Auckland Airport

Three Years of Collaborative Wildlife Hazard Management at Auckland Airport

Establishing a legacy through an Enforceable Undertaking and a multi-stakeholder Wildlife Working Group (2023–2026)

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Executive Summary

In November 2021, Auckland Airport entered into an Enforceable Undertaking (EU), a legally binding agreement under New Zealand's Health and Safety at Work Act 2015 (HSWA), establishing a programme of actions to improve worker safety, contribute to industry practice, and support the community. EUs are designed to commit a duty holder to measurable safety improvements and wider benefits to workers, industry, and community.

Auckland Airport monitored and progressed activities under the Enforceable Undertaking by:

1. Appointing members to project delivery and governance teams from Operations, Health, Safety and Wellbeing and Corporate Services.
2. Regular meetings of the project delivery and governance teams on project updates, completion timeframes, identifying potential issues.
3. Quarterly report to the Board.
4. Bi-annual reporting to WorkSafe EU compliance team.

As part of the EU's Benefits to Industry, Auckland Airport created a Wildlife Working Group (WWG) and committed $250,000 over 36 months to targeted projects. Any proposed projects by the WWG were presented to the Governance Team for authorisation before progressing any further. Over three years, the WWG delivered practical, science-informed initiatives across vegetation management, roost enhancement, high-risk species management (black swan, Canada geese), GPS tracking studies, stakeholder engagement, and community planting—reducing wildlife risk on the airfield while fostering biodiversity.

The programme operated in alignment with New Zealand CAA Advisory Circular AC139-16 (Wildlife Hazard Management at Aerodromes) and international guidance (ICAO Doc 9137, ACI Wildlife Hazard Management Handbook), embedding best practice and multi-stakeholder collaboration.

A core outcome of the Wildlife Working Group was the generation and sharing of practical, evidence-based knowledge to support aviation wildlife hazard management across New Zealand and beyond. The programme intentionally captured lessons learned, decision rationales, and transferable tools, which have been actively shared with industry through publications, guidance documents, conferences, and sector forums, contributing to improved capability beyond Auckland Airport.

1.0 Background and Rationale

1.1 Enforceable Undertaking (EU)

In 2021, Auckland Airport entered into an EU with WorkSafe New Zealand, committing to actions that directly support safer work, industry improvement, and community benefits. EUs are voluntary, binding, and monitored by the regulator, and can deliver higher safety outcomes by channeling investment into prevention, worker support, and industry engagement.

Within the EU, Auckland Airport proposed to: Develop an annual Aviation Wildlife Safety Conference and sponsorship programme; establish a Wildlife Working Group (WWG) with key stakeholders to research innovative technologies, wildlife ecology (including roosts, food sources), and practical risk mitigation; invest in safer deterrent tools to reduce reliance on high-risk tools; support worker wellbeing and community initiatives.

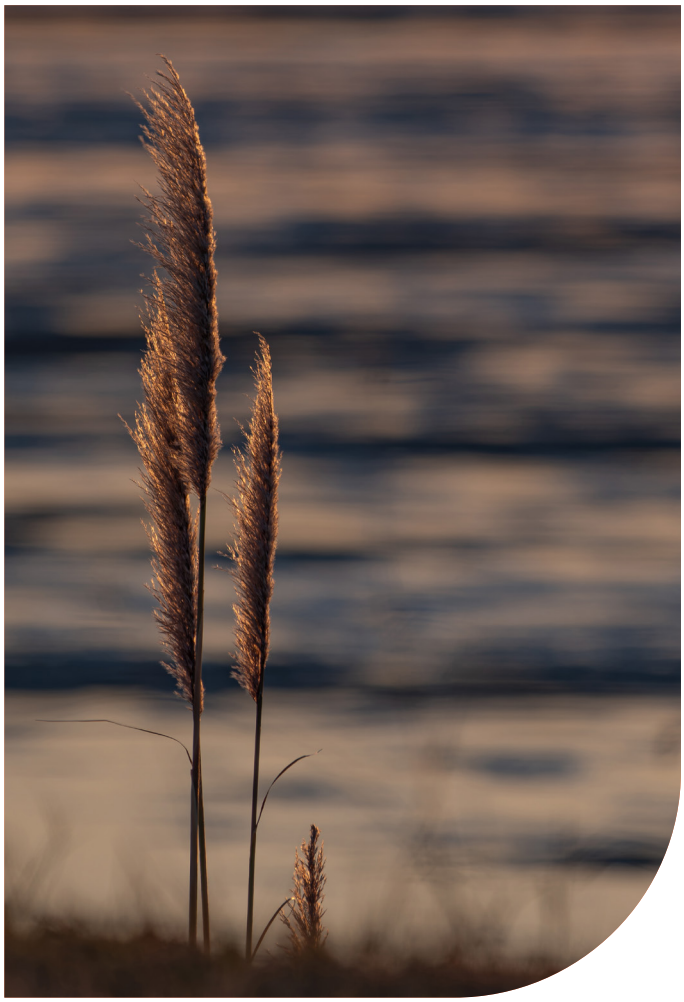
1.2 Regulatory and Industry Context

Wildlife strikes are a persistent aviation safety risk concentrated in take-off/landing phases near airports. International guidance emphasises holistic Wildlife Hazard Management Programmes (WHMPs) with habitat management, monitoring, reporting, deterrence, training, and performance review. New Zealand's AC139-16 provides local guidance aligned to Civil Aviation Rule Part 139 and ICAO standards; it supports integrated programmes across and beyond the aerodrome boundary, with practical tools for operators and territorial authorities. Industry handbooks (ACI, 2013; updated effort underway) and international coordination bodies (AAWHG, NZAWHG) further disseminate best practice, training, and data analysis (e.g., IBIS global wildlife strike statistics).

2.0 Objectives

Primary Objectives (EU/WWG):

1. Reduce wildlife strike risk on the airfield through research, innovation, and stakeholder engagement.
2. Support Sustainability & Biodiversity by conducting water quality analysis of local water bodies, enhancing vegetation habitat appropriately, and collaborating with local communities and iwi.
3. Build industry capacity by developing tools, guidance, and cross-airport collaboration via NZAWHG and partner forums.



3.0 Governance, Methods, and Data

3.1 Governance and Stakeholders

The Wildlife Working Group (WWG) met monthly and was intentionally designed to bring together people with operational responsibility, technical expertise, and frontline experience of wildlife outcomes. Membership included airport operations, specialist consultants, wildlife rehabilitation and conservation organisations, and public agencies, creating a space where aviation safety, environmental responsibility, and animal welfare could be considered together rather than in isolation.

Pattle Delamore Partners (PDP) supported the group by providing ecological and technical expertise, acting as subject-matter advisors to the NZAWHG on behalf of the Civil Aviation Authority. Their role was to help translate complex environmental data into practical insights that informed discussion and option development. Organisations such as BirdCare Aotearoa brought an essential real-world perspective, grounding decision-making in tangible wildlife welfare outcomes.

This governance model proved critical to the group's effectiveness. Regular meetings built trust and shared understanding, while the clear separation between collaborative development and formal approval enabled robust discussion without diluting accountability. For other airports, this approach demonstrates the value of pairing inclusive, multidisciplinary collaboration with strong governance frameworks to support confident, transparent decision-making.

