trapping as most preferable (50% of all responses), followed by dispersal, and habitat modification (**Figure 10**).

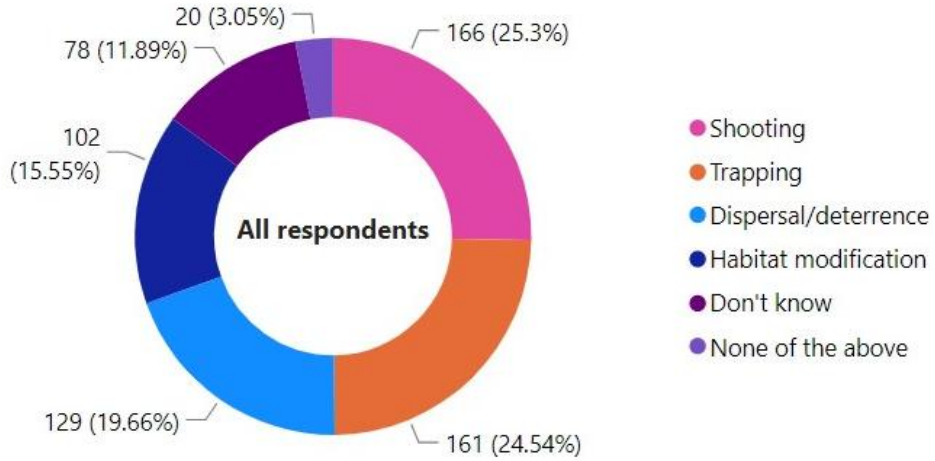

Figure 10a: Preferred control techniques of pest parrots and cockatoos by all respondents combined.

When responses were analysed separately for each demographic, the answers differed considerably. The Channel 2 audience selected shooting (43%), and trapping (29%) as the most preferred control measures, whereas the Channel 1 responses were more oriented towards non-lethal control, such as dispersal (25%), closely followed by habitat modification (21%), and trapping (21%). Answers may have reflected background experiences of the 2 groups, with more Channel 2 respondents being in rural areas and having experienced damage caused by birds and therefore preferring 'permanent' solutions.

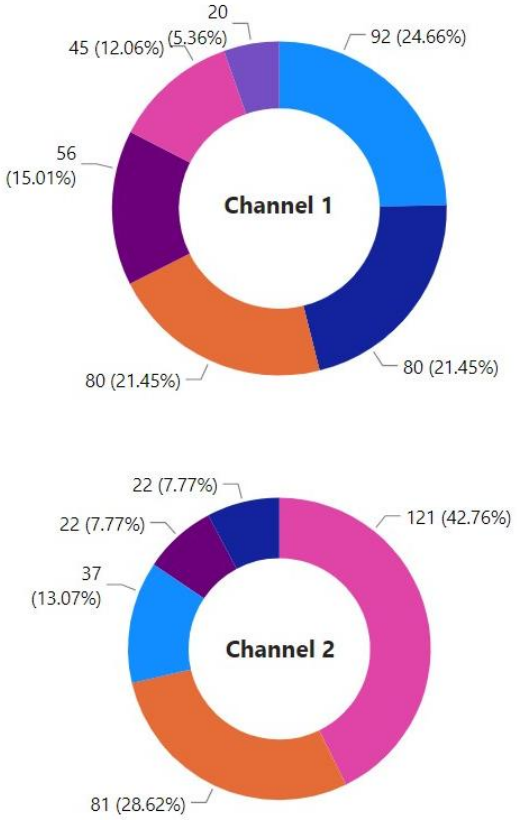

Figure 10b: Preferred control techniques of pest parrots and cockatoos by audience channel.

Relationship between public's knowledge of pest status and level of concern

Respondents who had prior knowledge of the bird's pest status were more likely to record their concern about the presence of pest parrots and cockatoos in their area (**Figure 11**). It may be that concern triggers people to find out about the species pest status, or it may be that knowing that the species are declared pests makes people take more notice when they see the birds.

Improving awareness of pest birds in WA via information, education, and promotion will assist public acceptance and adoption of necessary control. If the public does not see these birds as major pests, control may be difficult to implement. Public support is needed for effective control of pest birds in WA.