Table 1 — WWG membership

Organisation	Name	Role	Contributions
Auckland International Airport Ltd	Lucy Hawley BSc (Hons)	Grounds & Wildlife Manager	Wildlife Historic & Current Data, Wildlife Behaviour, Aviation Risk
Birds New Zealand	Adrian Riegen	Shore Bird Researcher	Shore Bird Behaviour
BirdCare Aotearoa	Carl Ashworth	General Manager	Wildlife Rescue & Rehabilitation
Wild Ways	Lynn Miller	General Manager	Wildlife Behaviour, Ecology, Research and Veterinary advice
Forest & Bird	Colleen Grayling	Regional Manager	Wildlife and Ecology
Watercare	Diana Villa Ortega	Environmental Scientist	Site Specific Ecology
Auckland Council	Ashley White	Team Manager	Environmental and Pest Management
Auckland Council Ambury Park	Sally Ewers Janine Nillesen Maddy Pye	Park Rangers	Wildlife Behaviour & Monitoring
Pattle Delamore Partners	Lizzie Civil	Service Leader - Ecology	Environmental Ecology and Wildlife Behaviour
Auckland/Waikato Fish & Game Council	John Dyer, Danielle Lelievre	Officer	Current & Historic Wildlife Data & Licenses

Through regular monthly meetings, the Wildlife Working Group provided an open forum for members to propose and discuss projects, share operational insights, and contribute specialist expertise. The group supported this work through collaborative problem-solving, targeted research, peer input, and by connecting the project team with relevant subject matter experts and stakeholders across the sector, helping ensure actions were practical, well-informed, and aligned across organisations involved in aviation wildlife hazard management.

3.2 Project Selection and Funding

While ideas and options were collaboratively developed within the WWG, the group did not operate as a decision-making body for funding. All proposed projects and recommended actions were formally presented to the Auckland Airport Governance Committee for review and final authorisation prior to the release of funds. This ensured that initiatives progressed through established governance channels, aligned with broader airport priorities, and were subject to appropriate oversight and accountability.

Table 2 — Portfolio summary by year with budget allocation

	Year 1	Year 2	Year 3
Biodiversity	Vegetation & Landscape Management Document $0	Community Planting $0	Community Planting $0
Kohia Island Roost	PDP Project $16,695	Mangrove Trimming $9k Grass Treatment $0	SEA Consent $30k
Black Swan	PDP Seagrass Project $22,141		Environmental Operation $84,942
Canada Goose management Plan		GPS Trackers $21,787	
BirdCare Aotearoa		Platinum Sponsorship $60k	
Total	**$38,836**	**$90,787**	**$114,942**

3.3 Data Sources and Monitoring

- Operational logs: airfield observations, deterrent deployments, strike/near-miss records.
- Target species counts & roost surveys: shorebirds, waterfowl, black swan, Canada geese.
- GPS telemetry plans: collars for Canada geese during summer moult to map roost/forage flights.
- Community planting & vegetation audits: species selection, growth, and habitat use.
- Stakeholder meeting notes: decisions, actions, lessons learned.

3.4 Standards and Best Practice References

Aligned to Auckland Airport's Wildlife Hazard Management Plan, ICAO Doc 9137, NZ CAA AC139-16 (linked to Part 139), ACI Handbook, and The New Zealand Aviation Wildlife Hazard Group (NZAWHG) resources.

4.0 Results (Three-Year Summary)

4.1 Year 1 — Foundations and Early Wins

Vegetation Guidelines for the Airport Precinct

As development activity across the airport precinct increased, it became clear that assessing vegetation on a project-by-project basis was no longer sustainable. Every new landscaping proposal airside and landside required a standalone wildlife risk assessment, creating delays and inconsistencies at a time when delivery speed and certainty were increasingly important. In response, AKL developed a precinct-wide Vegetation Management Guidance Document, shifting the focus from reactive assessments to proactive, standardised decision-making.

The guideline provides a clear, practical framework for low-risk landscaping across all airport-owned land. It divides the precinct into three vegetation zones based on proximity to operational areas and wildlife-hazard sensitivity and includes an approved list of plant and tree species selected specifically to minimise attraction to hazardous birds. Guidance on canopy structure, spacing, and growth form ensures vegetation does not create sheltered movement corridors or roosting opportunities, while shrub selection avoids dense ground-level cover that could support pest species.

A key component of the Vegetation Management Guidance Document is its focus on best-practice grass re-seeding following airfield earthworks. Disturbed ground, if left unmanaged, can quickly become dominated by weeds, many of which produce seed heads or structural cover that attract birds and other wildlife. Uncontrolled weed establishment therefore represents a short-term ecological issue but a long-term aviation safety risk.

The guideline emphasises the importance of rapidly returning disturbed areas to stable grass cover once construction activities are complete. Wherever practicable, this involves the use of Avanex grass, a sterile or low-palatability species selected specifically because it does not produce seed attractive to birds. Establishing the correct grass species early reduces the likelihood of weed invasion, limits follow-up maintenance requirements, and supports a consistent, low-risk airfield surface.

To support successful establishment, the document includes a step-by-step best-practice guide for ground preparation prior to re-seeding. This involves a planned sequence of weed-control applications to exhaust existing seed banks and suppress regrowth before sowing occurs. Guidance is also provided on post-seeding aftercare, including irrigation where required and follow-up weed treatments during the establishment phase to ensure the grass cover becomes dominant.

Importantly, the document goes beyond wildlife alone. It integrates fire-risk considerations through low-flammability plant lists, supports Fire and Medical response access requirements, and provides best-practice guidance for managing wildlife risks during construction and re-establishment phases. It also sets clear expectations for stormwater and wetland planting, balancing environmental outcomes with reduced attractiveness to hazardous species.

The result has been an improvement in how vegetation decisions are made at AKL: greater consistency across projects, fewer assessment bottlenecks, and earlier integration of wildlife risk into design. For other airports, the key takeaway is simple: investing upfront in clear, evidence-based vegetation guidance can dramatically reduce workload while improving both safety and environmental outcomes.

To support uptake and share learnings, the guideline was launched internally through a joint Team Call presented by Lucy Hawley, Grounds and Wildlife Hazards Manager, and Chloe Surridge, Chief Operations Officer, highlighting its operational value. The work was also presented at the end-of-year NZAWHG Forum in Wellington, generating strong interest across the sector. Since then, several New Zealand airports have been supported to develop their own approved vegetation lists and grass re-seeding guidance, helping move the industry toward more consistent, risk-aware vegetation management.

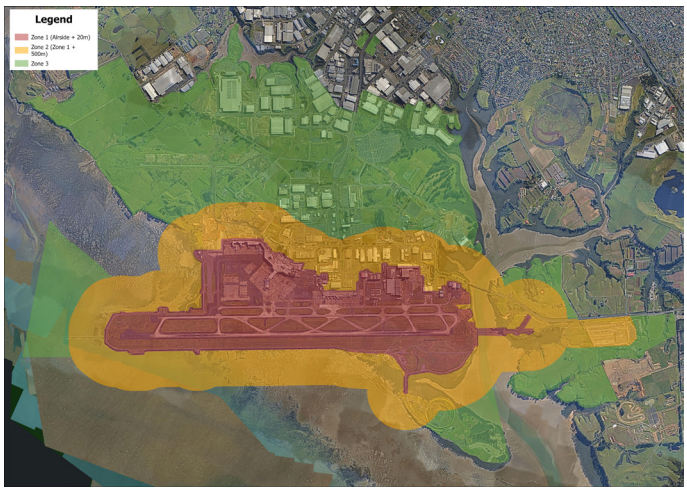


Figure 1 — Map of AIAL vegetation risk zones

Roost Strategy Scoping (Kohia Island / Puhinui Reserve)

Shorebirds remain an ongoing wildlife hazard at AKL, not due to unpredictable behaviour, but because their movements are highly consistent. Each tidal cycle, large numbers of South Island Pied Oystercatchers and migratory shorebirds travel between roosting areas at Ambury Regional Park and Watercare ponds and their feeding grounds in the Manukau Harbour, crossing directly over the airfield twice daily. While this creates a recurring operational challenge, it also presents a strategic opportunity: by improving roosting habitat south of the airfield and closer to key feeding areas, these routine airfield crossings can be reduced, lowering strike risk at its source.

Analysis undertaken by PDP supported this approach, using long-term Birds New Zealand data to demonstrate that when suitable southern roosts were available, shorebirds were more likely to remain closer to the harbour edge and less likely to cross the airfield. PDP identified both Puhinui Reserve and Kohia Island as priority locations for roost enhancement. While Puhinui sits outside airport control, Kohia Island is located within the airport boundary, allowing AKL to directly trial, adapt, and manage interventions. As a result, initial scoping focused on Kohia Island as a practical test site for understanding what types of interventions could deliver the greatest combined operational and ecological benefit.

Two broad enhancement pathways were explored: physical expansion of roosting surface using aggregate and shell material, and targeted vegetation management to improve the suitability of existing habitat. The aggregate option was assessed to understand its potential contribution to long-term roost availability and durability. While technically feasible, further evaluation showed that similar risk-reduction outcomes could be achieved through more targeted habitat interventions that offered greater flexibility, faster implementation, and broader applicability across the aviation network.

In parallel, the Wildlife Team sought specialist ecological advice to identify lower-impact alternatives that aligned with both wildlife behaviour and environmental responsibilities. This led to the selection of a vegetation-based approach, focused on removing grass cover adjacent to the existing roost to increase bare substrate preferred by shorebirds and dropping the height of surrounding mangroves to increase visibility of the roost from the feeding area. A non-residual herbicide treatment was chosen following consultation with ecologists, allowing roost suitability to be enhanced while maintaining adaptability as regulatory, ecological, and site-specific considerations evolved.

This work reinforced a key learning for the Wildlife Working Group: effective wildlife risk reduction does not always require large-scale engineering solutions. By understanding species behaviour and applying

Figure 2 — Map of PDP recommended roost improvement locations

targeted, evidence-based interventions, it is possible to deliver meaningful improvements for both aviation safety and the surrounding environment. For other airports, the Kohia Island trials demonstrate the value of prioritising interventions that offer the greatest overall impact—those that are proportionate, scalable, and capable of delivering benefits beyond a single site.

Seagrass/Nutrient Pathways Study to address Black Swan

Understanding the drivers behind black swan abundance in the Manukau Harbour was a critical step for the Wildlife Working Group, given the direct link between swan behaviour and aviation risk at AKL. To support this, Pattle Delamore Partners (PDP) investigated how nutrient inputs and contaminants across the harbour influence seagrass growth and, in turn, the availability of feeding habitat for black swans.

Their work combined historical data analysis with targeted sampling of surface water and sediments and long-term mapping of seagrass distribution. What emerged was a clear picture of a harbour system receiving nutrients from multiple sources. Elevated nitrogen and phosphorus levels were detected at several locations, with the Mangere Wastewater Treatment Plant showing the highest concentrations. These nutrients are known to limit seagrass growth under natural conditions; when present in greater quantities, they promote faster growth, denser meadows, and longer leaf structures—effectively increasing food availability for grazing species such as black swans.

Additional inputs were identified through overland flow areas, where elevated sulphate and potassium were linked to acid sulphate soils and fertiliser use. While sediment nutrient concentrations were generally lower, long-term spatial analysis revealed substantial expansion of seagrass meadows between 2005 and 2024. This expansion closely aligned with sustained growth in the harbour's black swan population, reinforcing the link between nutrient availability, habitat extent, and wildlife pressure on the airfield.

Rather than pointing to a single source, the findings highlight a cumulative system-wide effect: nutrient contributions from airport activities, wastewater infrastructure, and surrounding rural and industrial land uses collectively support ongoing seagrass proliferation. This creates a reinforcing cycle in which food availability sustains a stable—and increasing—black swan population. PDP concluded that a natural decline in swan numbers is therefore unlikely, and that effective risk reduction requires a shift in focus.

Instead of relying solely on population-wide reduction, PDP recommended prioritising how swans interact with high-risk airport areas. Practical measures include active management approaches such as herding, supported by improved monitoring tools (for example, GPS or acoustic tracking) to better understand movement patterns and inform targeted interventions. Small-scale, land-based mitigations—such as riparian planting, wetland creation or enhancement, and localised filtering systems—were also identified as valuable ways to reduce nutrient inputs at source, while broader coordination through the Manukau Harbour Forum was recommended to address cumulative nutrient loading across the catchment.

For other airports, this work reinforces an important lesson: wildlife risk is often driven by broader environmental systems rather than isolated on-airport features. By understanding and responding to those systems, rather than attempting to control wildlife numbers alone, airports can apply more effective, proportionate, and enduring risk-reduction strategies that deliver benefits for both aviation safety and the surrounding environment.

Canada Geese — management plan with Auckland Council

Managing Canada geese at AKL has always required looking beyond the airport fence. Since 2021, AKL has worked closely with Auckland Council, Fish & Game, Federated Farmers, and Watercare to develop a coordinated approach to a species that presents a disproportionate aviation risk due to its size, flocking behaviour, and regular movement through key approach and departure corridors. Goose movements across Pūkaki Creek have been recorded year-round, creating repeated exposure to potential strike events and highlighting the need for action at a regional scale.

From the outset, it was clear that no single organisation could address this risk in isolation. Canada geese utilise a broad network of agricultural land, freshwater systems, and coastal habitats well beyond the airport boundary, meaning their management is inherently a shared responsibility. This recognition became one of the most important outcomes of the early discussions: effective aviation risk reduction would only be possible through collaboration, shared data, and aligned objectives.

To support a more informed, coordinated response, Auckland Council engaged EcoFX in 2023 to undertake further assessment of goose distribution and movement across the wider landscape. As a foundation for this work, AKL provided historical ranger data documenting goose presence and behaviour within a 13-kilometre radius of the airfield—an area identified as having the greatest relevance to aviation safety. The intent of the programme was to better understand how geese move between feeding, loafing, and roosting areas, and how these movements intersect with flight paths.