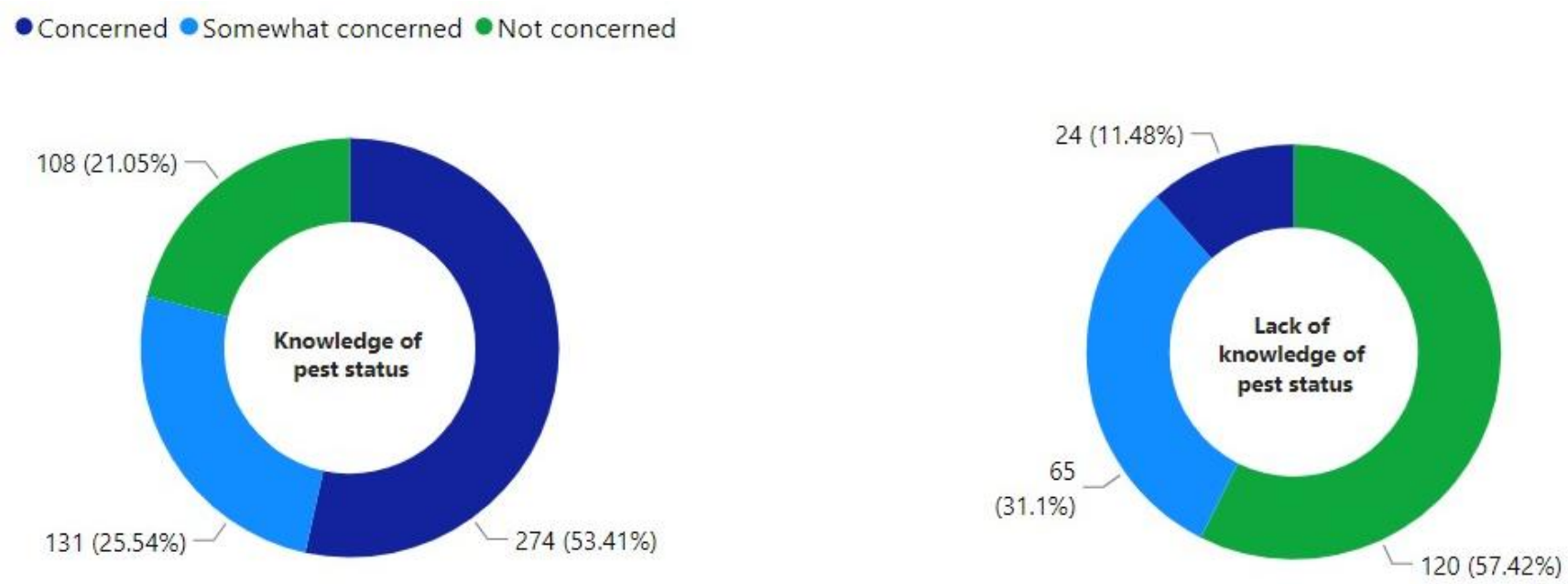

Figure 11: Relationship between public knowledge of parrots and cockatoo's pest status and level of concern.

Appendix 2:

Supplementary information provided to the online survey respondents

Supplementary information 1

'Pest parrots and cockatoos are known to cause extensive damage in both rural and urban areas in WA. Because of this, several species are declared pests (referred to simply as pests) and are subject to management control. Once a species of parrot or cockatoo has been officially declared as a pest, all landholders are required to control them on the land they manage. The Department of Primary Industries and Regional Development (DPIRD) works with other agencies and landholders in the coordination of pest management and actively works to prevent exotic incursions into the State. DPIRD has engaged Strickland Park Economics to assist with the development of a Western Australian Declared Pest Parrot and Cockatoo Strategy (the Strategy) to guide the future management of these birds. An important part of this work is a survey of public attitudes to the control of birds as pests, in particular declared pest parrots and cockatoos. Information on the public's understanding of these birds, and how they should be managed is fundamental to the development of the Strategy. This survey collects the relevant information.'

The information in paragraphs 2 and 3 was provided on the current approach to the management of declared pest parrots and cockatoos to test respondent's knowledge of the management approach and which agencies were involved.

Supplementary information 2

'Did you know that some introduced species of parrots and cockatoos in WA have been officially declared pests because of the damage they do to agricultural crops, urban environments, playing fields and other infrastructure, and also threaten the survival of indigenous bird species?'

Supplementary information 3

'Managing pest parrots and cockatoos is complex, requiring collaboration among many landholders and other stakeholders with diverse and sometimes competing expectations and interests. The first step in managing pest birds is preventing them from entering the State, followed by eradication of any new arrivals before they can spread. For pest birds already established in WA, containing their spread to prevent damage outside of infested areas is the objective. However, once a pest bird becomes widespread, protecting and limiting impact to private and community assets by reducing populations is the goal.'

One of the important objectives of the survey was to assess the extent of public knowledge of declared pest parrots and cockatoos. The respondents were shown images of selected pest parrots and cockatoos, asked whether they had seen them in their local area, and whether they regarded them as a pest.

Preparatory to these questions, they were given the following information:

Supplementary information 4

'Overabundant and non-native parrots and cockatoos cause substantial damage in both metropolitan and rural areas of the State. The WA public has reported a range of problems caused by these birds, which include:

- noise
- damage to fruit (they are regarded as a serious pest for cherries, apples, pears and stone fruit, and a very serious pest for grapes)
- fouling of outdoor areas and vehicles with droppings
- competition with native species
- eating summer/autumn stock feed (grain)
- digging up newly planted seeds such as wheat and oats, and pulling up seedlings of blue gums lettuce, cabbage, and other root vegetables
- damaging irrigation systems used in intensive horticulture by cutting piping or removing fittings, resulting in system leaks
- roosting on and damaging infrastructure (e.g. telecommunication towers)
- damaging grassed public surfaces (e.g. playing fields) leaving sizable holes in the surface which can be hazardous to users.

The nature and extent of damage caused is the basis for birds such as rainbow lorikeets, galahs, little corellas (3 sub-species), Western corella, sulphur-crested cockatoos and Indian ringneck parakeets being declared pests by DPIRD.'

An important aspect of managing pest parrots and cockatoos is the selection of appropriate control techniques. Respondents were asked to share their view for the preferred control techniques upon being provided with the following information:

Supplementary information 5

'DPIRD works with other agencies and landholders to coordinate management of declared pests to alleviate their harmful impacts. Local governments play an active role, although private landholders are ultimately responsible for controlling declared pest species on their land. A range of control mechanisms are available for pest parrots and cockatoos. These include culling (e.g. shooting, trapping), dispersal and deterrence (e.g. visual, and auditory devices) and habitat modification (e.g. restriction to food/water, alternative feeding areas, removal of roost sites).'

Appendix 3:

Management of corellas in the Avon Region – case study

Corellas are very mobile pest birds, which cause damage to television antennas, golf courses, artificial turf, hockey and tennis facilities and other infrastructure within the Avon region. Cooperative Bulk Handling (CBH), Australia's largest co-operative in the grain industry, incurs considerable damage from corellas to tarpaulin covers on bulkheads and associated equipment, causing loss of grain due to moisture damage. This results in significant repair costs. The Avon and Wheatbelt Shires identified that collective action, involving all landholders in a control program, would achieve a more effective outcome in controlling these mobile pests and reducing impacts.

Group formation and structure

The key participants in the project are:

- Avon Regional Organisation of Councils (AROC) comprising the Shires of Toodyay, Goomalling, Northam, York, and Victoria Plains
- Wheatbelt East Regional Organisation of Councils (WEROC) comprising the Shires of Bruce Rock, Merredin, Kellerberrin, Tammin, Yilgarn, and Westonia,
- Wheatbelt Natural Resource Management (NRM)
- CBH

Initially, the shires and CBH were acting individually with a focus on asset protection in isolated areas that were regularly impacted by corellas, using a variety of scaring devices to deter the birds from assets. In addition, the shires employed two to three rangers for the control of all pests, including corellas, and CBH regularly engaged sport shooting clubs to control corellas on their sites. As control was applied in an 'ad-hoc' manner, it had varying results. Eventually, stakeholders realised that focussing management on asset protection does not address the broader issue of corellas beyond the immediate location of their assets and acknowledged the need to act collaboratively with other groups to manage the pest more effectively.