This work represented the first regionally coordinated attempt to consider Canada goose management at a scale that reflects both their ecology and the operational risk they pose to aviation. While the programme explored a range of potential management tools, its greatest value lay in establishing a shared evidence base and reinforcing the importance of collective decision-making.

For other airports facing similar challenges, this approach demonstrates that tackling high-risk species effectively often starts with partnership—bringing landowners, councils, and operators together around a common understanding of the problem before solutions are selected.

4.2 Year 2 — Scaling Deterrence and Environmental Changes

Community Planting Programs

Community planting programmes play an important role in restoring Auckland's natural environment, and the Wildlife Working Group provided an opportunity to strengthen how these activities align with aviation safety outcomes. Through the group, new environmentally focused partnerships were formed with Forest & Bird and the Ambury Park Rangers, both of whom are actively involved in on-the-ground habitat restoration across the region.

This represented a deliberate shift from Auckland Airport's usual volunteering focus, which typically centres on social support initiatives delivered with partners such as Kura Kai, KiwiHarvest, Nurturing Families, and Auckland City Mission. While those programmes remain an important part of the airport's community commitment, the Wildlife Working Group recognised the value of creating volunteer opportunities that directly support environmental outcomes linked to wildlife risk management.

Forest & Bird leads a wide range of restoration projects, including native planting, weed and pest control, and biodiversity initiatives focused on seabirds, native butterflies, and urban songbirds. Their work not only restores habitat but also helps reconnect fragmented remnants of ancient forest, stabilise soils, and reduce erosion—benefits that extend well beyond individual planting days. Similarly, the Ambury Park Rangers host regular, family-friendly planting events that support the long-term restoration of foreshore areas, freshwater wetlands, salt marshes, and salt meadows within the Manukau Harbour catchment.

Through their involvement in the Wildlife Working Group, these organisations shared planting dates directly, allowing targeted restoration activities to be promoted internally to Auckland Airport staff. This ensured volunteering efforts were purposeful and aligned with identified environmental priorities, rather than ad-hoc participation. For the airport, supporting these initiatives contributes to a longer-term strategy of strengthening and enhancing wildlife habitat away from the airfield, helping to draw birds toward suitable environments while reducing attraction to high-risk operational areas.

For other airports, this approach demonstrates how community planting can move beyond goodwill alone and become a practical component of wildlife hazard management—delivering benefits for biodiversity, community connection, and aviation safety at the same time.

Kohia Island roost enhancements

Building on earlier scoping work, Year 2 focused on identifying the most effective way to enhance roosting habitat at Kohia Island in a manner that delivered meaningful outcomes for both shorebirds and aviation safety. While PDP had previously identified aggregate placement as a potential option for expanding roost area, further review considered site constraints, long-term maintenance implications, and the likely ecological response. This assessment highlighted the opportunity to achieve stronger, more flexible outcomes through targeted habitat manipulation rather than large-scale physical modification.

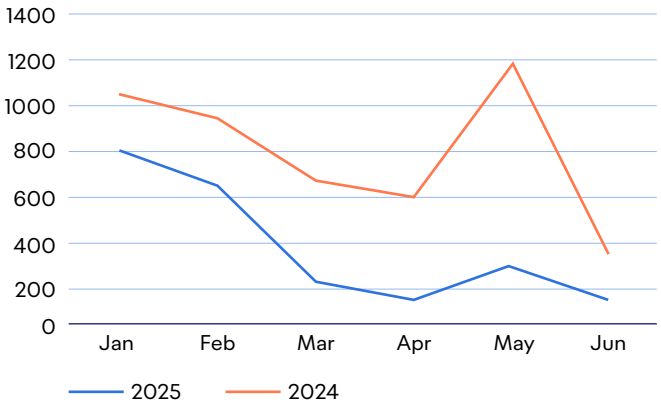
Following consultation with shorebird expert Adrian Riegen, a more practical approach was identified: removing grass cover adjacent to the existing roost to create open, bare substrate that closely mimics the conditions preferred by many roosting shorebird species. Between October and December 2024, AKL undertook six fortnightly herbicide treatments to clear a defined vegetation strip next to the roost. At the same time, mangroves immediately adjacent to the roost were height-managed to improve visibility for birds feeding in the Manukau Harbour, making the roost easier to locate and more attractive for use.

Post-treatment monitoring commenced in January 2025 and included weekly and monthly counts of South Island Pied Oystercatchers, Bar-tailed Godwits, Wrybills, New Zealand Dotterels, and Variable Oystercatchers. As shown in Graph 1, shorebird use of the Kohia Island roost increased markedly compared with the same period in 2024. Estimated monthly increases ranged from 25–38% in January and February, rising to approximately 250–300% from March onward, with May showing the strongest response. Across the monitoring period, average monthly counts increased by approximately 118%, demonstrating that relatively simple habitat adjustments can deliver substantial ecological gains and strengthen the wider network of safe roosting sites within the harbour.

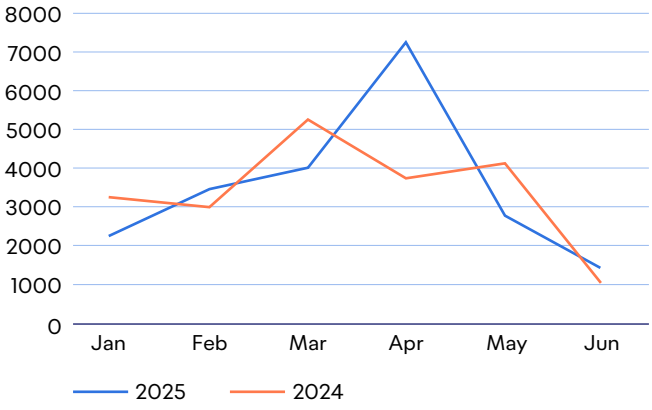
These changes also delivered clear operational benefits.

Overall shorebird counts were higher in 2024 than in 2025; however, monthly distributions were broadly similar between years, with the difference largely driven by an anomalously high count of godwits recorded at Ambury Farm in April 2024 (Graph 2). This suggests the increased use of the Kohia Island roost in 2025 was not driven by an overall increase in shorebird abundance.

Shore bird monthly counts on Kohia Island roost



Shore bird monthly counts within 13km radius



Increased roost use at Kohia Island reduced the frequency of shorebirds travelling north across the airfield toward Ambury, lowering the number of routine cross-airfield movements and directly reducing wildlife strike risk during critical phases of flight.

Monitoring concluded in June 2025 as grass regeneration began and further treatment was being considered. Before additional work progressed, Kohia Island was confirmed as a Significant Ecological Area (SEA), triggering the need for a more detailed assessment of ecological effects and regulatory pathways. These considerations, and their implications for future roost management, are explored further in the Year 3 summary.

Integrating Environmental Insights into Major Infrastructure

Following completion of the PDP investigation into seagrass expansion and its relationship to black swan abundance, the findings were deliberately shared beyond the Wildlife Working Group. The results were discussed with AKL's Sustainability Team and shared with mana whenua through existing engagement forums, recognising that vegetation management, nutrient pathways, and long-term habitat change sit at the intersection of ecological stewardship and operational responsibility.