In 2018, separate discussions between various individual stakeholders began, leading to more coordinated meetings in 2020 between Wheatbelt NRM and the Shires of Toodyay and Northam. A meeting between AROC and Wheatbelt NRM followed, where it was agreed that although each shire was undertaking localised control, collective action on a broader scale was needed. CBH, who is a major asset owner in the region, agreed to have an ongoing role in the collective action.

Progress

In 2022, Wheatbelt NRM, on behalf of and funded by AROC, commissioned a report by Edith Cowan University to: (1) review the ecology of the 2 corella species in the relevant shires, including breeding and feeding ecology and seasonal movements; (2) review past and current management methods for addressing corella issues and evaluate their potential efficacy in mitigating impacts; (3) propose an integrated management plan to help reduce or eliminate corella problems; and (4) identify research gaps for informing a management plan.

The report[7] identified that effective corella management requires a governance framework coordinating all stakeholder groups to support long-term solutions to corella impacts at the regional, sub-regional and local level. The report acknowledged that shires would also require short-term actions to deliver some immediate outcomes. While it described a range of control measures, the report did not prescribe a precise set of priorities and actions, which disappointed some stakeholders. However, this exemplifies the diversity of potential control measures and their varying acceptability dependent upon which are most appropriate for a given situation.

One of the key recommendations from the report was for stakeholders to agree on a funding model that would deliver secure funding and prescribe how that funding would be allocated to address corella impacts in the region. Another was to identify a coordinator, whose role would be to drive the collective management of corellas in the region.

As a result, Wheatbelt NRM agreed to take on the leadership role and put to AROC a proposal to employ a full-time coordinator at a cost of $150,000 per year for 3 years. The coordinator would be responsible for developing a strategic action plan that would combine short-term actions and long-term mitigation measures for effective management of corellas in the region. The coordinator reports to a steering committee made up of representatives of the key stakeholders.

To broaden the geographic coverage of the project and to enhance its financial viability, Wheatbelt NRM approached WEROC, who subsequently joined the group in 2023. As a result, a steering committee has been formed, comprising of representatives from AROC, WEROC, CBH, and chaired by Wheatbelt NRM. The role of the chair is to oversee the work of the coordinator and the development of the strategic action plan. The role of the steering committee is to agree on future funding requirements and assist the coordinator in preparing applications for research grants.

AROC, WEROC and CBH have each agreed in principle to contribute $50,000 per year for 3 years to a funding package to be managed by Wheatbelt NRM. This provides a total package of $150,000 per year to employ the project coordinator for 3 years. In addition, the funds allow for small research project(s) and/or test the applied control measures.

In addition, $5,000 per year will be contributed by each shire from AROC's and WEROC's areas, with the exception of Westonia, Yilgarn, and Tammin shires. The future inclusion of these shires should be an intended outcome of the collective action.

[7] Craig, M, and Davis, R. (2022). Research and management priorities for corellas (*Cacatua* spp.) in the Shires of Goomalling, Northam, Toodyay, Victoria Plains, and York. Edith Cowan University, Western Australia.

Key lessons

As the project is still in a formative stage, no specific actions and key performance indicators have been formulated. Nevertheless, the principles of partnerships, common interest and governance suggest the group has taken appropriate steps to address their corella issues. Key outcomes of the group to date include:

- The group agreed that it is more effective to work together and to apply broad-scale actions to manage corella problems in the region.
- The group approved the funding model and secured an initial tranche of funds to employ a project coordinator and has a plan to seek further funds from other funding sources open to LGAs, the NRM groups, and potential research funding providers.
- The group appointed a project coordinator responsible for development of a strategic action plan for corellas in the region.
- The project coordinator has initiated a ‘citizen science’ survey across the Wheatbelt region to engage the public in providing information about corella distribution, activity and impacts.