This cross-team engagement ensured that the black swan work informed not only wildlife hazard management decisions, but also broader catchment-scale thinking around biodiversity, water quality, and resilience. Rather than treating wildlife risk as a standalone issue, the findings were used to strengthen alignment between aviation safety objectives and AKL's wider sustainability strategy.

A key outcome of this integrated approach was the commissioning of the Coupled Wetland Biofilter (CWB) in July 2025 as part of the northern remote stands infrastructure project. The CWB is the first stormwater treatment system of its kind in New Zealand and was designed to protect the culturally and ecologically significant Manukau Harbour while enabling ongoing airfield expansion. It currently treats runoff from 56 hectares of new development, with capacity to expand to 106 hectares, and does so within a compact footprint—approximately three times smaller than traditional stormwater ponds—preserving land critical for airfield growth.

Stormwater treatment occurs through a staged process comprising a sediment forebay, a constructed wetland planted with approximately 20,000 native plants, and a biofilter raingarden containing a further 2,600 native plants for final polishing during high-flow events. Importantly, plant species were selected in accordance with the Vegetation & Landscape Management Guidance Document, ensuring that water-quality objectives were achieved without introducing species known to increase wildlife hazard risk. In this way, the vegetation guidance directly influenced infrastructure design decisions, embedding wildlife risk considerations at the earliest stages of project planning.

Collectively, the CWB contributes to long-term reductions in nutrient and sediment inputs to the Manukau Harbour, directly addressing environmental drivers previously identified as contributing to seagrass proliferation and increased black swan presence. At the same time, the creation of a large open water body close to the airfield was recognised as having the potential to elevate wildlife strike risk if left unmanaged.

In response, AKL's infrastructure, environmental planning, master planning, airfield operations teams, and the Wildlife Working Group worked collaboratively to identify a solution that balanced safety, environmental performance, and cultural considerations. The agreed mitigation involved installing netting across the full extent of the water body to prevent it from functioning as a roosting or

feeding habitat for waterfowl, ensuring that the system delivered its environmental benefits without introducing new aviation risks.

By embedding ecological research into major infrastructure decisions and applying consistent vegetation and habitat principles across disciplines, AKL has demonstrated a proactive, systems-based approach to managing wildlife risk. For other airports, this work highlights the value of using environmental insight not only to respond to risk, but to actively shape infrastructure outcomes—delivering safer operations while supporting healthier, more resilient ecosystems.

Canada Geese Management Plan expansion to investigate GPS trackers.

Year 2 of the Canada goose work marked an important transition from broad scoping toward a clearer understanding of what information was still missing to support effective, long-term management. While EcoFX had been engaged by Auckland Council on a one-year contract to contribute to goose management planning, the most valuable insight from this phase was not a completed plan, but a shared recognition across agencies that the existing knowledge base was insufficient to confidently target interventions at the scale required.

As personnel changed and the project evolved, the Wildlife Team and Auckland Council expanded surveillance beyond previously known locations. This broader focus led to the identification of additional congregation areas and direct engagement with local landowners to explore opportunities for Auckland Council–led pest-management operations. Through this work, Auckland Council confirmed three likely moult sites in the vicinity of the airport—critical intelligence, given that the summer moult period represents the most effective window for large-scale goose control due to birds being temporarily flightless.

In parallel, the team explored a range of potential management tools. The use of orally delivered toxins was investigated for geese feeding on surrounding farmland; however, this pathway was ruled out as there are currently no approved poisons in New Zealand for Canada goose control. To better understand non-lethal and targeted capture options, AKL participated in a wider stakeholder demonstration of net-capture technology led by Nelson Collie, proprietor of Status Guns & Engineering, an internationally recognised manufacturer of net projectors for live animal and bird capture.

The demonstration showcased two capture configurations with potential application for Canada geese. The first was an overhead drop-net system, mounted above a baited area and capable of being food-triggered—an approach consistent with Auckland Council's existing bait-station methods for deer management and adaptable for targeted

avian capture. The second was a ground-based net-projector (net cannon) with adjustable trajectory and remote activation, allowing flexible deployment for mobile or wary bird groups. Following the demonstration, Auckland Council invested in several units for goose control and broader use within their deer management programme, expanding the regional toolbox for large-animal capture.

Despite these advances, all parties reached a consistent conclusion by the end of Year 2: a significant information gap remained around Canada goose movement patterns. Key questions persisted around flight paths, breeding locations, feeding areas, and how geese moved between these sites throughout the year. Without this understanding, even well-designed control tools risked being applied inefficiently or in the wrong locations.

In response, the Wildlife Working Group identified GPS tracking as the most viable way to generate the detailed movement data required to support evidence-based decision-making. The topic was first raised during a monthly WWG meeting, prompting several members to undertake independent research and share findings at the following session. In parallel, AKL's Wildlife Team consulted with their ornithological advisor, William Rutherford (Ornithological Technical Services), to ensure any tracking approach aligned with recognised welfare standards and best practice for marking large waterfowl.

A range of commercially available GPS devices was reviewed against agreed criteria, including durability in wetland environments, data quality and reporting frequency, attachment method, weight relative to body mass, and likely behavioural impacts. Through this collaborative evaluation, the group narrowed the field to two preferred suppliers suitable for a future trial. The first was Ornitela, which produces a lightweight, solar-powered neck-collar GPS unit already trialled successfully on a separate black swan project, providing high-quality movement data. The second was Global Messenger, whose solar-powered GPS units are fitted via a harness or backpack configuration, offering an alternative attachment method for comparison.

For the Wildlife Working Group, Year 2 reinforced a critical lesson: effective management of high-risk species such as Canada geese depends first on understanding how animals use the landscape. Rather than progressing prematurely to large-scale interventions, the group deliberately shifted focus toward building a robust evidence base—laying the groundwork for more targeted, humane, and effective management decisions in the years ahead.

BirdCare Aotearoa

As part of the Wildlife Working Group's commitment to responsible and humane wildlife management, AKL became the first Platinum Sponsor of BirdCare Aotearoa, recognising the organisation's critical role in Auckland's wildlife response network and the airport's shared responsibility for birds affected by aviation activity. BirdCare Aotearoa is New Zealand's largest wild bird hospital and rehabilitation centre and is now the last remaining wildlife rehabilitation facility in Auckland, following the closure of several other centres after COVID due to funding pressures.

BirdCare Aotearoa provides specialist care for approximately 6,000 injured native birds each year, including birds recovered from the airport environment. This includes individuals injured through aircraft or vehicle strikes, as well as birds affected by operating an international airport in close proximity to significant coastal and wetland habitats, where noise, lighting, and disturbance can influence wildlife behaviour. Ensuring that injured birds can be transferred to a trusted, DOC-permitted rehabilitation facility was seen as a fundamental component of AKL's wider wildlife hazard management responsibilities.

The decision to support BirdCare Aotearoa at a Platinum partnership level was made collectively by the Wildlife Working Group. Members were asked to consider the appropriate level of support, and the group unanimously voted in favour of Platinum sponsorship. This reflected a shared recognition that all participating organisations had, at some

point, relied on BirdCare Aotearoa's services—whether for the rehabilitation of injured birds, expert advice, or training support—and understood the importance of maintaining this level of specialist capability within Auckland. With BirdCare Aotearoa now the last remaining wildlife rehabilitation facility in the region, the group agreed there was a collective responsibility to help sustain an organisation that plays a critical role at the intersection of aviation operations, wildlife welfare, and regional biodiversity protection.

The partnership is underpinned by an established operational relationship. Staff from BirdCare Aotearoa have provided safe bird handling and euthanasia training to the AKL Wildlife Team, strengthening on-airport welfare standards and ensuring that birds encountered during airfield operations are managed ethically, safely, and in accordance with best practice. This two-way exchange of knowledge has improved both immediate response capability and longer-term rehabilitation outcomes.

Becoming a Platinum Sponsor was a deliberate decision to help sustain a regional capability that benefits both aviation safety and biodiversity conservation. Beyond clinical rehabilitation, BirdCare Aotearoa plays an important role in research, training, education, and advocacy, and works in alignment with tikanga-based approaches and mana whenua values across Tāmaki Makaurau. Supporting this work reflects an understanding that effective wildlife management extends beyond risk mitigation alone, encompassing stewardship, responsibility, and collaboration across the wider environmental system.

For the broader aviation community, this partnership highlights the value of proactive investment in specialist wildlife organisations that sit at the interface between operational reality and conservation outcomes. As pressures on rehabilitation services increase nationally, sustained partnerships such as this are becoming an increasingly important part of resilient, ethical wildlife management at airports.

4.3 Year 3 — High-Risk Species Focus and Adaptive Management

Black swan: expanded deterrent toolkit (vehicle, sound systems, gas cannons, lasers, Rofalcon) and summer moult cull planning.

Year 3 represented a critical consolidation phase for black swan management at AKL, bringing together expanded deterrent capability, workforce safety improvements, and the application of an adaptive, population-based management framework. A central commitment of the Enforceable Undertaking was to deliver tangible benefits to workers, including access to safer, more effective wildlife deterrent tools that reduced reliance on higher-risk methods such as firearms and pyrotechnics while maintaining strong bird-strike prevention outcomes.

Over the course of the programme, and particularly through 2024–2025, AKL significantly broadened its black swan deterrent toolkit. This included vehicle-based harassment, programmable sound systems, gas cannons, handheld and indoor laser units, and the trial of the Rofalcon remote-controlled bird-of-prey platform. Used collectively, these tools provided rangers with greater flexibility, reduced fatigue, and enabled proportionate responses to

changing conditions on the airfield. While deterrence delivered measurable reductions in general bird activity and short-term decreases in black swan crossings, Year 3 reinforced that local harassment alone could not counter sustained population growth across the wider Manukau Harbour.

Further options were explored to strengthen harbour-based deterrence, including investigation of a hovercraft platform capable of operating in shallow tidal areas. This concept was ultimately not progressed, prompting a deliberate shift toward embedding a long-term Adaptive Swan Management Plan.

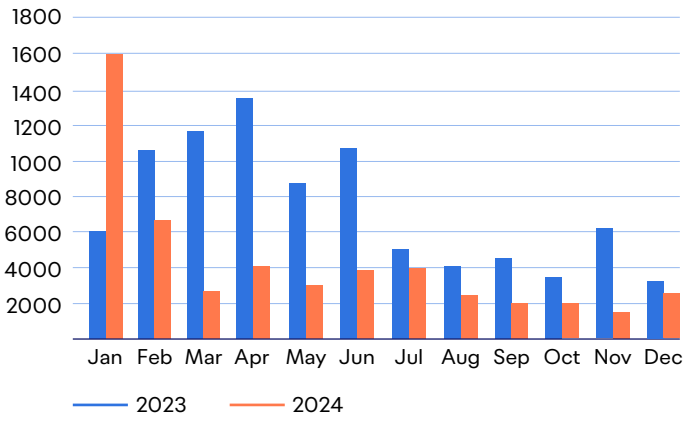
The adaptive framework establishes clear population-based thresholds that trigger escalating management responses. It integrates ongoing deterrence with population-level intervention when required and explicitly accounts for the annual return of migratory birds during the summer moult. This approach moved swan management from reactive decision-making toward a structured, evidence-led system that could respond consistently to changing risk profiles.

A two-day population removal operation was successfully undertaken in December. Delivery of the operation required close coordination between Kahu Helicopters, contracted boat operators, Airways, and AKL's internal project team. The work was undertaken in the complex and often hazardous environment of the Manukau Harbour, where rapidly moving tides and extensive sandbanks constrain vessel access and increase navigational risk.

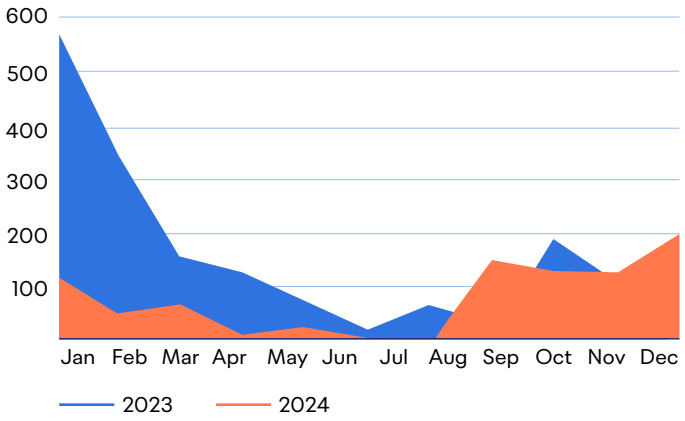
Ranger monitoring in the weeks following the operation observed an initial behavioural shift, with remaining swans keeping further from the airfield. As expected, this effect diminished as seasonal migrants continued to arrive for the summer moult, reinforcing the importance of viewing population management as an ongoing, adaptive process rather than a one-off intervention.

As the final black swan section of this programme, Year 3 marks a clear transition from development and trialling to embedded, long-term management. The combination of expanded deterrent tools, improved worker safety, incident-driven learning, and a mature adaptive framework now provides a robust foundation for managing black swan risk at AKL into the future. The lessons gained through this work—particularly around proportional response, operational readiness, and population dynamics—represent a significant and transferable contribution to aviation wildlife management practice.

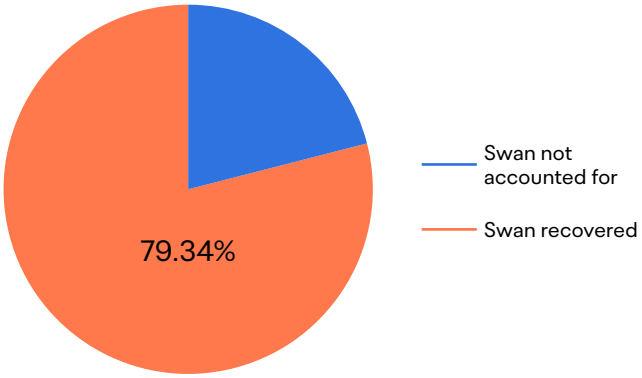
Birds observed on the airfield



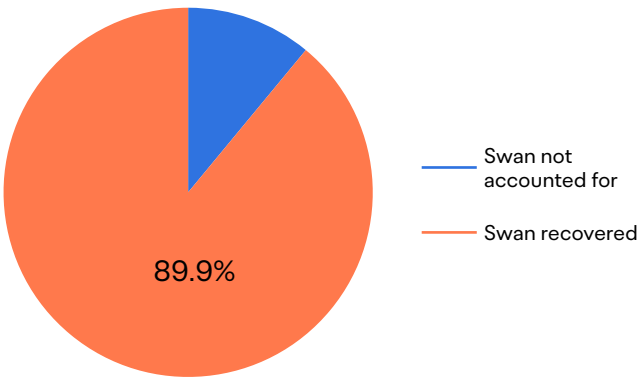
Black swan crossing airfield



Swan cull recovery comparison 2019



Swan cull recovery comparison 2025



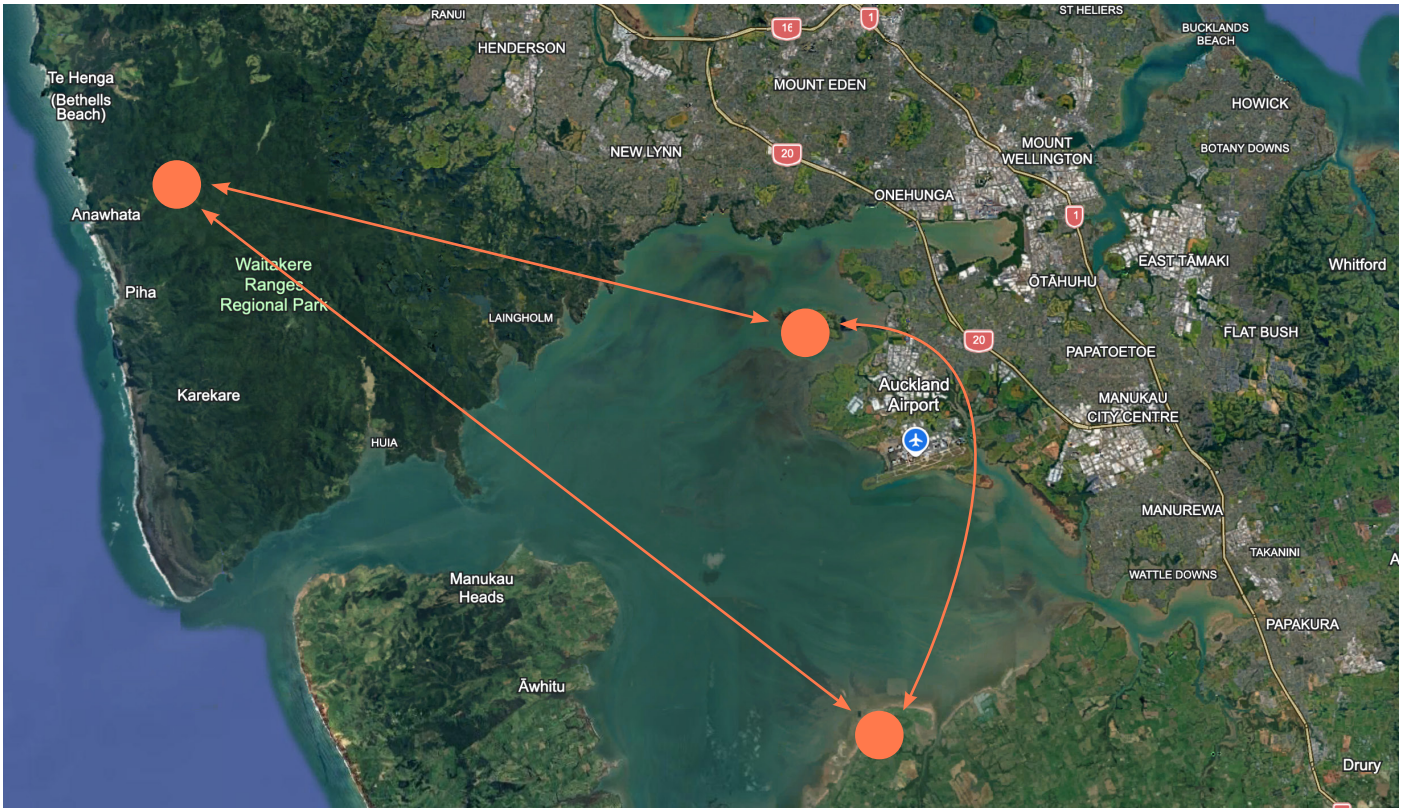
Canada geese: 15 GPS trackers across 3 sites for summer moult; 50/50 cost-share with Auckland Council.

In the final year of the Canada goose programme, AKL and Auckland Council jointly agreed to invest in GPS tracking to address the remaining information gap around goose movement and habitat use. Fifteen GPS units were procured, enabling the tagging of five geese at each of three key sites identified within 13 km of the airfield—an area recognised as having the greatest relevance to aviation safety.

To maintain continuity with existing datasets and maximise learning, a dual-supplier approach was adopted. AKL selected the same GPS model previously used in the black swan tracking programme, allowing direct comparison across species, while Auckland Council opted to trial a newer supplier. This approach was intentionally designed to assess data quality, usability, attachment performance, and long-term reliability across different technologies, supporting more informed decision-making for future tracking programmes.

Both tracker manufacturers were based overseas, and delivery delays meant the units did not arrive in time for deployment during the critical summer moult period. Rather than progressing prematurely, the additional lead-in time was used productively to strengthen operational readiness for the next moult season. This included testing the safety and effectiveness of gas-powered net-cannon systems outside of moult, refining capture logistics across multiple sites, and completing a detailed ethics and animal-welfare review to ensure full alignment with best-practice standards for humane wildlife handling.

This final phase of the programme reflects a deliberate shift from rapid intervention toward precision and preparedness. By prioritising robust data collection, safe capture methods, and welfare assurance, the Wildlife Working Group has positioned both AKL and Auckland Council to move into the next phase of Canada goose management with greater confidence, clarity, and coordination. For other airports, this work reinforces the value of investing time upfront to build a strong evidence base—ensuring that future management actions are targeted, defensible, and effective.



Proposed GPS collar deployment sites and flight corridors

Kohia Island resource consent pathway (SEA protected vegetation)

As habitat enhancement work progressed at Kohia Island, it became increasingly clear that the site sits within a Significant Ecological Area (SEA) Overlay under the Auckland Unitary Plan. This designation, introduced during the mid-2010s planning process, places additional controls on vegetation modification and earthworks, with even relatively small-scale activities requiring formal resource consent. With limited continuity from earlier planning discussions, the implications of this overlay had not been widely understood across current operational teams.

The confirmation of the SEA status marked an important transition point for the Kohia Island work. Activities undertaken by the Wildlife Team—such as targeted vegetation management, weed control, and grass removal to maintain and improve shorebird roosting habitat—now formally trigger the need for consent, reflecting the site's recognised ecological value. In response, all further work on the island was paused to ensure full regulatory compliance.

To support a robust and transparent pathway forward, AKL commissioned external ecological specialists to assess the proposed management actions and prepare the required technical assessments and supporting documentation. These materials have now been submitted to Auckland Council for review. Based on specialist advice and the nature of the proposed works, no significant issues are anticipated with continuing roost enhancement and ongoing maintenance, provided activities are undertaken within an agreed consent framework.

This process has reinforced an important learning from the Kohia Island programme: effective wildlife risk management must be underpinned by strong alignment with planning and ecological frameworks, particularly in sensitive environments. By pausing, reassessing, and progressing through the appropriate regulatory channels, AKL has ensured that future roost management at Kohia Island can continue in a way that supports both aviation safety and long-term ecological protection.

Additional Initiatives

Over the three-year period, the Wildlife Working Group also considered a number of potential initiatives that were ultimately not progressed. These were discussed through the group's collaborative forum and assessed against feasibility, resourcing, risk, and alignment with operational priorities at the time. Initiatives considered but not progressed included the proposed wildlife reporting application, along with other concepts raised by members during monthly meetings. While these initiatives did not proceed, the discussions informed the group's understanding of sector needs and helped refine focus on actions with the greatest practical and safety benefit.

Knowledge Sharing and Industry Impact

A central objective of the Wildlife Working Group was to ensure that knowledge generated through the Enforceable Undertaking delivered benefits beyond Auckland Airport. Rather than limiting outcomes to site-specific interventions, the programme focused on capturing transferable lessons, decision frameworks, and practical tools that could be applied across the aviation sector.

Key knowledge outcomes included:

- Development of a precinct-wide vegetation and landscaping guidance framework that reduces wildlife hazard risk while supporting environmental outcomes.
- Evidence demonstrating the effectiveness of targeted habitat manipulation over large-scale engineering for shorebird roost management.
- Improved understanding of how nutrient pathways and catchment scale pressures influence high-risk species such as black swans.
- Practical insights into the governance, welfare considerations, and limitations of shared digital wildlife tools.
- Lessons on adaptive population management, including thresholds, recovery performance, and operational readiness.

These findings were actively shared with industry through the New Zealand Aviation Wildlife Hazard Group (NZAWHG), Auckland Airport's Aviation Wildlife Safety Conference, direct peer to peer engagement with other airports, and presentations to national and international aviation safety forums. Several initiatives — including vegetation guidance and grass reseeding practices — have since informed similar approaches at other New Zealand airports.

By documenting not only outcomes but also decision pathways and lessons learned, the Wildlife Working Group has contributed to improved capability, consistency, and confidence in wildlife hazard management across the aviation sector.

5.0 Conclusion

Over the three-year period, the Enforceable Undertaking evolved from a regulatory obligation into a catalyst for meaningful, long-term change. What began as a requirement ultimately became a sector-leading programme that strengthened wildlife hazard management, improved worker safety, deepened ecological stewardship, and built enduring partnerships across agencies and disciplines.

Through the Wildlife Working Group, Auckland Airport moved beyond isolated interventions to deliver a coordinated portfolio of work grounded in evidence, collaboration, and practical outcomes. Projects spanning habitat enhancement, roost creation, population studies, deterrent innovation, telemetry development, and regional partnerships delivered tangible operational benefits. These included reduced airfield bird activity, improved shorebird roosting behaviour, greater resilience in stormwater and catchment management, and a far clearer understanding of how high-risk species move through the wider Manukau Harbour system.

Equally important were the people-centred outcomes. Investment in safer, more effective deterrent tools reduced reliance on higher-risk methods and delivered genuine benefits for Wildlife Rangers working in a demanding operational environment. The development of adaptive management frameworks for both black swans and Canada geese marked a shift toward decision-making based on population thresholds, seasonal risk, and real-world behaviour. The 2025 black swan removal operation demonstrated the airport's ability to manage high-risk wildlife events in a controlled, compliant, and environmentally responsible manner, while the Canada goose GPS tracking programme laid the foundation for more targeted, humane, and effective future management.

The programme also reinforced that aviation safety and environmental stewardship are not competing priorities. Initiatives such as the Vegetation and Landscape Management Guidance Document, the Coupled Wetland Biofilter, riparian and community planting programmes, and partnerships with organisations like BirdCare Aotearoa showed how thoughtful design and collaboration can reduce wildlife attractants, support biodiversity, and strengthen social licence at the same time. Sharing these learnings through the NZAWHG, Auckland Airport's Aviation Wildlife Safety Conference, and wider industry engagement has

helped build capability beyond AKL, contributing to a more consistent and informed national approach to wildlife risk.

At the same time, the work made clear that challenges such as black swan and Canada goose management cannot be solved through short-term or single-agency efforts. Sustained commitment, continued monitoring, shared data, and adaptive, cross-boundary management will remain essential well beyond the life of the Enforceable Undertaking.

Ultimately, this programme demonstrates what is possible when regulatory requirements are approached not as constraints, but as opportunities for learning, innovation, and partnership. The outcomes achieved over the past three years provide a strong foundation for ongoing wildlife hazard management at Auckland Airport and offer a practical, transferable model for other airports navigating the complex interface between aviation safety, environmental responsibility, and community expectation.

6.0 Dissemination and Industry Knowledge Transfer

In accordance with the obligations of the EU, Auckland Airport is required to publish the findings of the Wildlife Working Group in a free-to-access domain for any organisation or industry with similar risks to use without commercial gain. The purpose of disseminating this information is to share the Wildlife Working Group's learnings with the wider industry to promote improved wildlife management and safety outcomes.

Given the intended purpose, Auckland Airport will share the paper through the following channels:

- Public release on Auckland Airport and WorkSafe channels (per EU commitment).
- Industry presentations to NZAA, NZAWHG, WBA, and ACI communities/conferences.

Optional peer/technical submission (e.g., Wildlife Society Bulletin case study).

7.0 Ethical and Regulatory Considerations

Health and Safety

Health and Safety at Work Act 2015
Dangerous Goods Act 1974
Health & Safety at Work (Hazardous Substances) Regulations 2017
Hazardous Substances and New Organisms Act 1996

Animal Welfare/Biosecurity

Dog Control Act 1996
National Policy Direction for Pest Management
Biosecurity Act 1993
Regional Pest Management Plan 2020 – 2030, Auckland Council
Wild Animal Control Act 1977
The Animal Welfare Act 1999

Firearms

Worksafe Safe Use of Firearms for Bird Scaring June 2021
NZ Arms Act NZQA Level 5 Course
The Arms Regulation Act 1992

8.0 Acknowledgements

Auckland Airport Wildlife Rangers, Operations Team, Legal Team, HSW Team; WWG members and partners; NZAWHG; PDP; Forest & Bird, BirdCare Aotearoa; Auckland Council; Watercare; Fish & Game; local iwi; WorkSafe NZ.

References (Selected)

NZ CAA AC139-16 (Wildlife Hazard Management at Aerodromes);
Civil Aviation Rule Part 139;
ICAO Doc 9137, Part 3;
ACI Wildlife Hazard Management Handbook (2013);
NZAWHG resources;
Auckland Airport's Wildlife Hazard Management Plan
NZ CAA Vector article;
Skybrary Large Flocking Birds;
FAA Wildlife Hazard Mitigation;
PDP project note;
WorkSafe NZ Enforceable Undertakings overview.